

PRESIDENT
William Shafer
308 S. East Ave.
Oak Park Il 60302
708/383-0186

F. V. E. A. A. NEWSLETTER

JANUARY 1990

VICE PRES.
Kenneth Woods
1264 Harvest Ct.
Naperville Il 60565
708/420-1118

TREASURER
Vladimir Vana
5558 Franklin
LaGrange Il 60525
708/246-3046

MEETING NOTICE

The next FVEAA meeting will be
JANUARY 19th at
Cragin Federal Savings & Loan
333 W. Wesley st. Wheaton, Il
Time - 7:30 P.M. sharp. Guests
are welcome and need not be
members to attend the meeting

SECRETARY
Paul Harris
9421 N. Kildare
Skokie Il 60076
708/674-6632

NEWSLETTER EDITOR
John Emde
6542 Fairmount
Downers Grove Il 60516
708/968-2692

DEADLINE for newsletter *STUFF* - in my hands the friday before the next meeting. Editor

THE PREZSEZ

The January Newsletter will be the last issue for FVEAA members who have not renewed their membership for 1990. Those who have not renewed their membership should send \$15 to Vladimir Vana, 5558 Franklin; La Grange Illinois 60525 to remain on the mailing list.

Environmental and energy developments promise to put increased emphasis on electric cars in 1990. With the recent unveiling of their latest concept electric car, GM is beginning to catch up with the FVEAA. Our construction and operating experience should be valuable. Our 1990 exhibition schedule is important to make the FVEAA better known. At the January meeting, I hope we can hear progress reports from the persons checking out the various events and formulate future plans.

Bill



**FOX VALLEY ELECTRIC
AUTO ASSOCIATION**
6542 Fairmount Downers Grove Il 60516

FIRST CLASS

ADDRESS CORRECTION
REQUESTED

MINUTES OF THE FOX VALLEY ELECTRIC AUTO ASSOCIATION
December 15, 1989

The meeting was called to order by President Shafer at 7:35 PM. Thirteen members were present.

Treasurer Vana reported \$ 1269.86 was in the NOW checking account and \$ 876.07 in the savings account for a total of \$ 2145.93.

The various options for car exhibitions was discussed. It was decided to hold a Rally sometime in mid-summer of 1990. The preferred location was Fermi Lab, possibly during the annual open house at that institution. Member Stockberger agreed to contact Fermi and former FVEAA members who may still be at the Lab to see what arrangements can be made for a Rally. A second choice was Triton and Member Oviyach will be available should we decide on this location.

Participation in Earth Day ceremonies was discussed. This event will be held on April 22, 1990, the 20th anniversary of the original event. Events are to be conducted in several Chicago area locations including Lincoln Park, Evanston, and the Morton Arboretum. The members agreed that electric cars can make a positive contribution to improved air quality, particularly when the source energy is nuclear produced. Member Shafer agreed to contact the various events to see if our participation would be acceptable and encouraged.

Discussion about FVEAA participation in a 4th of July celebration resulted in selection of Downers Grove as the preferred event. Member Emde will contact the organization sponsoring the event and determine requirements for our participation.

Exhibition of FVEAA cars at shopping centers was discussed. The Fox Valley Shopping Center Arts and Crafts exhibition was desired as a preferred event. Member Woods agreed to investigate this possibility, together with some event at Yorktown.

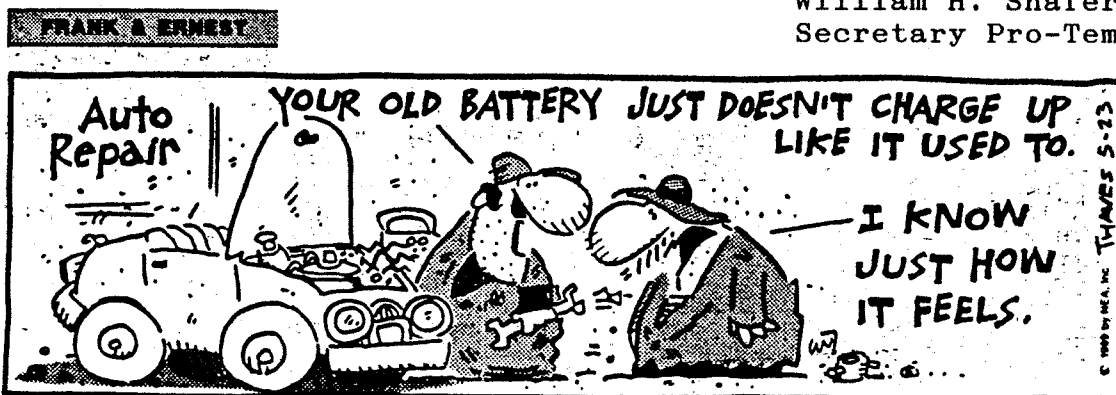
Member Newton noted there are numerous events at the College of Dupage at which we could exhibit cars. He will investigate this to determine what future events offer a possibility for FVEAA participation.

The meeting was adjourned at 9:45.

Submitted by

William H. Shafer

William H. Shafer
Secretary Pro-Tem



1st battery-powered production car due from Peugeot in 1990

By Sue Baker
London Observer Service

PARIS—The puzzled frown on the face of the elderly Frenchman said it all: He clearly wondered why I appeared to be coasting silently downhill in the little Peugeot, its engine apparently switched off.

If he had been able to see inside the Peugeot 205's engine bay, he would have been even more surprised: The engine space was packed tight with a dozen six-volt nickel cadmium batteries.

Peugeot plans to put the hatchback 205 on sale in 1990, the first battery-powered production car from a major car manufacturer.

Memories of the ill-fated Sinclair C5 are inevitable, but misleading. The new electric car looks indistin-

Convulsive decade

guishable from a normal Peugeot 205, and drives like one, capable of transporting four people and their luggage, although not too far or fast.

Top speed is only 60 miles an hour. Acceleration to 30 m.p.h. takes 11 seconds—roughly the same time as a comparable gasoline-engined car takes to reach 60.

It is a heavy car for its size, weighing a ton. Its range is only about 60 miles before the batteries are drained and need an overnight recharge. Until someone invents a new kind of battery, performance

and range are limited.

Even so, Peugeot is convinced that the environmental appeal of a nonpolluting, exceptionally quiet and simple-to-drive car (no gearstick and just two pedals) that plugs into electrical outlets rather than stopping at a gas station, is strong enough to be commercially viable.

Unlike previous electric cars, it doesn't give up trunk space to batteries. To go into reverse, you press a button on the dashboard.

As a city car, for shopping, school runs and short commuter trips, the battery car is a pleasant alternative, although not a cheap one. When it goes on sale next year, the price will be "a little dearer" than its gas-driven cousin, according to Peugeot.

GM test car electrifying

By John Hillkirk
USA TODAY

General Motors has developed an electric car that leaves today's gas-guzzlers in the dust.

The "Impact" can zoom from 0 mph to 60 mph in eight seconds — faster than sports cars such as the Nissan 300ZX or Mazda Miata.

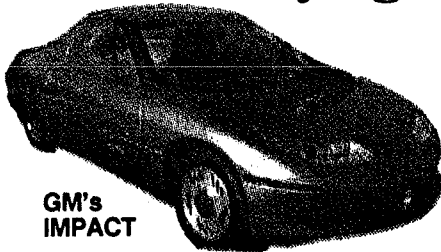
And it runs up to 120 miles at 55 mph before it needs to be recharged — twice as long as other electric cars.

"I've never heard of an electric car like it," says Jim Wangers, of Automotive Marketing Consultants Inc.

But don't look for this tear-drop-shaped, two-seater soon:

► Only one prototype exists, and GM must decide if production is feasible.

► The cost of operating the Impact is high. The 320-volt battery pack, weighing 870 pounds, must be charged for at least two hours. Including the electric bill, it costs about



GM's
IMPACT

By Nick Ut, AP

twice as much to operate as a gasoline-powered car.

The high cost is "why I don't hold out a whole lot of hope for electric cars in the near future," says Wangers.

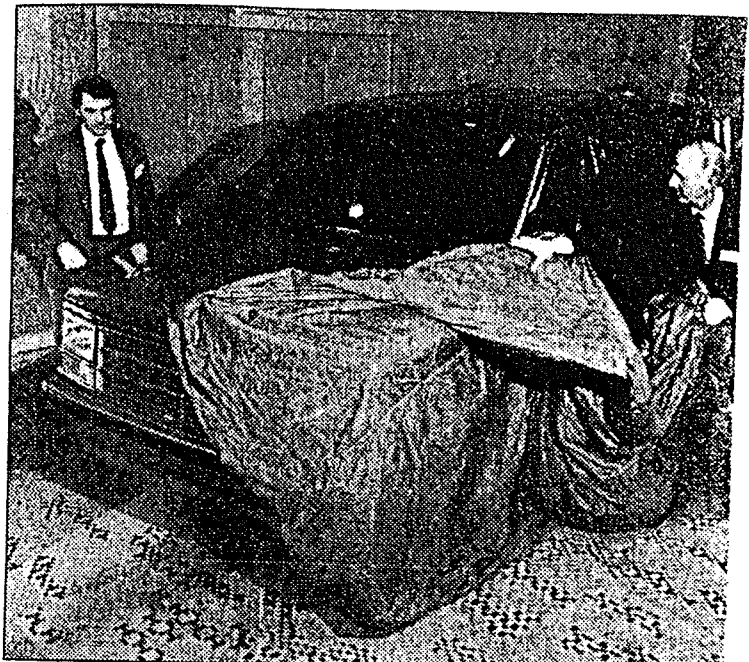
GM chairman Roger Smith says it could catch on if gas prices skyrocket or when battery technology improves.

"This is not a car for driving to New York," says Smith. "Running around L.A., I think it's great."

Another prototype motorists won't see soon is Chrysler's Voyager III van, with a detachable front end that becomes a three-seater car.

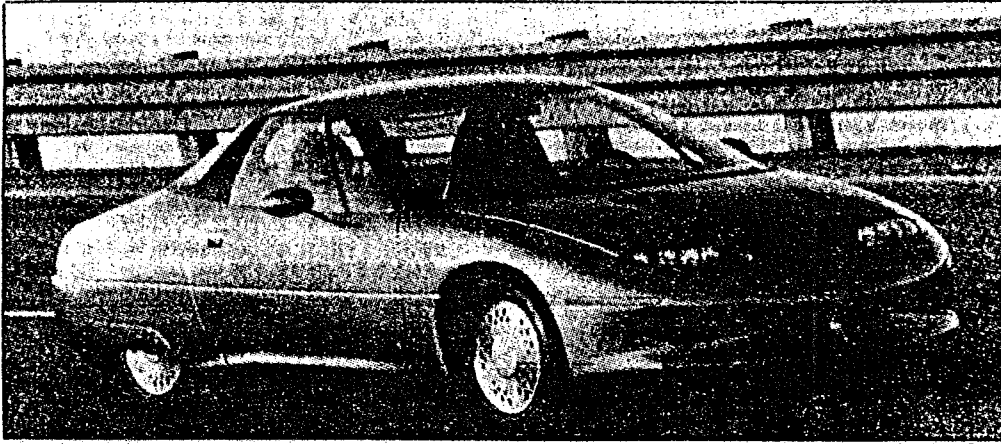
Announcing the second annual
American Tour de Sol
5 Days in New England

May 23 - 27 1990



The New York Times/Ed

The utility industry's hopes for a pollution-free vehicle rest on an electric van introduced yesterday by the Electric Power Research Institute.



General Motors Wednesday introduced Impact, an electric-powered car with swift acceleration that should erase the perception of electric cars as "golf carts," GM Chairman Roger Smith said.

Associated Press

GM electrifies auto world with Impact

General Motors Corp. on Wednesday introduced in air-quality-conscious Los Angeles a zoomy-looking electric car "with a regular car's comfort and convenience" and sports-car-like acceleration.

GM Chairman Roger Smith said at the unveiling of the two-seat test car, called the Impact, that GM is "evaluating a business plan to see just how feasible it would be to produce it. The Impact is producible."

Smith, speaking at a press conference at GM subsidiary Hughes Aircraft Co., said GM would have to look at "crashworthiness, longterm durability, extending the life of the battery, and more. We need to determine just how much public enthusiasm there is out there—not just in California but all over the country. Will there be enough customers to justify mass production?"

"The Impact outdoes other electric vehicles, thanks to new developments in electronics, motor design, structural materials and tire and batteries ... along with careful attention to weight, aerodynamic and rolling design efficiencies," said John Zwerner, GM's executive director, advanced product engineering, Advanced Engineering Staff.

"The Impact can be driven on freeways without being a hazard to other motorists," Zwerner said. "Its off-the-line acceleration and passing capabilities at highway speeds make it highly

suitable for urban commuting. If not for its 21st century shape, it would blend right into traffic.

"There's still lots of work to be done, but we're excited by results."

The major drawback of electric cars, including those GM has worked on since 1916, has been molasses-slow acceleration. GM claims to have whipped that problem with the 2,200-pound Impact, which has a 114-horsepower dual-motor-gearbox package.

GM said the Impact tops 100 m.p.h. and streaks from 0-60 m.p.h. in eight seconds. When the car is accelerating from 0-60, "its battery puts out more than enough power to service nine average households," Zwerner said.

GM said the Impact has a 120-mile

range while cruising at 55 m.p.h. before a battery recharge, which can be done with a regular home electric outlet.

"There is no 'miracle battery' involved," said GM spokeswoman Toni Simonetti. "We're using proven lead-acid battery technology. Some electric cars rely on exotic batteries, such as nickel-iron or sodium-sulfur."

Sources at GM say the automaker capitalized on engineering and design philosophies from its sleek-looking, world-record-setting solar car, the 1987 Sunrayer. The Impact has about half the air resistance of most production cars. Goodyear developed tires for it with a rolling resistance only about half that of regular tires.

Smith said the Impact "delivers extraordinary performance with less than a third of the energy needed by a comparable gasoline-powered car." But he added, "We'll need much more electric power over the long term from an efficient, clean source of primary energy. We shouldn't thwart our own efforts to achieve clean air. If we try to do it all just by burning more fossil fuels, we'll be right back at Square One."

Meanwhile, in Detroit, a Chrysler Corp. executive said Chrysler has been talking with at least one Asian automaker about a joint project to build a successor to its Omni-Horizon subcompact cars, a company executive said Wednesday.

Chrysler Motors President Robert Lutz said the nation's No. 3 automaker is moving on two fronts to develop a new subcompact for the mid-1990s to succeed the Dodge and Plymouth cars. They go out of production early next month when Chrysler shuts down its Jefferson Avenue assembly plant in Detroit.

By Dan Jedlicka
Auto Writer

2 All-Electric Vans Ready to Roll Out

The utility industry is charging into the alternative fuel fray with new designs it claims will make electric vehicles economically feasible.

"The technology has now reached the point where we are ready to take electric vehicles to the marketplace," says Larry O'Connell, senior manager of the transportation program at the Electric Power Research Institute, the \$400 million research and development arm of the utility industry. The Palo Alto, Calif., organization, which has been developing electrically powered vehicles for 10 years along with General Motors Corp. and Chrysler Corp., has just introduced its two most promising models.

At the forefront of the new generation of electric vehicles is GM's G-Van, a 1-ton cargo van that will be available in the spring. Running on an improved lead-acid battery and upgraded propulsion system, the G-Van achieves a top speed of 52 mph and is able to go 60 miles per battery charge. The battery takes roughly eight hours to recharge. There are some 400,000 vans in commercial fleets that go no more than 60 miles on a given day, and O'Connell says the G-Van could substitute for at least one-fourth of those. But for 1990, the institute expects about 500 will be sold at \$32,500 each, about twice the price of the utility van it is modeled after. He claims the cost will be competitive with gasoline-powered vans once the production level increases.

An even more versatile model, the TEVan, is expected to hit the market in late 1992. The six-passenger electric vehicle from Chrysler, based on the minivan design of the Dodge Caravan and Plymouth Voyager, uses a nickel-iron battery that gives it a range of 120



The electric G-Van attains 52 miles

and a top speed of 65 mph.

Skeptical analysts say the vehicles will need a strong track record of performance and service before they are widely accepted. The institute believes concern about air pollution and increased domestic dependence on foreign oil combined with the backing of major U.S. automakers all but assures successful commercialization.

Electric Vehicle Planned By the Utility Industry

Speed: 72 M.P.H.;
Range: 100 Miles

By **MATTHEW L. WALD**

Special to The New York Times

TEANECK, N.J., Nov. 14 — In the quest for clean air, the utility industry today introduced a high-technology entry to curb pollution from autos: an electric van that speeds along at up to 72 miles an hour, and can run for more than 100 miles without having to be recharged.

The shiny maroon vehicle, housed in the body of a Chrysler van, is a prototype that the producers hope will be in production in about three years. But at a national conference here, begun today, the Electric Power Research Institute also showed off less advanced models based on the body of a General Motors van, which customers can order today for delivery next year.

"Go out and kick the tires — they're real," said Richard E. Balzhiser, president of the power research institute, which is sponsoring the two-day conference.

Long a Dream

Replacing gasoline with electricity in vehicles has been talked about and tinkered with since the early days of the automobile, and particularly since the 1973 oil embargo. But the cars have never had the range or durability to be very useful. Today, however, improved technology and the prospects of tougher environmental enforcement are beginning to make electric vehicles look more practical.

Moreover, even advocates concede that electric vehicles will be a modest niche market for the foreseeable future, mainly used as delivery trucks, service vans and the like that travel short distances each day. Optimists predict that the potential market is more 100,000 electric vehicles a year, compared with a total American market of 15 million cars and light trucks.

Still, the first factory production of an electric vehicle in North America in recent years, with the General Motors van body, is scheduled to begin in May. The power research group, a nonprofit utility consortium based in Palo Alto, Calif., hopes to sell 500 next year.

"We are looking for a foot in the door that will convince the population," Mr. Balzhiser said.

According to C. Dennis Bausch, a vice president of Vehma International Inc., a developer of the General Motors-based van, North American production of the G.M. Vandura, the Ford Econoline and the Chrysler

Ram models comes to 440,000 a year. Half are for commercial use and, he estimated, electric vans could substitute for perhaps half of those — 120,000 a year.

Clean-Air Campaigns

The main force behind the push for electric vehicles is that clean air is suddenly a national priority. Nearly 60 percent of the population of the United States lives in areas that do not meet Federal clear air standards. One area that violates the standards, Los Angeles, has mandated that 40 percent of passenger vehicles and 70 percent of freight vehicles run on clean fuels by the year 2000. And Glenn Barr, a Los Angeles Deputy Councilman, said the vehicles shown here demonstrated that the technology exists to make those vehicles electric.

In fact, the higher-technology Chrysler-body van, still a prototype, shows that substantial progress has been made. Its nickel-iron batteries are 30 percent lighter than standard lead-acid batteries storing the same amount of power, an important consideration since a heavier battery means more energy to move the vehicle, and therefore less range. And the fuel economy of the new van is half a kilowatt-hour per mile, a substantial improvement over earlier models.

The model about to enter production is known as the **G.M. Van** after General Motors' designation of the body style. It was developed by the power research institute; Vehma, a subsidiary of the Magna International Company, a Toronto-based auto parts maker; Chloride EV Systems, which made the batteries, and General Motors, with support from the Southern California Edison Company.

Although it uses lead-acid batteries, it also represents technical progress. In test rides today, it accelerated acceptably, but designers are still working on the whine of the motor.

It's Not Cheap

Like all electrics, this van uses no energy when it is not moving, in contrast to internal combustion engines which continue to burn fuel while idling. Thus, the advantage of electric vehicles is magnified as traffic worsens, engineers say. But it had better have an advantage, because it sells for \$32,000, roughly double the cost of a four-cylinder gasoline model.

Yet with opinion polls showing a popular willingness to spend more to protect the environment, the appeal of the electric vehicle is obvious. The vehicles produce no pollution at the point of use, and the power plants that supply them are substantially cleaner sources of energy than gasoline engines. The research institute, comparing the G.M.-based electric van with its gasoline cousin, found a 97 percent reduction in pollution.

The attraction is obvious for the utilities, too. A single electric car would use about one and a half times as much electricity as a typical household, said Lawrence Hamlin, manager of research at Southern California Edison. The utility has enough slack capacity to run 600,000 vehicles, which would add \$90 million a year to profits, Mr. Hamlin said.

The new Chrysler-based van is meant to be charged by a 220-volt circuit — the kind used in households to run electric ovens or central air-conditioning — at 40 amperes. That amount of electricity is the rough equivalent of running every electric-using device in a typical house. Some industry officials foresee more advanced technologies, like power lines buried in the pavement from which cars pick up electricity.

First, however, the business is struggling to get off the ground. The van will be sold through General Motors dealerships. Marketing plans for the Chrysler-based van are less certain.

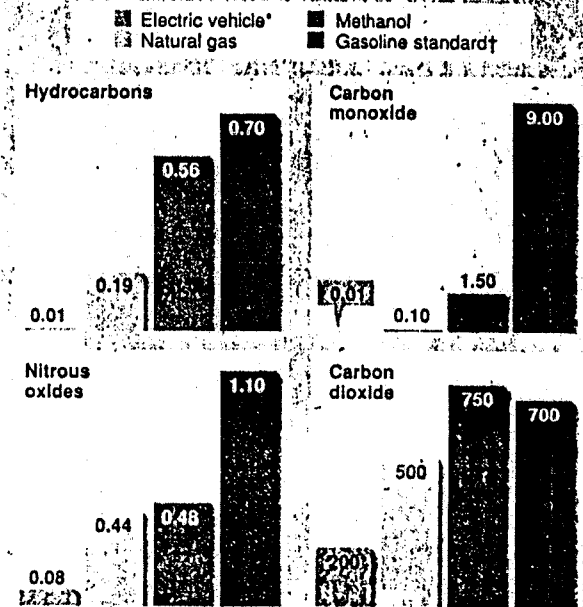
In the face of that uncertainty, however, there is appetite. Martin F. Gitten, a spokesman for Con Edison, said his company had already tested some cars converted to electricity, and

"everywhere you took them, JUST like the Pied Piper of Hamelin, THEY DREW a crowd."

"There is a public fascination," HE said. "All we need now is THE TECH. nology."

Comparing Vehicle Emissions

Emissions of pollutants in vans using different forms of energy, in grams per mile.



* Figures represent power-plant emissions, based on mix of coal, oil, hydro and nuclear plants in current use.
† Assuming 17 miles per gallon

Source: Electric Power Research Institute

At Last, a Practical Electric Vehicle?

By ROBERT JOHNSON

Staff Reporter of THE WALL STREET JOURNAL
A stroll down memory lane in the auto industry usually inspires recollections of classics like the 1960 Cadillac Biarritz, with its sharklike fins, triple carburetors and baby-smooth leather.

Rarely does anyone pay any attention to those other automotive milestones: the great lemons.

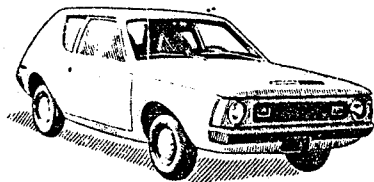
Yet at a time when the American love affair with the car is once again producing hysteria over such roadsters as the Mazda Miata and Chevy's big-engined Corvette, a splash of cold reality couldn't do anyone much harm.

So here is a tribute to the clunkers, the bombs that humble their manufacturers. No amount of wax can gloss over rust buckets like the 1977 Plymouth Volare, one of the most recalled jalopies in Detroit history. Or how about the 1972 Chevrolet Vega, whose styling was reminiscent of a small rocket. The car ran about as long as the first stage.

Disguised on the Lots

Some losers, like the 1984 Pontiac Fiero, are fairly recent offerings. Other vintage junkers can be found lingering on the back rows of car lots under strings of lightbulbs, pretending to be bargains. They are the good-for-nothing, the bad and the ugly.

But once upon a time, they were someone's dream car. As William Jeanes, editor of Car and Driver magazine, says: "The losers teach painful lessons. Lucky people learn from the car in the neighbor's driveway." The following sampling of 10 turkeys—by no means all-inclusive—is based



The Gremlin

on the bitter remembrances of consumers, mechanics and auto brokers, as well as on test results from various watchdog groups. Current prices come from used-car dealers and auction lots.

The 1970 American Motors Gremlin. Design critics complained that this car looked as if it had been rear-ended while on the showroom floor. The manufacturer advertised it as "pure and simply more fun to drive," but the Gremlin was so cramped that when passengers swung the front seat forward to get in back, the horn honked. The engine tended to conk out inexplicably on right turns. Seats were covered in vinyl so slick that the driver slid away from the steering wheel going around a corner. The windshield-wiper knob was right by the light switch and looked about the same—a hazard at night or in a rainstorm. New: \$2,000. Now: \$150, negotiable.

The 1969 Subaru 360. This car shook so hard at 50 miles an hour that the driver's inside mirror was unusable. In handling tests, the 360 seemed to have a mind of its own. Condemned by Consumers Union as unfit for the road. "It was a pleasure to squirm out of the Subaru, slam the door and walk away," the watchdog group summarized. The doors were designed with hinges at their rear edges instead of the front, meaning they opened into the wind. Thus, even at low speeds, the airstream could rip open a partly latched door and

A Clunker Like a '70 Gremlin
Or a '77 Volare, to Name 2;
The Pussycat of a Jaguar

What Goes Bump in the Night— If It Will Manage to Move at All?

slam it against the exterior. The ineffectual defroster could clear only a tiny triangle of the windshield. New: \$1,300. Now: \$100, less than a Schwinn three-speed.

The 1977 Plymouth Volare. Guinness doesn't have a listing for most-recalled vehicle, but this would be a top candidate if it did. Recalled four times for engines that stalled and for faulty hood latches, front brakes and suspension systems. Two years out of the showroom, some bodies had deteriorated so badly that radio aerials simply fell off. One buyer complained that the back of the front seat collapsed backwards. Another said his new Volare was delivered with black carpet up front and brown in the back; the dealer at first claimed it was designed that way. New: \$4,400. Now: \$300. Think of the bus tickets that will buy.

The 1975 CitiCar. Made by Sebring-Vanguard Inc. of Florida, this electric car was a shocking low point in automotive technology. One of the few cars to flunk tests performed by Consumers Union, its brakes were known to shear off when the driver applied them while going just 30 miles per hour. "The car rolled to a leisurely stop in a puddle of brake fluid, trailing plastic fragments," recalls Robert Knoll,



The CitiCar

head of auto testing for the watchdog group. The test car later blew a fuse, stalling in the middle of a busy intersection. New: \$3,100. Now: \$200 if all eight batteries are fresh. Sebring-Vanguard sold about 3,000 CitiCars. Now doing business under a new name, Sebring Auto-Cycle Inc., the company still makes electric cars.

The 1960 Chevrolet Corvair. General Motors Corp. proved that truth in advertising still exists when ads promised "the big surprise comes when you pull away from the curb." The Corvair was the first air-cooled, rear-engine U.S. car since the 1920 Franklin (there haven't been any since). Roughly 60% of Corvair's weight was on the rear. This meant that on sharp turns the inside rear wheel rim tended to pinch the tire, deflating it and sending the car into a spin or flip. "Unsafe at Any Speed," Ralph Nader's book, indicted the car. The Corvair also baffled mechanics. Volkswagen repairmen, among the few people familiar with rear-engine technology, refused to work on Corvairs because they weren't metric. New: \$2,000. Now: \$50 barely running. However, collectors who prize the car's sporty look are willing to fork over as much as \$6,000 for a fully restored relic.

The 1978 Jaguar XJ6. An elegant pile of scrap, it inspired bumper stickers reading, "All Parts Falling Off This Car Are the Finest English Workmanship." The electrical wiring remains a mystery. The car was plagued by fires and failures of its lights and windshield washers. Some mechanics took to replacing the engines with ordinary Chevy engines. New: \$16,000. Prices have plunged as low as \$550, but some still manage to wring \$8,000 from the unknowing who figure that is a bargain compared to new Jags at more than \$40,000.

The 1980 Renault LeCar. French motorists have a saying that to own one of their cars is to shrink all other worries to nothingness. "LeCar—a terrible thing. When I see it coming, I feel a heart attack on the way," says Stanley Gordon, chairman of Great Western Systems Inc., which operates auto auctions in the Southwest. Blown head gaskets. Oil and water leaks. A mechanic's nightmare. The spare tire, squeezed under the hood, blocks the spark plugs, the air filter and other regularly serviced parts. Awkward controls meant drivers often turned off their headlights when signaling a left turn. Exhaust pipes tended to come loose, as did bumpers and driver's seats. New \$3,200. Now: \$50.

The 1984 Pontiac Fiero. Pontiac boasted that the fiberglass panels would help this car last forever. Unfortunately, the engines had the lifespan of a mayfly. The car was notorious for cracked engine blocks, oil leaks and engine fires. Pontiac killed Fiero this fall after only five years in production. To give this car its racy look, designers crammed the engine between the passenger compartment and the trunk. Tuck your grocery bags in the trunk? Don't think of it. Heat from the engine and exhaust would toast your weiners after a few miles. All that and slow, too. The Fiero lost to Volkswagen Rabbit GTI in acceler-

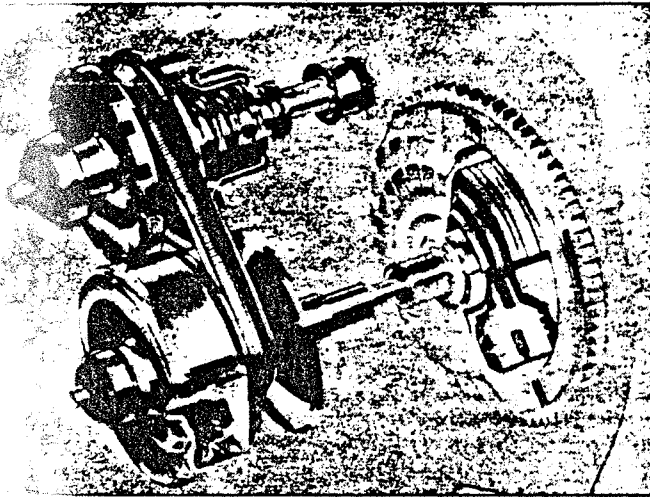
ation tests. New: \$10,100. They are asking \$3,900 now, but a "best offer" should be \$1,000 or less.

The 1971 Plymouth Cricket. Sold in Europe under the more fitting name Avenger. Cruising on the highway, the Cricket tended to jerk as if you were shifting gears. Consumers Union found 40 defects in its Cricket. "One of the many serious oil leaks from the engine and driveline soaked the clutch housing and probably caused the clutch chatter that we experienced," the auto test division reported. Shoulder straps were positioned to chafe your face. New: \$2,000. Now: \$100, but there is really no floor on the "best offer" for one of these babies.

The 1973 Fiat 124 Coupe. Fiat had so few good things to say about the 124 that ads merely touted radial tires and bucket seats. This car was the automotive version of a spaghetti Western: bad-acting, noisy and with a grim ending. Buyers really should have purchased a pair so as to have one for spare parts. Engines ran rough. Clutch cables repeatedly snapped. One former owner says Fiat agreed to repurchase his lemon on the condition the dealer would destroy it. Another owner says his dealer's mechanic expressed amazement he actually bought one. New: \$3,200. Now: \$150, or less than a pair of Italian loafers.

SUBARU REVIVES THE VARIABLE TRANSMISSION

It adds smoothness to the little Subaru Justy.



with steel powder to engage and disengage. Subaru achieves continuously variable gear ratios with a metal-link belt that drives a pair of variable-diameter pulleys. The belt operates under compression rather than tension, so it pushes rather than pulls.

Performance and handling

The technology translates into a rather unusual driving experience. For example, when waiting at a stoplight in an ordinary car with an ordinary automatic transmission, the car strains to move forward. The *Justy* ECVT just sits there, in neutral, until you step on the accelerator.

With light to moderate pressure on the accelerator, the electromagnetic clutch engages gently, and the car moves out rather sluggishly. If you step down hard on the accelerator (or if the engine is cold and racing), the clutch engages abruptly and the car moves out with enthusiasm. The engine revs up quickly, then the car speed climbs steadily to catch up with the engine. It felt strange at first, but drivers grew accustomed to it quickly.

Accelerating to pass and climbing hills in the *Justy* ECVT are unusual, too. There are none of the normal sounds and sensations that accompany the downshifting of most automatic transmissions, just a smooth increase in engine speed.

When coming to a stop, the ECVT is slow to downshift. The clutch doesn't disengage until the car is nearly at a standstill (which causes some vibration). Subaru recommends using the Ds (low gear) shifter setting when descending steep grades where additional engine braking is desired. You can also use the Ds setting in normal driving for better acceleration. But fuel economy, which should average about 34 mpg when using the normal Drive gear, will suffer.

The new *Justy* has the same 1.2-liter Three used in the old *Justy*, and it gave the same mediocre performance. The engine started reliably, but often hesitated, and sometimes stalled, when we began to accelerate. On cold days, the engine idled noisily and fast (sometimes as fast as 4000 rpm). When the engine was warm, it idled more quietly and slowly, but the steering wheel vibrated annoyingly.

In routine driving, the *Justy* handled the way you would expect a small car to—smoothly, nimbly, and quickly. The manual steering required moderate effort in most maneuvers, considerable

effort in parking. The car remained nimble in our accident-avoidance tests and in high-speed driving around the test track.

The brakes performed well, but they were a bit touchy, and the car swerved in some of the shortest stops. (See Facts & figures, page 517)

Comforts, conveniences, other concerns

The *Justy* is a small car with the typical small-car ride—stiff on expressways, very active on secondary roads. The ride was truly uncomfortable only when the car carried a full load (660 pounds) of passengers and luggage. Noise was quite subdued for a small car.

Front seating is roomy enough. The seats are a bit too firm, but nicely shaped for good support. Most drivers were comfortable behind the wheel. Not surprisingly, the rear seat is cramped, suitable only for children.

There are lap-and-shoulder belts in the front and rear seats. Tall occupants found the pressure of the shoulder strap bothersome; its mounting is quite low. The rear belts are comfortable enough, but a bit awkward to buckle up. All the belts require a locking clip to secure a child safety seat. There are tether anchors in the rear for safety seats that need them.

The heater warmed up slowly—and it never warmed enough when outside temperatures dropped below 10°F. Warm-air distribution was uneven. Ventilation was adequate. The dealer-installed air-conditioner worked well. It operates on any setting at the touch of a button.

The *Justy*'s bumpers held up well against the abuse of our bumper basher, emerging unscathed from our series of 3- and 5-mph blows. The new *Justy* has not yet been added to the roster of cars scheduled for Government crash testing.

Routine servicing is easy enough. The ECVT oil must be changed every 15,000 miles.

Subaru's warranty provides free adjustments for one year or 12,000 miles. The basic warranty, which includes the new transmission, is for three years or 36,000 miles. The rust-perforation warranty is five years or 60,000 miles. Subaru advises against towing a trailer with the *Justy*.

We tallied nine sample defects in our *Justy*. One was crippling: When we first tried to drive the car after taking delivery, it could barely get out of its own way. Usually, the engine died as soon as we shifted into gear and touched the accelerator. When we managed to get the car moving, its progress was fraught with severe hesitation and stumbling. Readjusting the carburetor cured the problem.

Overall, the new *Subaru Justy* is a big improvement over its predecessor. And drivers who prefer to be shiftless will appreciate the economy of the ECVT. When we reported on the *Daffodil* 25 years ago, we advised readers that we had no information on the transmission's reliability. That's true of the new *Subaru Justy*, too: The ECVT needs time to prove itself. In fact, we don't have enough data from subscribers on the *Justy* in general. To find out how the car and the new transmission hold up first hand, we're going to keep our *Justy* for long-term testing.

The Subaru's continuously variable transmission changes ratios (or gears) by hydraulically adjusting the diameter of the pulleys to match engine rpm and vehicle speed. There's no interruption of power flow as there is during gear changes in conventional automatic transmissions. Because there is no torque converter, engine power (and fuel) are not wasted.

Twenty-five years ago, CONSUMER REPORTS auto engineers tested the *Daffodil*, a tiny Dutch-built car with a little 30-hp engine. For the most part, we didn't like the car. But we did like its unusual "Variomatic" automatic transmission. We said it was "close to the ideal," providing the performance and fuel economy of a manual transmission with the convenience of an automatic. The Variomatic consisted of rubber V-belts running in tapered pulleys to provide a continuous range of speed ratios between the engine and drive wheels. Generically, the design became known as the continuously variable transmission, or CVT.

The transmission was new, and its reliability and durability were unknown. It soon became evident that the CVT was troublesome, that its ability to transmit power was severely limited, and—worst of all—that its rubber drive belts had a life expectancy of only about 25,000 miles.

Development of the CVT continued, but this type of transmission rarely made it to market. Then, in 1987, Subaru introduced its version of the CVT in Japan. It came to this country this year in the new *Subaru Justy* ECVT.

The E in ECVT stands for electronic: The Subaru transmission has a computer-controlled clutch that uses the interaction of a magnetic coil

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- | | | | |
|------------------------------|---|----------------------------|---|
| Starting/running | ○ | Front seating | ○ |
| Acceleration | ○ | Rear seating | ● |
| Transmission | ● | Heating | ○ |
| Economy | ○ | Ventilation | ○ |
| Routine handling | ○ | Air-conditioning | ● |
| Emergency handling | ○ | Controls | ○ |
| Braking | ○ | Displays | ○ |
| Ride | ○ | Trunk | ○ |
| Noise | ○ | Servicing | ○ |
| Driving position | ○ | Bumpers | ● |

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L.A. Officials Choose 3 Firms for EV Deals

LOS ANGELES — City officials here have selected three companies to build nearly 10,000 electric vans and cars for use in public and private fleets during the 1990s. The three winners are Vehma International Inc., Toronto; Unique Mobility Corp., Englewood, Colo.; and CAT (Clean Air Transportation) Holdings, a British-Swedish venture. They outlasted four other finalists and 11 contenders who were eliminated earlier in the 7-month competition to win Los Angeles officials' favor.

A spokesman for the city Department of Water and Power (DWP) said the city expected to work out an individual deal with each of the companies. Initially, the city had planned to buy only six-passenger vans and two-seat cars, but the spokesman said other vehicles could be added to the mix when individual contracts are arranged. No financial agreements or delivery timetables have been established yet, he said.

The city of Los Angeles will buy electric vehicles to replace current gasoline or diesel engines where appropriate. The city's fleet amounts to about 5,000 vehicles, spokesman said; the balance of the vehicles will be made under the city's program but sold to private fleets.

The DWP was the first to buy any of the electrics with a \$433,000 order last month for six vans from Vehma (AEJ, Nov. 6). Delivery is scheduled for this month.

Separately, the Southern California Rapid Transit District (RTD), which operates the largest bus system in the region, announced that it plans to put 10 buses that operate on compressed natural gas (CNG) into service in December and January.

The buses, made by The Flexible Corp., Delaware, Ohio, will be among 65 new vehicles delivered to the transit agency. The other 55 will be diesel.

The RTD will pay nearly \$12.3 million for the vehicles, but Southern California Gas Co. is subsidizing the cost of converting the 10 buses to CNG. An RTD spokesman said the gas company also will pay to convert the buses back to diesel if the experimental run is unsatisfactory. □

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DEADLINE for newsletter *STUFF* - in my hands the friday before the next meeting. Editor