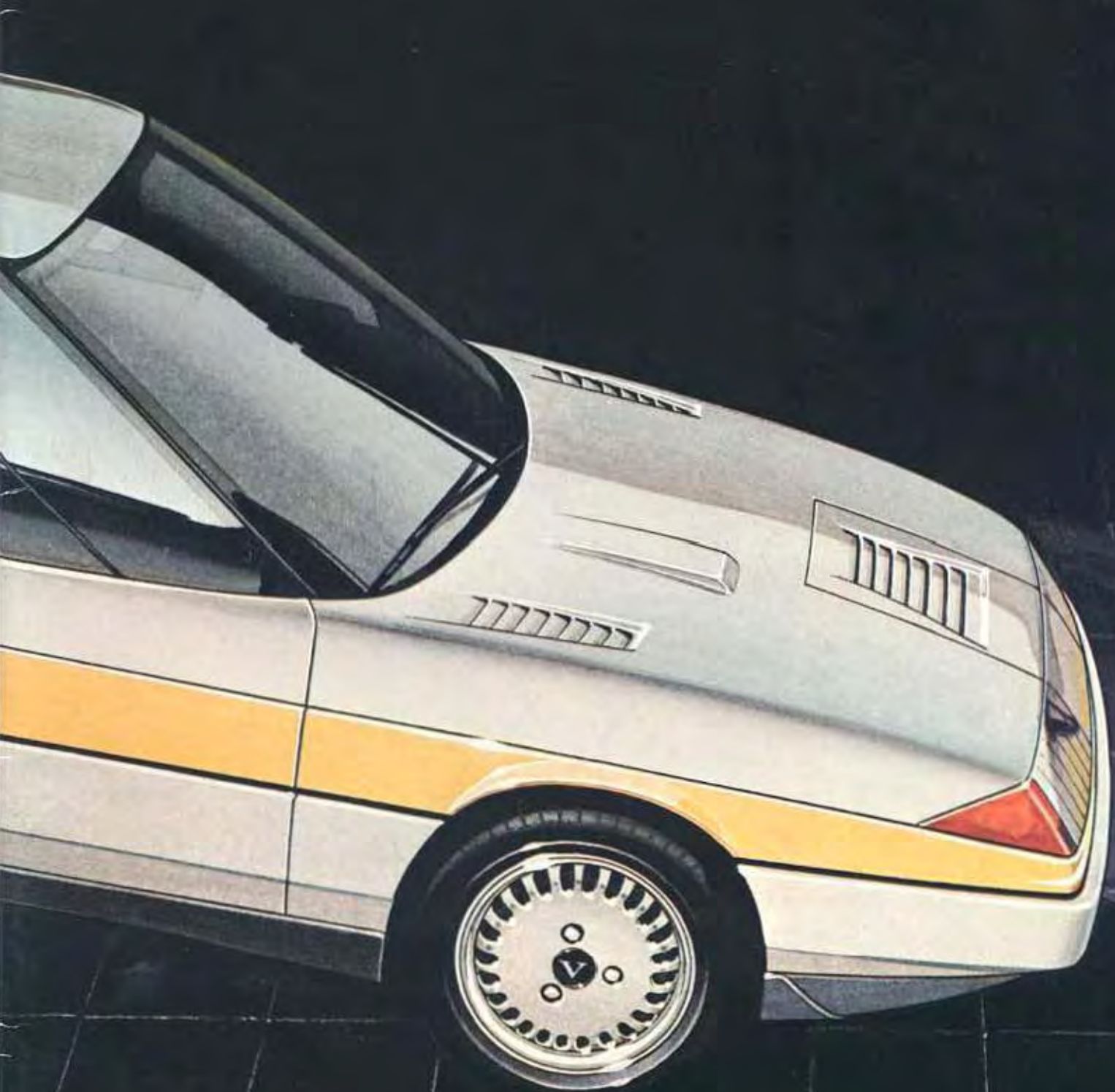
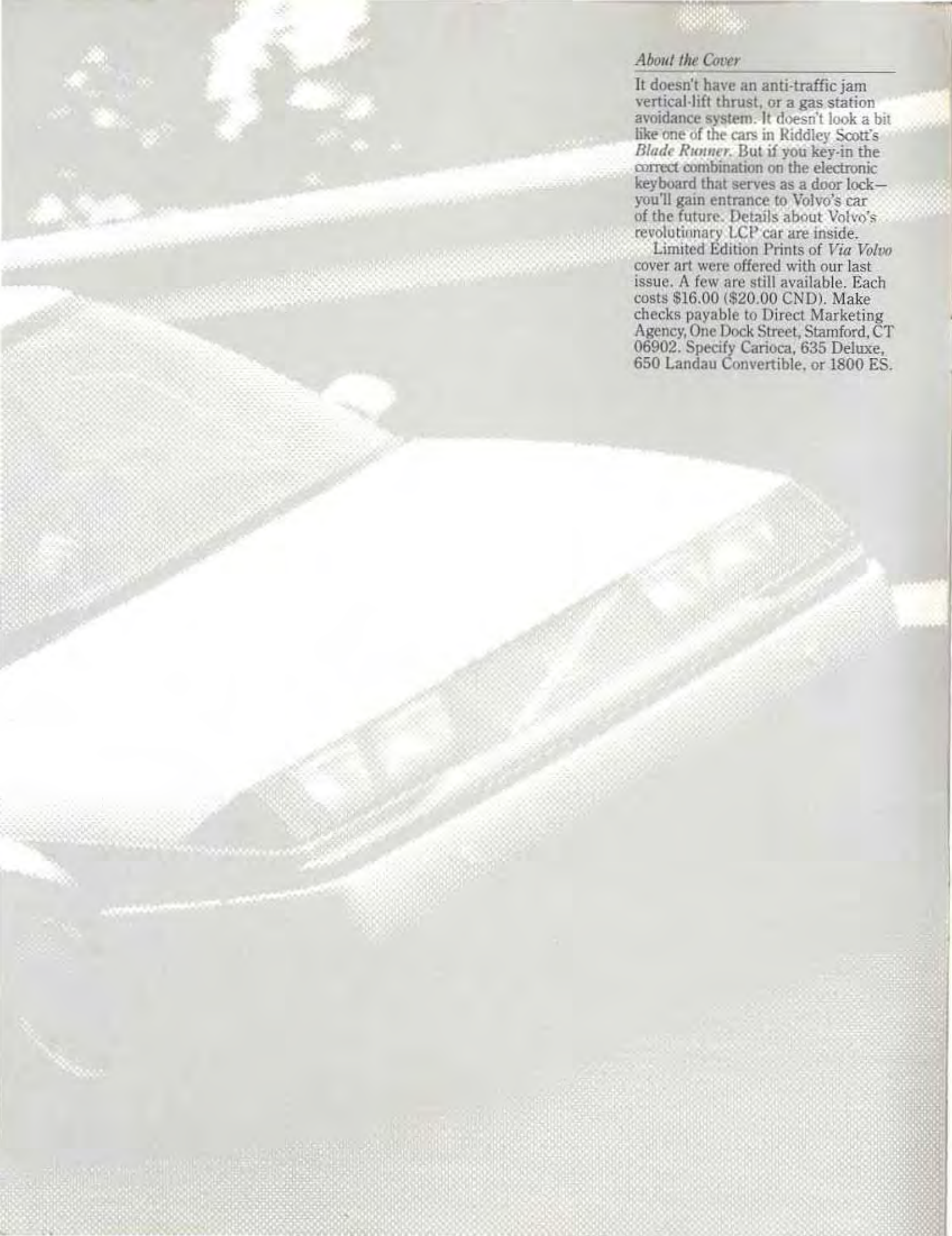


VIA VOLVO



Winter 1984

III. STEHRENBERGER '84



About the Cover

It doesn't have an anti-traffic jam vertical-lift thrust, or a gas station avoidance system. It doesn't look a bit like one of the cars in Riddley Scott's *Blade Runner*. But if you key-in the correct combination on the electronic keyboard that serves as a door lock—you'll gain entrance to Volvo's car of the future. Details about Volvo's revolutionary LCP car are inside.

Limited Edition Prints of *Via Volvo* cover art were offered with our last issue. A few are still available. Each costs \$16.00 (\$20.00 CND). Make checks payable to Direct Marketing Agency, One Dock Street, Stamford, CT 06902. Specify Carioca, 635 Deluxe, 650 Landau Convertible, or 1800 ES.

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Thinking

MEN & WOMEN In Their Clubs are Saying...

by Warren Weith

The majority of people in North America who own automobiles would never join a one-make car club.

The reason for this is not difficult to understand. Most people in this country drive dull cars. In fact, most people think of their cars as appliances. And who ever heard of joining a dishwasher owner's club?

But for people who drive interesting vehicles and who have a long-standing attachment to one particular brand of same, there are the one-make car clubs. It must be understood, though, that these clubs are not for every owner of an unusual car. They are for the owner who pours his pre-priandial libation from a decanter shaped to simulate the grille of his car; or who, before shipping off to the land of nod, dons a pair of jammies with a similarly suitably designed patch on the pocket. In other words, the person whose automobile is more to him or her than just a device for conveyance from Point A to Point B.

To this type of person, membership in a one-make club is not a descent into a maelstrom of mono-mania, but an ascent to a plateau of sanity. And there is a club to suit just about any vehicle, and owner, to be found on the roads of America. The leading authority on automotive hobbies, Beverly Rea Kimes, seems to think that they number in the hundreds, running the full gamut from "A" for Abarth (a now defunct Italian sports car) to possibly "Z" for Zipp Cycle Car (an American effort of the early teens).

The reasons behind the founding of all these clubs are as varied as the organizations themselves: reasons as simple as two friends talking over a mutual interest in one particular make of automobile, to the more complex emotions of a group of people angry at a manufacturer for discontinuing

production of a much-loved automobile.

What do the relevant car companies think about one-make car clubs? To the clubs involved with vehicles long out of production, and long removed from the sales race; they adopt a whimsical, if not a benign, attitude. With clubs that concern themselves with cars that companies would like to forget — Edsels and Corvairs come to mind — there is often a certain coldness in corporate attitude.

However, a company can act like a doting parent towards clubs whose main reason for being is the deification of a current sales leader. Corvette and Mustang owner's clubs fall into this rather comfortable category.



What makes a particular car model of sufficient interest to impell people to form clubs in its honor? In the case of the Model T, Model A and VW Bug; sheer weight of numbers produced over the years would seem to be the big reason for the number of clubs active today. At the Rolls-Royce, Bugatti, Dusenbergs end of the scale, exclusivity would seem to be the important factor. Performance, with more than a nod toward vintage sports car racing, accounts for the popularity of the MG, Jaguar, Austin Healey and Triumph TR clubs. Just what do one-make-car-club members do when they get together? Well, aside from talking about their favorite make of automobile, and it is amazing how fine a narrow subject can be sifted; there are traditional club events. Easy to enter, but tough to win, is the shine and show of these events. Favored by clubs centered around the big-bucks luxury cars, this event naturally basks in the upscale designation of Concours d'Elégance.

Serious contestants go to unbelievable lengths, down to using tooth brushes and baby swabs to clean the less accessible portions of their entries.

White gloved judges go to the same lengths to insure that first prize is not so easily managed. For the more sporting automobile and club member/owner there are gymkhanas and rallies. The first is rather like a slalom event but run on flat, dry pavement (usually an empty parking lot), and in a car rather than on skis. A rally, on the other hand, is a test of precision navigation. Run on public roads, at very legal speeds, winning depends on split second accuracy, the ability to follow printed instructions, and a super accurate speedometer. Not to mention a navigator who cannot only navigate but also keep a driver from making stupid mistakes. Needless to

say, a husband and wife team is not always a winning combination (whoever makes the first mistake is not likely to ever hear the end of it).

Don't be put off by the above rather limited descriptions. Both events can be a surprisingly interesting way to spend a day...or a weekend. At the very least, they are esoteric leisure-time activities.

There are still other benefits from membership in a one-make car club. Some are not immediately apparent. For example: a friend of mine, an executive whose firm seemed to move him and his family from one part of the country to another every two years, found membership in a one-make car club a perfect way to meet people in each new neighborhood. It was a case of his aging P 1800 proving to be not only a dependable station car but an unusual "Welcome Wagon" as well. An end result that neither the club organizers nor the car makers had in mind when they set about doing their thing.

At the present writing, there are only a handful of Volvo-oriented clubs in contact with Volvo. The surprise here is not that there are so few Volvo clubs but the fact that there are any at all.

The generic Volvo, when first considered, does not seem to have the automotive persona that would impell people to ban together in club-like groups to sing its praises. They aren't the most expensive cars in the world.

Nor are they the fastest. Neither can one say they are the oddest-looking automobiles one has ever seen. And no one can say they have been stamped out by the millions over the years. Yet, they are not middle-of-the-road cars. Each model being very much a Volvo, and nothing else but. Of all the cars celebrated by a one-make club, Volvo must be the only one that merits this accolade simply because it's user-friendly. And if you attend a Volvo owner's club meeting, you'll find that its users are friendly, too. There's more to club membership than just meeting friendly people, though. For one thing, you'll learn more about your particular Volvo than you have up till now. Possibly more than you really care to know and, because none of the Volvo clubs have any official connection with the company, possibly more information than Volvo of America Corporation or Volvo Canada Ltd. has the time or patience to distribute. Whether your Volvo is a pampered pet or a much abused old family container, there'll be something to gain from membership in an owner's club.

The various clubs, unlike most of the other one-make organizations, seem to cater to a broad spectrum of owners—from the Volvo maniac to the people who bought one because they liked the color. The following is a list of the various Volvo clubs that have made themselves known to the corpora-

tion. If you know of others, drop us a line so that we can print an updated list in our next issue.*

The Volvo Club of America
P.O. Box 710
Durham, NH 03824
Att: Fran Stewart, Membership

Volvo Sports America/1800 Register
1203 West Cheltenham Avenue
Melrose Park, PA 19126

Washington Volvo Club, Inc.
8608 Saffron Drive
Lanham, MD 20706
Att: Harold Stumph, Membership

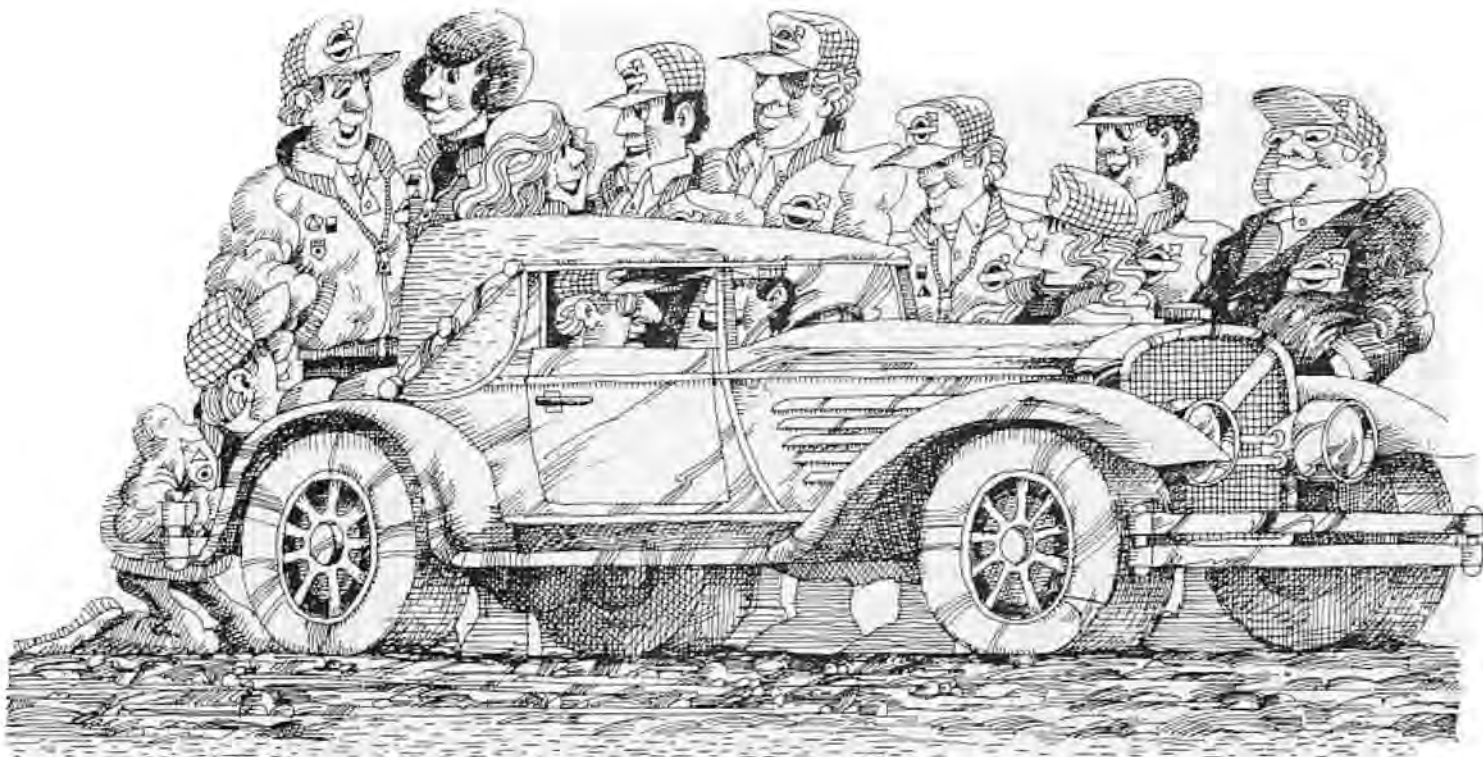
Hudson Valley Volvo Club
P.O. Box 328
Pleasant Valley, NY 12569
Att: Elaine Longsderff

For a list of other one-make clubs, send a self-addressed, stamped envelope to VIA VOLVO.

Why not try a Volvo car club? At the very least it will get you out of the house one night a month, and odds on it will be in a recently washed and polished Volvo. After all you'll be right there listening to what thinking men and women in their clubs are saying! ■

Warren Weith is a contributing editor of *Car and Driver* magazine and the co-author of *The Last American Convertible*. He writes frequently for *Via Volvo*.

*As previously mentioned the clubs are not sponsored by Volvo. We list them merely for your convenience.



INTRODUCING THE VOLVO 740 MODELS



Several seasons back, Volvo surprised those who had come to expect, each year, yet another edition of the traditional 240 line, and introduced the first of the new 700s—the 760 GLE. Styled in a distinctively different manner, with an interior dressed to the nines, offering remarkable handling and performance, the 760 was truly in a class by itself.



But not for long. Seeking to offer the particular pleasures of the 700s to a larger market of car buyers, Volvo has this year introduced the 740 series: three models, each featuring the principal stylistic and automotive elements of the 760s but on a more accessible financial scale.

Consider the 740 GLE: the low inertia mass and the improved balance of the new B230F four-cylinder engine help make it one of the quietest and most efficient four-cylinder engines Volvo has ever offered. Contemporary in appearance, yet classic, the 740 GLE's appointments make it an elegant, upscale alternative. The interior, moreover, is plushly fitted with luxurious upholstery; power windows; a manually-operated sunroof; dual manually-controlled outside mirrors;

a heated driver's seat; rear center armrest (richly endowed with storage space); and, to insure that it will always be as climatically correct as it is chic, air conditioning.*

The Mr. Hyde of the threesome is none other than the 740 Turbo—a Volvo that might conceivably pass muster on a drag strip (albeit a particularly fancy one). Featuring the same




B230FT intercooled, turbocharged engine found on the 760; the 740 has a sporty look, encircled by matte black trim, and painted, 10-spoke alloy wheels. Its special pin-stripe velour upholstery adds a dash of sportiness to the package, and, with such standard assists as a turbo boost gauge, voltmeter, and front and rear fog lights*, the 740 Turbo appeals to the outlaw lurking in us all.

Last but *not* least, the new 740 GLE Turbo Diesel: an excellent choice for drivers looking for a well-designed, finely-constructed automobile with the pragmatic benefits of a smooth, six-cylinder turbocharged diesel engine.

Equally pleasing is the fact that our new 740s share the extraordinary level of engineering that distinguishes the 760 series. The performance, handling, dynamic and crash safety, unique suspension and comfort features which proved so impressive in the 760s have been carried over intact to the 740 line — providing the same thrill that, in four short years, has

remade many people's concept of a quality driving experience.

If all this seems an awful lot to offer in a supposedly economized series of autos, consider that paring down is a process that pertains to adornment rather than muscle. Close your eyes (though not when you're driving), and the 740s manifest all the significant aspects of their elders. Open them — and they still look great. 

*Air conditioning is not standard on the Canadian 740.
†Subject to state and local laws.



Volvo is currently conducting a 24-Hour Test Drive program for the curious. If you're wondering about a state-of-the-art Volvo — stop in to see one of our participating dealers for details.



A REVOLUTIONARY VOLVO—CIRCA 2000

THE LCP CAR

BY MIKE KNEPPER





Experimental cars aren't just flights of fantasy stylists and engineers take from time to time to keep the creative edges sharp. And they aren't just futuristic razzle-dazzle the marketing department wants for the auto show circuit. Experimental cars are why-not-try-it ideas come to life in kick-the-tires, slam-the-doors reality. They're rolling test beds for many of the imaginative bits and pieces that become standard features on cars a few years later. Some fantasy, yes. A bit of the old razzle-dazzle, of course. But experimental cars are a serious part of the automobile business, and no experimental, future-think car is a better example of all this than Volvo's LCP 2000.

With gasoline at a price much lower than the experts were predicting possible a few years ago, with the price of crude oil going down, and with serious talk of OPEC disintegrating as an organization; energy conservation, once the nation's second favorite pastime, is about as popular today as mah-jongg. But although we may be up to our necks in (relatively) cheap oil these days, the bottom line has not changed: we have to learn to do more with less. And car companies, if they are to stay in business when the next crunch comes, will have to have "more with less" products. In 1979 Volvo assembled a team of engineers and designers under the direction of Rolfe Melde. They were charged with creating a vehicle that to the best of their collective thinking would represent the design, the construction techniques, the performance and energy efficiency that would be necessary in a vehicle in the year 2000. The program was called the Light Component Project and the car they would create: the LCP 2000.

First, some general guidelines were established. Nowadays we often pay a penalty in original cost and in operating expenses in order to drive a much bigger car than we really need because occasionally we need to carry four or five passengers and/or a lot of cargo. The LCP group determined that in the future, primarily for cost considerations, owners will tend to have vehicles more specifically suited to their transportation needs. Therefore, it was agreed the LCP 2000 would be a small, sporty two-seater with a generous luggage space that could be easily converted to accommodate one or two "occasional" passengers. The car would weigh no more than 700 kilograms (1540 pounds) and would have a coefficient of drag—the measure of its aerodynamic efficiency—of less than 0.30, better than the best even

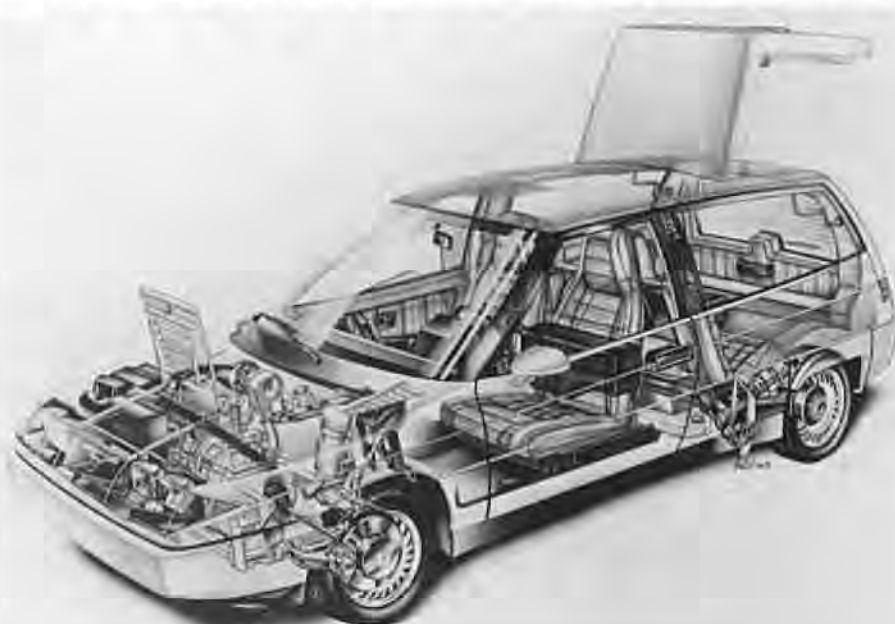
today, six years later. Fuel consumption was the big bogey and it was agreed it had to be kept above 55 miles per gallon. But performance wasn't to be sacrificed in the interest of economy. The team would shoot for 0-60 mph times of under 13 seconds.

The vehicle would have to meet all the required safety and emission regulations in effect at its projected debut in 1983; it could not be so exotic it couldn't be mass produced; and the car would be designed and built with considerations for the energy required for construction and for the easy recyclability of the materials used.

The LCP 2000 was on the road four years later, and the results of the team's efforts have far exceeded expectations.

To maximize fuel economy, the LCP 2000 is much smaller than current Volvos, so front-wheel drive is used because it is very space efficient in small packages. Hundreds of hours in the wind tunnel resulted in an aerodynamic shape that in profile is somewhere between a hatchback and a station wagon. The nose is sloping and low, all the edges rounded and flowing. The result: a coefficient of drag of 0.28.

The front wheels are driven by a turbocharged, intercooled 1.4 liter three-cylinder diesel engine that produces 88 horsepower, and can move the 1555-pound car (it came in just 15 pounds over the target weight) from 0-60 in less than 11 seconds. Top speed is more than 110 mph. The engine is mounted transversely and drives through a five-speed manual transmission, although a continuously variable transmission (CVT) is under development. Real-world fuel consumption averages 65 mpg. The engine has multi-fuel capability and can be run on



non-petroleum fuels such as sunflower oil or rape seed oil, instead of diesel fuel. (Take that, OPEC.)

The engine, transmission, front suspension and steering are mounted onto a magnesium sub-frame; the rear suspension, which uses magnesium trailing arms, onto another. The sub-frames are bolted onto an all-aluminum, platform-type chassis. The light alloys used in the LCP 2000 required less energy than steel and cast iron to shape, heat treat, cast, weld and, ultimately, to recycle. Adhesive bonding, for example, meant the number of spot welds was reduced from 4000 to 500. The use of aluminum in the chassis saved 253 pounds, and the 6000-series aluminum alloys used provide excellent strength and corrosion resistance.

Hydragas spring/shock units (a canister containing hydraulic fluid and compressed gas) control each wheel. Because of the vehicle's low weight, no power assist is needed for the rack and pinion steering, and front disc/rear drum brakes provide more than sufficient stopping power.

An important aspect of the LCP study was developing the use of materials not currently used in the manufacture of automobiles: materials that in the future will be used if suitable production technology is also developed. The LCP 2000 has shown how successfully magnesium, aluminum, carbon fiber, polycarbonate and other types of plastics can be used. (Lightweight materials are more expensive than conventional materials. The LCP team decided a material wouldn't be used in a particular instance if the efficiency from lighter weight didn't make up for the increased cost in three years.)

Magnesium is about half again as light as aluminum, and 110 pounds of it were used for components such as the clutch and gearbox housing, wheels, subframes, steering housing and rear trailing arms. Conventional materials would have weighed almost 440 pounds more. (The relatively high cost of magnesium may be coming down, by the way, due to new techniques for "mining" it from sea water that yield up to three pounds from one cubic yard of water.)

Aluminum alloys were used extensively in the LCP 2000's brake system. Although aluminum master cylinders and brake calipers are not revolutionary, aluminum brake discs certainly are. The aluminum front discs—and aluminum rear drums—have plasma-sprayed iron facings; this design provides the light weight of aluminum and the durability of iron.

Plastics play an important part

in the LCP 2000's low weight. The roof, hood and all exterior body panels are made of compression molded, fiber-glass reinforced plastic. The windshield, side windows and bumpers are of polycarbonate, a very hard clear plastic with excellent impact and scratch-resistance characteristics. The accelerator pedal, brake pedal, clutch pedal and support assembly are made



of fiber reinforced nylon. Carbon fiber has been used to make graceful and extremely light door glass frames. In fact, although cast iron and steel were used for driveshafts, gears and other highly stressed components, only about 320 pounds of the car's total weight is from such conventional automotive materials.

To maximize energy and production time efficiency there was also a concerted effort to get away from conventional automotive production techniques. The front and rear sub-assemblies can be built up separately from the main assembly line and installed in the chassis very quickly. Since the roof is separate from the upper body, it's attached later so technicians can install wiring, carpets, instruments and upholstery without wasting time crawling in and out of doors.

An analysis of the overall energy consumption of the LCP 2000—including conversion of raw materials, lifetime energy consumption, and recycling—indicates that during its lifetime the vehicle should consume only 60 percent of the energy used by a conventional car of the same size built with conventional materials and produced by conventional methods.

But what good is a wonderfully unconventional energy saving automobile if it's so unconventional it's

impractical? Not much. So underlying all the future-think that went into the LCP 2000 was the understanding that it must ultimately be as practical as it is innovative. It is.

The front bucket seats are wide, comfortable and adjustable by means of gas springs. The easy-to-read liquid crystal instruments are housed in a triangular-shaped pod that

moves up and down with the adjustable steering wheel. The center console contains the shift lever as well as heating and ventilation controls. The interior is comfortable and familiar despite the car's Twenty First Century theme. The thirty-five cubic feet of cargo space that is tucked in behind the rear seats can quickly be converted into rear-facing seating for one or two passengers who enter through the top-hinged rear tailgate.

Despite its practicality and efficiency, Volvo doesn't consider the LCP 2000 a running prototype for future vehicles. Rather, it is a real world test bed, a collection of ideas and philosophies in plastic and metal, many of which will undoubtedly find their way into production. That was the case with the Volvo Experimental Safety Car (VESC) of the early seventies that proved the practicality of such concepts as the sloped aerodynamic nose now part of every Volvo's design, the fixed rear head restraints and automatic-leveling rear suspension of the Volvo 760s, the engine mounting technique now used on all Volvos that is designed to force the engine down and under the passenger compartment in a head-on collision and more.

From today's planning, and a little dreaming, come the very real cars of tomorrow. ■



by Mike Knepper

We all get attached to things, right? I don't mean spouses, kids, dogs, things like that. I mean inanimate objects, stuff we like so much we just can't bear to throw it out even though it's worn through in spots, or doesn't work quite right, or is so far out of style it's about to make a comeback. It's comfortable; we know its quirks. We like it.

Maybe that goes for that faithful old Volvo in the driveway. All good things must come to an end, and the end may be in sight for old Lars, or Sten or whatever name he acquired over the years. But maybe not. The last thing we want to do is talk you out of buying a new Volvo, but there's this mechanical fountain of youth in Belvidere, New Jersey called Automotive Import Recycling, or simply A.I.R.,

that's in the business of taking faithful but worn out old Volvos, stripping them down to their Scandinavian skivvies and then rebuilding them from the inside out. Remanufacturing, owners Dave Leggett and Peter Fuller call it, and the end result is a Volvo that isn't officially "as good as new," but it's mighty close. (They also remanufacture BMWs, but that's another story. For another magazine.)

The idea sprang from Leggett's admiration for Volvos (and BMWs), and his belief there were plenty of people out there equally as enthusiastic about the cars who would eagerly pay for a "like new" 122S or 164 or whatever. Fuller heard Leggett's story, decided to invest in the scheme and six years ago A.I.R. was born.

"The original idea," Leggett explains, "was to buy up inexpensive 'core cars,' remanufacture them and sell them. We started with 10 cars. When two were completed we ran a two-inch by three-inch ad in the *Allentown Morning Call* saying we had remanufactured cars to sell so come on out and look them over."

The two completed cars were sold, as were the eight in preparation, and a couple of months worth of orders were taken. But then owners began bringing in their own cars for the treatment, and the thrust started to turn from remanufacturing for resale to remanufacturing for owners, which is now 75 percent of A.I.R.'s business. The partners employ 43 people and will gross about \$1.3 million this year.

Bring old Lars into the A.I.R. shop and the first order of business is a thorough inspection and road test. If the car is, alas, beyond the most capable ministrations, you are sent away to make plans for final disposition. (A burial at sea on a burning Viking ship is most appropriate.) If the car qualifies for remanufacture, a Car Book is opened in which all pertinent information will be recorded. The project will end about six weeks and an average of \$6,000 to \$10,000 later, depending on the model, condition, and the usual etceteras.

The car is assigned its own Job Foreman and disassembly begins. And I mean disassembly. Bit by bit and piece by piece. Each bit and every piece goes into a carefully marked plastic bag which goes into a wooden container on wheels called, logically enough, a car box. When the car is down to a stripped chassis on wheels with only the dashboard and wiring harness attached, reassembly—make that remanufacturing—begins.

All of the original car that can be saved is saved, repaired and reinstalled.

Parts beyond saving are replaced from extensive stocks of original equipment manufacture (OEM) parts. The frame is sandblasted. Body parts are repaired or replaced and there's a fully equipped metal shop available to build from scratch when necessary. Engines are torn down and rebuilt as needed, with a typical Volvo engine getting a new cam, lifters, pushrods, timing gears, pistons, rings, bearings, wristpins, valve guides, exhaust valves, distributor-drive bushings, clutch disc, pressure plate, and throw-out bearings. The suspension system is refitted, bushings replaced, brake system refurbished, transmission put right and on and on, including the interior. The Parts Prep Department takes care of all the little bits and pieces like door handles, wiper and heater motors, bits of trim. There's a complete rustproofing and, of course, the project is completed with an acrylic paint job. And it's all covered by a 12 month/12 thousand mile warranty.

And then, time warp time. You pick up your rejuvenated friend, and suddenly it's 1968 when that 145 was new, Reagan was governor of California, little cartoon Beatles were cavorting in their Yellow Submarine, protesting students were turning college campuses into chaos, and you were much, much younger. Too bad there isn't an A.I.R. for worn but usable owners.

Why spend several thousand dollars to refurbish an old Volvo? We know they were—are—great cars, but so are

Do you remember World War II-era cars with pointy noses and trunks that sort of wedged backward so that you had to check for the steering wheel to be sure which was the front end?...

Well, in the early to mid-'60s, that's what the Volvo people thought automobiles should look like...

Why, you ask, stifling a yawn, would I buy a 1966 Volvo? My wife asked that, too. It's hard to explain all in one breath, but of course I was quick to mention that in Sweden, where harsh winters chew up the roads, Volvos last an average of 12 years. (It's officially 20.7 years now.)

"So you've got a car that's been dead for six years. Wonderful."

When the deal was sealed and the original owners handed over the keys, they said two things that made me feel very good about the car.

"Love her."

"Her name is Chloe."

From a *Palau Beach Post* article by Ron Wiggins.

the new ones and for not a whole lot more money than remanufacturing costs. And 140-series sedans aren't exactly hot numbers in the collector field, so it can't be as a speculative investment.

The reason, Leggett says, is no mystery.

"The things that convinced them (owners) to buy the car in the first place are the same reasons they want to have it remanufactured," he says. "They like the simplicity of the cars [A.I.R. deals almost exclusively with '67 to '77 Volvos], and they like the ride, the handling and the safety. Probably 40 percent of our customers or a member of the family has had a major accident in a Volvo, and survived, and they simply won't drive anything else."

"We also have customers who are concerned with using the raw materials necessary to build another car when they already have one."

"And then there's the emotional tie. People tend to love their Volvos."

As for having a car fixed up to sell at a profit, no way. If Leggett knows that's the motive he won't take the case.

The most popular Volvo for remanufacturing, by far, is the 145 station wagon.

"Pound for pound and dollar for dollar, nobody has ever built a better station wagon," Leggett says. "It's truly an economical car in total cost to the owner."

After the 145 wagon, in order of popularity, come the 164 sedan and the 1800S and ES sports cars. The complete remanufacture of an 1800, by the way, can be as much as \$15,000.

So if the thought of parting with your old Volvo is simply more than you can stand, get in touch with A.I.R., and then get ready to experience the magic of mechanical rebirth. There's a lot of value left in that old car, and Dave Leggett and Peter Fuller and their band of craftsmen know how to make the most of it.

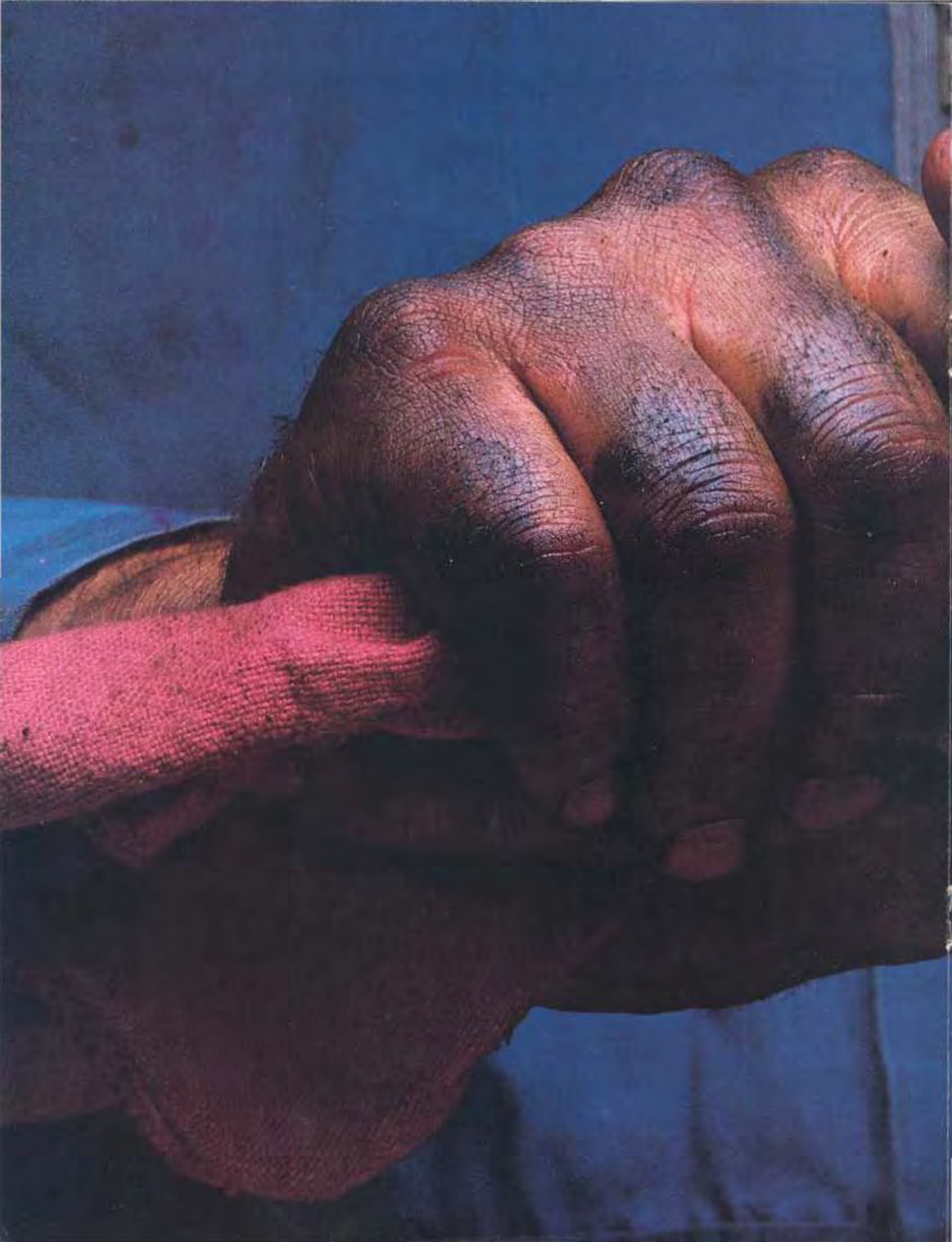
Additional reading:

Classic Motorbooks is a catalog that claims to offer "the world's largest selection of automotive literature." Their 1985 edition lists four pages of books on restoration, body repair and painting. Write to Classic Motorbooks, P.O. Box One, Osceola, WI, 54020.

Car Books, Catalog 842, carries a wide range of marque books including repair manuals for Volvos all the way back to the 1956 Volvo 444. Car Books, Inc., 181 Glen Avenue, Sea Cliff, NY, 11579.

Volvo stocks a large inventory of parts for older models including sheet metal, tune-up and suspension parts for 444s. ■

Mike Knepper is the former executive editor of *Car and Driver* magazine.





MOTOR OIL

On April 17, 1984, the Federal Trade Commission announced that a Chicago-based oil-products company would "no longer misrepresent its motor oils and transmission fluids under a recent FTC consent agreement."

Even on a slow news day, an FTC

MOTOR OIL

When oil is exposed to high engine temperatures, high pumping velocities, and corrosives from combustion gasses, it begins to deteriorate in regard to its protective abilities. Therefore, it is important not to exceed the recommended drain interval for your engine oil.

measure of an oil's resistance to flow. This resistance to flow is necessary to keep oil from being squeezed out under extreme pressure from between sliding engine surfaces. As far back as 1911, the SAE had developed a standard viscosity rating. Although modified and updated through the years, it is still used world-wide and typically has the prefix "SAE" followed by a number such as 10, 20, 30, 40, or 50. Thin (low-viscosity) oils have lower numbers such as 10 and 20; thicker oils are designated 30, 40 and 50. Viscosity tends to decrease at higher temperatures, so lower-viscosity oils are usually suitable only for cold climates. Most modern engines require viscosities of 20, 30, or 40.

The viscosity grading of some oils include the designation "W" (for winter), such as SAE 10W. Such oils have been tested at freezing and subfreezing conditions and have been found suitable to meet the appropriate viscosity criteria at those temperatures. Therefore, an oil which is labelled SAE 20 may not be the same as an oil labelled SAE 20W.

Chemical engineers have also developed additives known as "viscosity improvers" which help to widen the safe

viscosity temperature range of lubricating oils. Oils containing these additives are called "multi-viscosity oils" and are designated with two viscosity grades; as in SAE 10W-30. This designation means that the oil's viscosity is capable of meeting a 10W grade at low temperatures and a 30 grade at higher temperatures. Because these oils are safe to use through wider temperature ranges, they can be used year-round in most locations. Consequently, they are currently the most widely used oils.

The *API engine service classification* (sometimes incorrectly referred to as the "oil quality rating") is the most ignored and least understood of all the oil ratings.

Engine operating conditions and environment significantly affect the life expectancy of motor oils. Accordingly, manufacturers introduced an oil rating based on engine operating conditions. The API service rating typically begins with the letter "S" or "C" followed by another letter from the beginning of the alphabet. Oils designated by "S" are usually intended for gasoline-engine service (think of "S" as standing for spark ignition). Oils with a "C" designation are intended for diesel or turbo diesel engines (think of "C" as standing for compression ignition). Some oils can meet the API service rating for both categories and therefore have two designations, such as SF/CC or SF/CD.

It is important to make sure that the oil you use includes the rating specified for your engine. For engines built in the 1980s look for an "SF" designation for gasoline engines, a "CC" or "CD" designation for diesel or turbo-diesel engines.

Failure to use an oil with the correct API service rating can result in premature breakdown of the oil. This is characterized by oil sludging, varnish build-up, harmful deposits, oil thickening, or an increase in corrosiveness.

The most common misrepresentation of oil seems to occur in regard to the API service rating.

The third most important piece of information on an oil can sounds more like a sales hype than a rating: the oil's *energy efficiency statement*. Labels that include the words "energy efficiency," "energy conserving," "saves

press release gathers more yawns than press coverage. But this particular release brought to light a serious problem.

Some nine months prior to the FTC inquiry, a Domestic car manufacturer tested 200 brands of motor oil. Out of a hundred samples of "10W-40" motor oil, only about half met the standards specified on their labels.

At the moment, there is no government regulation or supervision of the motor oil industry. Organizations such as the Society of Automotive Engineers (SAE) and American Petroleum Institute (API) only have the power to develop and write motor oil standards. Oil companies are expected to comply voluntarily.

Proper motor oil testing costs approximately \$20,000 per test and there are only a handful of labs in the country which can effectively carry out the complicated testing procedures necessary to approve a motor oil. Perhaps that's why some manufacturers try to abbreviate testing procedures.

At the moment most consumers appear to be unaware of the problem. Most of us look for one piece of technical information, such as viscosity; seek the best price and reconcile ourselves to the belief that as long as it's slippery, one oil is just as good as the next. Unfortunately that's not true.

Standing by a product that you've used in the past may not be the answer either. Oils which were considered "state of the art" as recently as the late 1970s were not developed to withstand the severe operating environments of most current engines — which are now smaller, higher revving and higher powered than their predecessors.

What do we recommend? In an imperfect world, discretion and information are your best allies: Use oils from reputable firms and select an oil based on its label.

Most of the alphabet soup of letters and numbers appearing on the top of an oil can are interesting only to engine designers. Of that information, a consumer really needs to understand only three pieces of information: viscosity, API grade, and the energy-efficiency statement.

Viscosity is the piece of information that most people are familiar with. As you probably know, viscosity is a

gasoline," or some such indicate that the oil contains additives that help reduce some of the frictional characteristics associated with engine oil. To qualify as an "energy efficient" oil, a motor oil must improve fuel economy by at least one and one-half percent in specified vehicle testing. Most automobile manufacturers endorse and encourage the use of "energy efficient" lubricants as a means of lowering fuel consumption.

To help consumers sort through the alphabet jungle of oil labeling, car manufacturers and the API are encouraging the use of a uniform system of labeling. A logo (which insiders call the "doughnut") displays SAE viscosity, API service, and the energy efficient statement in a simple format. Regrettably, only a handful of oil manufacturers are currently using the logo but it is hoped that others will use the system in the near future.

"Synthetic" motor oils are another current concern of car manufacturers. Synthetic oils are derived or synthesized from mineral oil by-products. They exhibit some characteristics which are superior to those of conventional oil. They are, for example, generally superior in some respects to conventional oils at extremely low or high temperatures. Car manufacturers usually allow the use of synthetics provided they meet the same viscosity grade and API service ratings as conventional oils. However, most car manufacturers, including Volvo, still require that synthetic oils be replaced at the same intervals as specified for natural or conventional oils.

You should bear in mind, however, that synthetics are generally much more expensive than conventional oils.

Motorists often ask about oil additives. Are they effective? Are they worth the money? Generally speaking, high-quality motor oils from reputable manufacturers provide all the additive-protection that is necessary for your car's engine. Additional additives are not necessary and may, in fact, be harmful. The interaction of additives with the original lube oil additives or fuel contaminants are suspected of creating some oil deposit and sludging problems. So it's *not* advisable to use oil additives.

Please remember that using the

correct lubricating oil is important, but that it is equally important to drain and replace oil at specified intervals.

Current Recommendations From Volvo		
Viscosity Preferred	10W-30	10-30
Elevated Stable Outside Temperatures	15W-40 above 104°F-40°C	15W-40 above 68°F-20°C
API Service	SF (can appear in combination with SF/CC, SF/CD)	CD (can appear in combination with SF/CD, SF/CD)

When oil is exposed to high engine temperatures, high pumping velocities, and corrosives from combustion gasses, it begins to deteriorate in regard to its protective abilities. Therefore, it is important not to exceed the recommended drain interval for your engine oil. This drain interval is stated in your Owner's Manual (along with the correct viscosity and grade). For example, the recommended drain interval for one of Volvo's non-turbocharged gasoline engines is about 7,500 miles (12,500 km) or six months (whichever comes first). A turbocharged gasoline engine requires an oil drain about every 3,750 miles (6,250 km) or every three months because of its higher operating temperatures. Such recommendations are based on "normal" driving conditions and habits — and should be viewed as maximum allowable intervals for "normal" driving.

If you drive in conditions that promote oil contamination (such as dusty or sandy conditions); or excessive, continuous high-oil temperatures (trailer-towing, sustained hill-climbing or high speed driving); or conditions that encourage water condensation in the crankcase (repetitious cold starting, very short distance driving of ten miles or less per trip, or long periods of idling); you're exposing your car engine's crankcase oil to "severe" conditions.

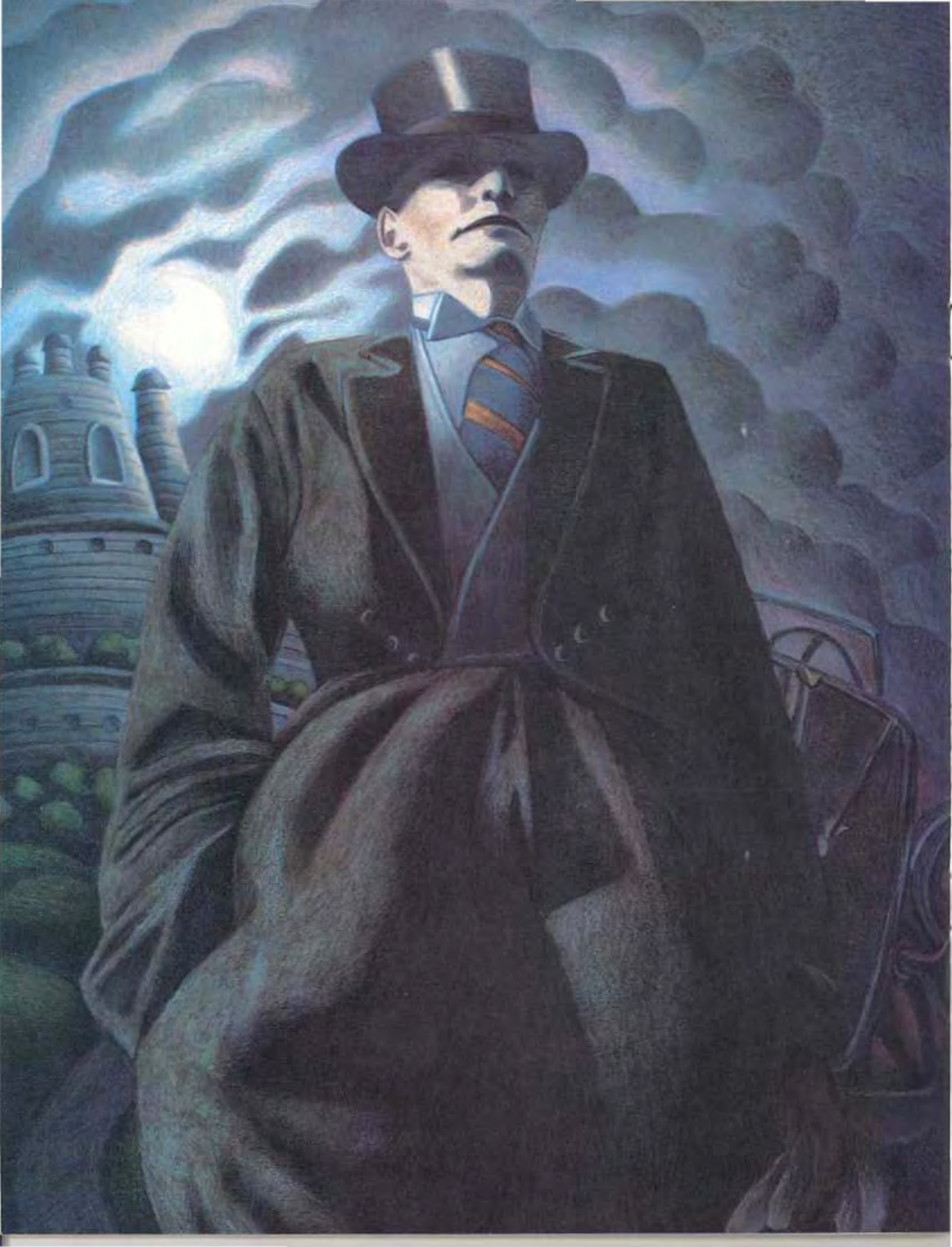
In the environment described above, the drain interval should be reduced for both turbo and non-turbo engines. When in doubt, reduce the drain-interval mileage in *half*. No engine was ever destroyed by changing oil too frequently.

To conclude: What can a consumer do about the problem of misrepresentation or incorrect labeling of motor oil? Obviously, few of us can actually go out and test oils, but we can follow a few basic rules:

- Use high-quality lubricants from known manufacturers.
- Consult your owner's manual.
- Ask your dealer's service manager or your mechanic about the manufacturer, viscosity and API grade of the lube oil that he uses. If you don't recognize or approve of the lubricants they supply, request something else, provide your own, or go elsewhere.
- Use the correct viscosity and API service grade. Don't buy oil in a container that is not labeled or that offers incomplete information.
- Drain and replace oil at the recommended intervals and replace the oil filter as specified by manufacturer. Change the oil more frequently if you are driving under severe conditions.
- Don't use additives.

Using the correct motor oil can make the difference between an engine that has to be rebuilt or replaced after a few years service or one that lives to a ripe old age. ■





THE MYSTERY CAR

As you may recall, the cover of our Spring/Summer 1984 issue featured a 1930's Volvo. We were not able to identify it except for a brief caption found in a tattered Swedish antique car book.

The museum in Ugglarp finally came through with some information: an excerpt from the memoirs of Nils Nordberg, the man who actually built our mystery car.

He described the day the King inspected the new car:

In 1936, the Volvo dealer in Stockholm convinced the Master of the Royal Stables, the Duke Otrante, that the stable's next hunting car should be a Volvo. Our coachbuilding firm was selected to build the large seven-seat cabriolet on a Volvo 657 with an extended chassis.

When the finished car was delivered to our client, there was silence about it for several weeks. But one day, quite unexpectedly, I received a phone call from the King's chauffeur (described ebulliently by Mr. Nordberg as a 'worthy man of honor,' etc.). He asked me to come up to the castle at one-thirty at which time the King would officially review his new car. I hesitated as I looked at the clock. I had only a little more than an hour. I was dressed for work, in quite shabby clothing, and I had only a sports cap to wear on my head. I was not willing to appear since I would not have time to go home and change my clothes. I explained my problem—but the chauffeur would not take no for an answer. This was a command performance ordered by the Duke; not a request.

So there was nothing for me to do but trot up to the castle. At the gate I met the Volvo representatives. They apparently had had more time than I. They were dressed to the nines in tails and top hats. Much chagrined, I told them I was appearing as ordered: 'come as you are.' To reassure them, I said I'd hide behind a pillar and try and blend in with the crowd.

My discomfort increased when the King and his Master of the Stables

appeared—wearing tails and top hats. Clearly, their intention was to go on to a more official function in another car after a brief inspection of my handiwork.

The King walked around the car several times, saying over and over in his nasal voice: 'Well, this is really a nice hunting car.'

While I was puzzling over what that phrase meant, the Duke spotted me peeking out from my hiding place. He waved to me to come forward, and introduced me to King Gustav by saying, 'Here we have Mr. Nordberg, who made the car.'

I kept Gustav company as he strolled around the car once more. I answered a number of questions, and again, the refrain came laconically and diplomatically:

'Well, this is really a nice car.'

Finally, he stood directly in front of the right front door. The door was opened for him, and the King prepared to get in. As on most other cars of that time, there was a long running board underneath the door along the sides. His Majesty made a maneuver while getting in which I had never seen before. He did not climb up on the running board with his right foot first—instead he put his long left leg through the door opening while he jumped up with his right leg. He slipped gracefully into the front seat, a phenomenal performance for such an old man. Unfortunately, during this gymnastics exercise, the King bumped against the edge of the cabriolet's folding top with his top hat, which tumbled down onto the stone pavement.

'This is a low car,' said the King, looking directly at me.

'Yes, your majesty,' I replied, 'this car is not meant to be ridden in with a top hat. This is a hunting car.'

The King looked down at the sports cap that I was nervously twisting in my hands and then directly into my eyes. He added in a more definite tone: 'Yes, you could say that it is a cap car.'

The 3.5 meter long hunting car was used for many years by the royal family. They must have enjoyed their first Volvo because as the years passed more and more Volvos replaced Detroit-made cars registered to Sweden's first family. Nils Nordberg went on to help establish his coachbuilding firm as one of the finest in Scandinavia. Eventually he wrote a book called "The Tales of a Bodymaker."

Maybe our excerpt from the book lost something in the translation. ■





THE CELLULAR REVOLUTION IN CAR TELEPHONES

by Marc Kristal

At one time or another, everyone has heard the frustrating words, "I tried to reach you, but you were out." Not being able to make or receive your phone calls remains one of the principal bugaboos of doing business.

Travel, whether between home and office or between appointment and appointment, is perhaps the principal agent of this distress. Business managers are a good example. According to recent studies, they spend more time communicating than any other activity. Yet at least two or three business hours a day are wasted on travel time—time taken away from that essential endeavor. Moreover, with commuting and business travel on the increase, the problem continues to worsen.

Cellular mobile phones are a useful, innovative solution. Once considered the province of the very rich, and fraught with technological problems, car phones are now more affordable, easier to use, and better made. They are even adaptable to other communication tools, such as portable computers. Indeed, for anyone operating in today's high-powered business world, they are becoming something of a necessity.

But what's the difference between today's cellular technology and the instruments of yesteryear? Essentially, old-fashioned mobile phones were little more than two-way radios, featuring a few channels, and requiring a central operator as an intermediate. While the user dialed a number, and

talked on a telephone-like instrument, he or she would first have to wait for an open line (and, as many markets had only a few lines, the wait could often be interminable). After the operator had "patched in" the call; reception, as with any radio receiver, would depend on the user's proximity to the main antenna. Worst of all, privacy could never be assured.

Cellular systems work on a different basic principle. In a cellular market, the user area is divided into a series of cells—sectors eight to twelve miles in radius—each possessed of a so-called switching center. When a call is placed, the tower in the cell nearest the phone captures the signal, and the connection is made. When the vehicle begins to move out of one cell and into another, the control computer monitoring the call "hands it off" to the next, stronger cell. The entire switch takes a mere 2/100 of a second, making it barely discernible to the user, and producing unparalleled clarity of reception.

Cellular systems offer other improvements. No operator is necessary. So many channels are available that thousands of calls can be made simultaneously. Waiting for a line is virtually unheard of. And a sophisticated scanner would be required to intercept and monitor a call, which all but insures privacy.

The price of the service varies, hovering in the general range of 30¢ per minute. Available in roughly 20-25 markets at present, cellular mobile phone centers are licensed by the FCC, which issues two per city: one to the local phone company, or wire line system, and another to an independent, non-wire line operator, who bids against others for the license. This permits the possibility of competition. Presumably, the same sort of price wars currently benefitting users of the

regular telephone system will extend to cellular as it becomes more prevalent.

As for the equipment in your car, that, too, has become considerably more advanced. The processing electronics and radio transceivers are simply mounted under the seat or in the trunk, and the phone itself can be set conveniently on the dashboard or console. Western Union, one of a number of companies creating cellular telephones, offers a variety of features that suggest the scope of available possibilities. Its "on-hook" dialing makes it easier to get a number while driving (and an accompanying visual display helps eliminate misdialled numbers). The phone features a ten-number memory, and a redial capacity for the last number called; two locking systems, to prevent unauthorized use; touch tone signaling, for services requiring sound activation; different incoming call alerts, including the periodic honking of the horn (so that if you are outside the car, you'll know your car phone is ringing). It also has call length warning tones, so that you don't gab unnecessarily; an elapsed time indicator; and a missed call indicator. With all this, the car phone becomes a remarkably sophisticated communications center—quite an advance over the primitive systems of just a few years back.

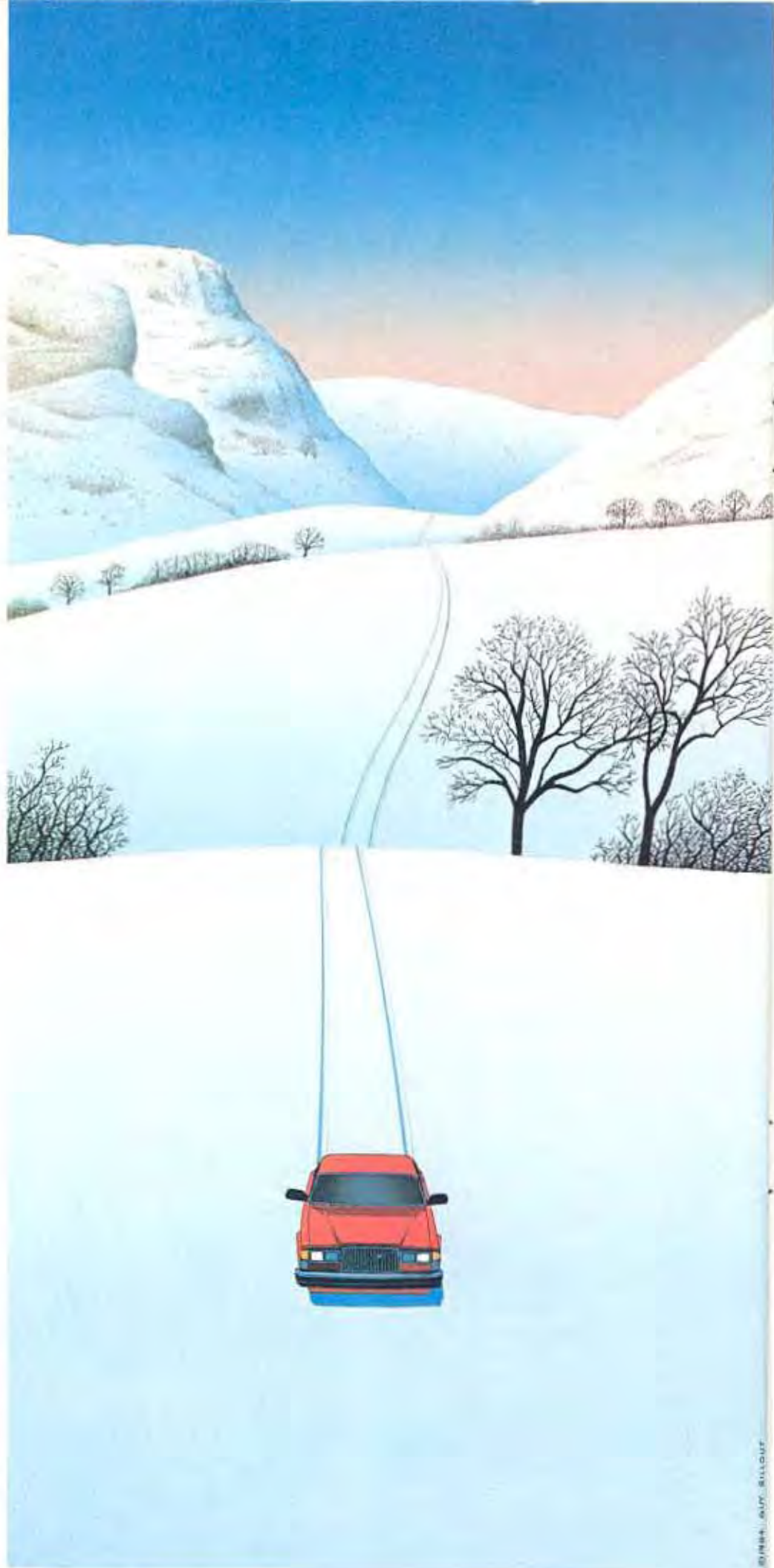
While it will be some time before cellular phones become commonplace in autos across North America, major markets, and some secondary ones as well, have already begun to proliferate. Like home video and compact discs, cellular will, in time, become a technological advance that most will embrace. Moreover, it fulfills an important function in a communications-oriented age, thereby removing the "expensive toy" onus which has always hung over mobile phones. In sum, we have seen the future—and the future is cellular. ■

CAR CARE:

A CHANGE OF SEASONS

BY MARC KRISTAL

The leaves turn red, the days grow short, a thick carpet of snow covers the landscape: before we've had time to pack away our swimsuits, winter is here. With the cold winds come conditions that affect the life and performance of your Volvo, and it's important to ready a car for the onslaught before it arrives. Drivers living below the snowbelt, too, should take note: much of the necessary maintenance is applicable in any climate, and rare is the southerner who, at one time or another, doesn't venture north. Your owner's manual will provide the specifics (and should be carefully read). Here are a few tips.



First, a number of minor yet significant precautions: make sure the windshield-washing fluid has anti-freeze in it, or you'll have no defense against a rain of brown slush. Check the windshield wipers for dryness, cracks, splits, tears and the like (many substitute so-called "arctic blades," which feature vinyl jackets that keep ice off the springs). Try the heater and defroster, and with fewer hours of daylight, be sure the high and low beams are sufficiently bright. Don't allow the transmission fluid to run low, particularly in automatics. And double-check the exhaust system for leaks—this is particularly important on those cold days when the car needs an extra minute's warm-up.

Nicks in your Volvo's finish can expose your car to the harsh winter elements. Your owner's manual will show you how to mend minor injuries to the paint by using Volvo's touch-up paint. Follow-up with a good wax before the winter's onset to further protect the finish from the elements, and that worst of assailants, salt. Salt builds up underneath the wheelwells and can eat through alloy wheels, so wash those areas frequently with fresh water during the winter to help prevent corrosion.

Anti-freeze is of primary importance. It is absolutely essential to get the proper mix of additive and water, which happens to be a convenient 50-50. Many drivers assume that a greater amount of anti-freeze will enable their cars to endure lower temperatures; but water is in fact necessary to create the most cold-resistant molecular shape. Too much of either ingredient can even raise the freezing temperature above normal. Use only Volvo anti-freeze: it has a silicate base which is especially formulated for composite engines (iron/steel/aluminum). Most anti-freeze contains phosphate. The mineral composition of water in different areas of North America can cause phosphate to become suspended in the anti-freeze solution. In that state phosphate is highly corrosive to the aluminum in composite engines; it can also clog up and corrode radiators. Please protect your car's engine by using genuine Volvo anti-freeze in gasoline and diesel engines.

To insure that the thermostat is working properly, start the car with the hood open, and place your hand lightly on the upper radiator hose. It should be cold while the car is heating up, then—after the engine has been running a reasonable amount of time—warm. When the thermostat opens, it releases the hot water, which travels from the bottom of the engine block

up through the radiator to the hose beneath your hand. If it remains cold, the thermostat might be clogged, which, incredibly, could cause your car to overheat—even on the coldest day of the year.

The last thing anyone wants to hear, after turning the ignition key on a freezing morning, is a solitary and final automotive cough: maintain your battery! The cells must be properly filled with distilled water, and tightly closed to avoid corrosion; there should be no "crust" (actually a build-up of hydrogen sulfide) on the cable or terminal heads, as this increases resistance, and impedes both flow of power and recharge rate. Your garage mechanic should also measure the specific gravity of the cells (the weight of fluid in the battery, in relation to the amount of water), to insure a sufficient charge. A Volvo battery warmer is a useful accessory for exceptionally cold mornings.

The colder it gets, the thicker oil becomes, making it immeasurably harder for the engine to kick over. Thus, a winter-weight oil, thinner than that used in summer, is imperative (the precise viscosity depends upon how cold it gets where you live, and the kind of engine you have). Insufficient lubrication wears out the engine parts and an oil of insufficient quality will be too dense to lubricate all engine parts equally. Consult your owner's manual for specific instructions. You may also find the motor oil article in this issue of interest.

Tire inflation becomes an issue during the winter, when handling on wet, icy, salt-encrusted surfaces is commonplace. When it's below freezing, use a drop of ethylene glycol anti-freeze (never alcohol or lock de-icer) in the tire valves when inflating the tires. Moisture inside the air of the tire can freeze the valve open and cause slow leaking. Always check pressure when the tires are cold: if you've been on the road for awhile, the gauge will read unnaturally higher, you'll mistakenly let out air, the belting will heat up and disintegrate and a blow-out will follow in short order. Moreover, use four snow tires or none, but don't mix them up, for this will change and make unpredictable the car's handling characteristics. Snow tires, which do the trick in deep snow, lack the ability to firmly grip a dry road; but, while they don't function as well as regular treads, a matched set can at least be relied upon to do the same things over and over again. No tire performs well on ice. If the roads are slick, don't drive. And avoid chains, which remain totally unpredictable,

and can do severe damage if they break.

If moisture condenses on the inside of your windshield, keep the heater on and briefly turn on your air conditioner (if you have one!). The condensation will clear up very quickly. It's a good idea to occasionally turn on your air conditioner in the winter anyway—it keeps the seals in good condition.

Power antenna freeze up? Use a little silicone spray on it. Silicone repels water and lubricates the antenna so that it will slide in and out of its housing easily. Obviously, this routine should be performed whenever you wash your car to prevent wear on the telescoping parts which in turn could deteriorate reception quality.

It's always a good idea to carry an emergency kit—just in case you get stuck or if other cars block your way. Such a kit should include such things as a first aid kit, chocolate bars, blankets, candles and matches, tow rope, flares and a shovel. Car clubs such as the AAA can give you specific suggestions for your kit.

Once more (though it cannot be reiterated too frequently), consult your owner's manual for specific instructions, pay attention to the above, and your Volvo should go sailing into a more merciful spring with neither significant deterioration nor diminished mechanical pluck. ■

Reprinted from Via Volvo, Fall 1983

Snow Tires

The handling and stability properties of a car are negatively influenced by the wrong choice of tire equipment. Volvo strongly recommends radial snow tires (and regular tires) be used only in complete sets of four, all the same size, the same make, and all the same tread pattern. In most cases, a narrow snow tire (175R14) provides better performance under slippery, snowy, slushy road conditions. A wider one (185/70R14) generally provides better performance on dry surfaces. However, keep in mind that on dry pavement snow tires do not perform as well as "summer" radial tires.

<u>Original Tire Size</u>	<u>First Choice Snow Tires</u>	<u>Alternative Recommendations</u>
175R14	175R14	175/75R14
185R14	185R14	185/75R14
185/70R14	175R14	185/70R14 175/75R14
185/65R15	185/65R15	175R14 175/75R14
195/60R15	175R14	185/65R15 175/75R14



DISCOVER: The World of Science

*Intriguing, New TV Science Series
Premieres on Public Television:
Volvo of America Corporation is under-
writing four one-hour specials*

Why do nearly half the astronauts who fly in space suffer from motion sickness? How do giant sea turtles—after roaming hundreds, even thousands, of miles out to sea—find their way back to the same beach year after year to lay eggs? And what do race horses, ballet dancers, athletes and turkeys have to do with a disease afflicting more than 20 million Americans?

The answers to these intriguing



questions and more are revealed on **DISCOVER: THE WORLD OF SCIENCE**, a new, four-part public television series premiering February 6, 1985, at 8:00 PM ET.

Hosted by Peter Graves, the one-hour magazine style programs feature provocative, often moving insights into the worlds of science, medicine and nature. Told with original on-location footage, new developments in technology, space, computers, robotics and behavior unfold with a distinctly human perspective.

The show's producers, Graham Chedd and John Angier, were also the original producers of the award-winning "Nova" series for PBS. "We believe good television is good storytelling," said Chedd and Angier. "And since we worked together on "Nova" in its early days, we've known how rich the world of science is as a source of wonderful stories...about fascinating people, doing extraordinary things for often entirely unexpected reasons."



Among the remarkable people viewers will meet are:

- NASA scientist Patricia Cowings, who has conducted an 11-year search for a cure to "space sickness" using biofeedback techniques—her work will be tested soon by astronauts in Space Lab III. With NASA planning to build and permanently staff an orbiting space station by the 1990s, solving the mystery of space sickness has taken on a new urgency. At home, Dr. Cowing's techniques may even help those of us earthlings who get "seasick" in cars, planes and boats.



- Dr. Archie Carr, the dean of giant sea turtle researchers, has spent most of his 77 years studying the elusive behavior of these enigmatic creatures. Carr now believes he has solved some of the puzzles surrounding the turtles.
- Dedicated cardiologist Michael Mirowski, once thought a medical maverick, has developed a unique miniature defibrillator. It's a device designed to help half a million Americans who die every year because their hearts stop beating. Most could be saved if their hearts could be shocked back into normal rhythm. After 15 years of dedicated research—without the help of government grants—Dr. Mirowski has invented an implantable defibrillator.
- The team of FAA engineers who have been working on the feasibility of “survivable aircraft crashes” plan to crash a Boeing 720 airliner in the Mojave Desert—on purpose! The aircraft will be unmanned, flown by remote control, with humanoid dummies in the passenger seats. Several new safety features are being tested including a new fuel additive that could prevent explosive fireballs that consume planes during

crashes, energy absorbing seats, safety belts and structural components built with fire-retardant materials. DISCOVER viewers will see the results of this unparalleled scientific experiment in which the extension of a few “safe seconds” may mean saving hundreds of lives.

Other recent scientific breakthroughs woven into the DISCOVER series include:

- The fascinating, new research which may halt—and even reverse—the debilitating disease known as osteoporosis, an alarming thinning of the bones which affects more than 20 million Americans and results in an alarming annual health bill of \$3 billion.
- Medical treatments such as chemotherapy and bone marrow transplants which have helped produce more than 50% cure rate for childhood leukemia—once considered a virtual death sentence for youngsters.
- Unique rescue efforts to save the peregrine falcon, a magnificent creature once considered on the verge of extinction. DISCOVER follows California naturalists as they scale precipitous cliffs to “borrow” the eggs, hatch and return them to the mothers’ nests.

And finally, viewers will see 200 MIT students pit their home-made robots against each other in a series of competitions as thrilling and exciting as any major athletic event. How would you design a robot from parts given to you in a paper sack?

Join us in celebrating some of the technological advances that are changing our world. Tune in to DISCOVER: THE WORLD OF SCIENCE, produced by the Chedd-Angier Production Company in association with DISCOVER Magazine. The series was made possible by a grant from Volvo of America Corporation.



Volvo in the News

Comments from the fourth estate.

*Better under pressure.
Turbocharging makes the
760 scream.*

From Auto Week, May 14, 1984

A great and compelling tradition is being systematically destroyed. Volvos... stolid, three-piece-suit-and-oxfords Volvos are getting interesting. Exciting, even. The latest evidence? The Volvo 760 Turbo.

For traditionalists, it is to weep. The Volvo 760, the one Volvo that wasn't in any way a performance car, now is. It is turbocharged. It is intercooled. It is quick. It will never be the same.

What must be understood at the outset is that the Turbo is another terrorist hit by the Volvo engineering corps, specifically the engine group. It has planted a highly explosive device in an otherwise unchanged 760 bodysell...

Light the fuse. The 760 Turbo will accelerate to 60 MPH in just over eight seconds...

*The latest family rocket
from Volvo's bad-boy
department.*

From Car and Driver, July, 1984

The young Turks are having their day at Volvo Car Corporation. Over the past ten years, a determined group of hard-core enthusiasts has muscled into the halls of power in Goteborg. Their self-appointed mission is to add more excitement...

But not to worry... Volvo isn't into nuking the whales yet. The company's forward thinkers have merely added the much-heralded turbocharged and intercooled 2.3-liter four-cylinder gasoline engine to the high-line 760 GLE. The 760 is still the same conservative, upright, socially responsible four-door sedan you remember from its introduction in 1982, only now it will peel the skin off an Audi 5000 Turbo as it flies by in the fast lane...

There are other rumors afloat that a genuine sports car is within the walls of Volvo (philosophically, if not in prototype form), fighting to escape. But one step at a time, eh? Today the 760 Turbo sends a message to the streets: a spirited group has infiltrated the highest ranks of this prestigious carmaker and its influence has only begun to be felt...

*No ordinary East German;
no ordinary car.*

From Time, March 12, 1984

Ingrid Berg was no ordinary East German, and she did not flee the country like one. With her husband, mother-in-law and two children, 3 and 7, Berg drove the family Volvo to Czechoslovakia. In Prague they headed for the West German embassy, claimed refuge and demanded asylum in the Federal Republic. Then Berg revealed her identity: she was, she said, the niece of East German Premier Willi Stoph, the second most important man in the Communist hierarchy...

*Volvo Concept Car
Cuts Assembly Time 66%.*

From Ward's Automotive Reports, May 21, 1984

Has Swedish automaker Volvo beaten General Motors Corp. and its well-publicized Saturn project to the punch?

Volvo last week gave Detroit media its first look at the company's latest experimental exercise: the LCP...

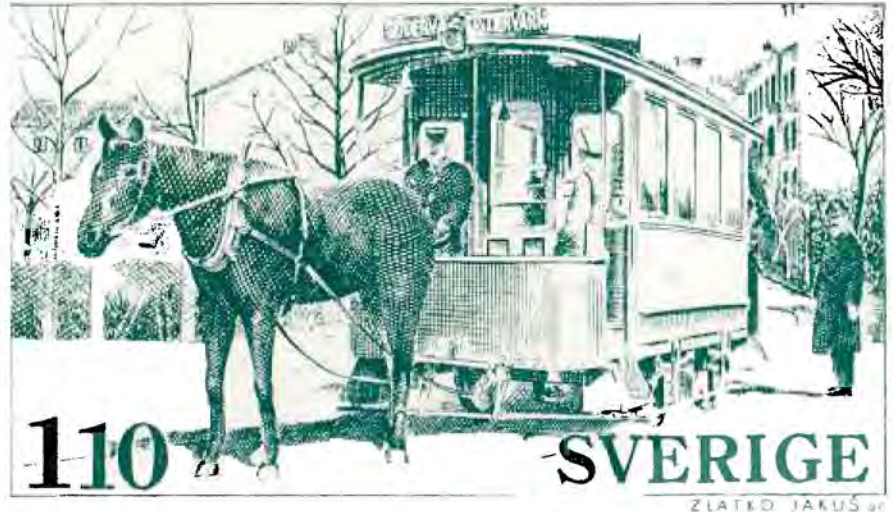
Although the project was chartered primarily to explore fuel efficiency through the use of alternative light-weight materials, a byproduct of the program was the creation of a vehicle which can be built in a fraction of the assembly time needed for today's cars—a primary goal of GM's Saturn project...

Volvo said the process would take one-third the time required to build today's vehicles...

Letters to the Editor

In addition to my 1983 Turbo wagon, I'm the proud owner of a 1971 164E I call "Sven." It's in almost as good condition now as when I bought it, even though I've put over 150,000 miles on it. When I heard about Volvo's High Mileage Program, I stopped by my dealership. They said they didn't know anything about it—that Volvo was probably running the program. How can I get a grille badge for Sven?

Almost all of our dealers are now participating in the High Mileage Program so you could contact another dealership. Of course, your dealership may not consider that sporting—considering the fact that they helped keep Sven going strong all these years. Give them another chance. They have probably joined the program since you last spoke to them.



My owner's manual indicates that brake fluid should be changed every second year or 30,000 miles (50,000 km). Is it really necessary? My brakes work fine after three years and they still have plenty of fluid.

Brake fluid is a complex substance which must meet stringent standards for high temperature resistance, corrosion protection, chemical stability, viscosity, lubricating quality and moisture tolerance. All brake fluid sold in the U.S. and Canada must meet tough federal safety standards. However, the fluid in your car's brake system can pick up moisture over a period of time—even though engineers have designed your car to minimize the possibility. Water, even in minute quantities, can impede the proper functioning of brake fluid by evaporating under the intense heat generated by hard braking.

So, don't take a chance. Have your dealer change the fluid at the specified interval. By the way, under severe conditions (such as mountain driving, where more heat is generated more often), brake fluid should be changed every year or every 15,000 miles (25,000 km).

