

F.V.E.A.A. NEWSLETTER

January 1993

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NEXT MEETING

January 15th @ 7:30
College of Dupage
Student Resource Center
Room 1046

Use Lambert Rd. Entrance, Lot 7 at the Southeast corner of 22nd & Lambert
Nonmembers are always welcome!

Director

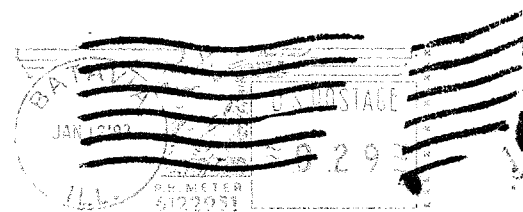
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MEMBERSHIP INFORMATION

Membership to the Fox Valley Electric Auto Association is open to the public. Anyone interested in electric vehicles or electric transportation are encouraged to join. The cost to join is \$15 per year from November to November. If joining in the middle of the year the cost is \$1.25 for every month remaining til November of that year. The cost for new members joining this month is \$13.75.

Fox Valley Electric Auto Association

336 McKee Street
Batavia, IL 60510



First Class

ADDRESS
CORRECTION
REQUESTED

...
:
: JOHN EMDE
: 6542 FAIRMOUNT AVE.
:
: DOWNERS GROVE, IL
:
:
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PRESEZ

Well, the quantity of articles on electric vehicles in the press continues. The past two months, more than ever before, have brought an exceptional amount of good information and press releases across my desk. Unfortunately I can't possibly put it all in the newsletter. There are a couple of articles that make for some very electrifying reading.

"Battery and Electric Vehicle Update"
Automotive Engineering -
September 1992
"AC Propulsion CRX, Harbinger of things
electric"
Road & Track - October 1992
The entire Issue of IEEE Spectrum -
November 1992
"Electric Vehicles: Why Now?"
"A breath of Fresh Air"
"Pursuing Efficiency"
"Architecting the system"
"The great battery barrier"
"Apples and Oranges"
"A different Spin"

Even Sports Illustrated had an article on the Peaks Pike electric vehicle race, which I included in this newsletter. Thanks to members John Emde, Carl Chapman, Leonard Fisher, Richard Johnson, Ken Woods and Mark Bohr for the article contributions to the library/newsletter.

Now for the bad news. With GM's financial hard times, it looks as though "Impact" project may be in trouble. Some people who have been following electric vehicles for the past 30 years have seen the promises of electric vehicles from the big three automakers rise and fall every 10 years, like sun spot cycles, and believe that this is another example. However, I am of the opinion that this really is a result economic hardships on the part of GM. Never before has a major automaker taken the electric vehicle as far as GM did with the Impact. I sincerely believe that they are or were very serious about intentions to manufacture this ground up designed EV.

Douglas F. Marsh

MINUTES OF DECEMBER 18, 1992 MEETING

The meeting at the College of DuPage was called to order by President Marsh at 7:38 PM. Fourteen members and two guests attended.

Treasurer Corel's report of \$ 2055.36 in the savings account and \$1422.14 in the checking account was approved. There were no corrections to the November meeting minutes.

President Marsh reviewed information received since the last meeting. These included the Australian newsletter, info on the World Solar Challenge, The Electric Grand Prix, and the Edison Electric Institute Competition to address infrastructure challenges posed by the electric car.

Director Emde reported on the FVEAA thank you sent to the Downers Grove firm that provided loading dock facilities used for participation in the June 21 Energy Fair in Amherst.

Members Tom Kaminski and Paul Harris attended Wisconsin's auction of 6 Unique Mobility vehicles on December 12th. News of this appeared in the November Newsletter. They reported about 100 persons stayed for this event. The cars had been stored in an open field for 5 years and their condition ranged from just tolerable to awful. None were operational and only one contained a battery set. Successful bids ranged from \$ 235 for what was essentially a parts car to a high of \$1100. Member Clark, who purchased Vehicle # 5 about a year ago, reported there were 40 cars built with an initial selling price of \$ 50,000 less a \$ 25,000 subsidy grant. There was considerable discussion about the vehicles and the auction.

Secretary Shafer announced availability of an 82 VW Rabbit, which will appear in the January Newsletter. He also noted that Member Brian Klosterman of Cedar Rapid Iowa has developed a battery charger that FVEAA members can purchase from him. He finally noted that Advanced DC electric motors are available from Rod Antrim who presented a program to the FVEAA. Member R L Johnson asked about use of a brushless DC motor. The question will be referred as an ASK THE FOX article to Member Dick Marsh, who recently broke his hip and is about to start rehab.

Secretary Shafer distributed draft copies of material to be used in an updated handout sheet. There was considerable discussion of what the handout should contain and its format. It was agreed that President Marsh would take the material and suggestions to assemble a final draft for the January 15th, 1993 meeting.

Member Clark suggested an inventory of member-owned electric cars be assembled. Members thought this was a good idea.

The annual election of officers resulted in the unanimous reelection of the present individuals in their same roles.

The meeting was adjourned at 10:05 PM.

Submitted by William Shafer

FUELING YOUR CAR

When you put gasoline in your conventional car, you are storing energy at a tremendous rate. The typical gallon of gasoline contains about 120,000 Btu. Since 1 kilowatt-hour of electricity is the thermal equivalent of 3413 Btu, each gallon of gas represents storage of 35 Kwh. The average gasoline pump delivers about 4 gallons per minute and has a refueling power level equivalent to 8,500 Kw. By comparison, the typical 15-amp, 120-volt branch circuit used for battery charging has a power rating of 2 1/2 Kw.

VW RABBIT FOR SALE

Jeff Kerr wants \$ 400 for his 82 VW Rabbit 5-speed, manual shift car that runs but has two bad cylinders. It is the type of car suitable for a FVEAA member to recycle and repower for electric drive (As a VOLTSRABBIT OR PLUGS BUNNY?) He reports the rest of the car is in acceptable shape. If interested you may call Kathy Hawkinson at 870-0900 during working hours or write to him at 118 North Gibbons in Arlington Heights, IL 60004.

EAA wish for 1800 Electric Saturns not to be!

Robert Van Iten, owner of Saturn of Naperville and Village Pontiac, Naperville, made a deal with Saturn's corporate headquarters to pave the way for high school auto shops across the country to receive 1993 cars about to be crushed.

Saturn recalled 1,800 cars with contaminated engine coolant. Instead of risking potential problems, the automaker started to smash them.

Van Iten found out about the problem and bought three of the cars. He donated one each to three area high schools - Naperville North, Naperville Central and Waubensee Valley.

Prompted by Van Iten's initiative, Saturn halted destroying the cars. Now at least 200 of the vehicles have been provided to auto mechanics classes throughout the nation because Saturn invited other dealers to buy the remaining cars and donate them.

The EAA had hoped to get Saturn to donate or sell the vehicles for conversion to electric.

Chrysler Reports Electric-Car Battery Deal

Reprinted from
Investor's Business Daily

Chrysler Corp. and Norvick Technologies Inc. announced a joint venture yesterday to develop a fast electric-vehicle battery-charging system.

The system allows quick charging of any type of battery - lead acid, nickel-cadium and nickel-metal hydrid batteries - without overcharging.

"With the right combination of battery and charge and our char-control technology, we can refuel electric cars as fast as we now pump gasoline," said Jiri Nor, Norvick's vice president of research and the inventor of the technology.

Chrysler said the Chrysler/Norvick smart-charging station will provide a full charge in about 25 minutes when a common 480 volts AC is supplied.

The charging station then converts the voltage to a lower DC voltage of 250 volts to accomodate today's electric vehicles, such as the Dodge Caravan.

However, Chrysler said the smart-charging system eventually will operate without any voltage conversion, allowing a complete charge in about 10 minutes.

Chrysler said it hopes to incorporate the smart functions of the quick-charge station into its electric vehicles in the next six months in order to provide universal charging stations that can adapt to improvements in battery technology.

"That translates into a far less expensive development," said David Smith, Chrysler's program manager for special projects.

Norvick Technologies is based in Burlington, Ontario.

Electric van plan shared by 2 firms

Reprinted from Los Angeles Times

Solar Electric Engineering Inc., the tiny Santa Rosa, Calif., company that produces more electric cars than any other U.S. manufacturer, has formed a joint venture with a Florida specialty automaker to produce an electric-powered utility van.

It would be the first electric van commercially available in the United States and is designed to meet demand spurred by the tax incentives favoring electric vehicles in the National Energy Policy Act of 1992.

Consulier Automotive of Riviera Beach, Fla., will build the shell, and Solar Electric will install the motors and drivetrain. Then plan to produce 100 units next year.

Though the vans will be available to the public, Gary Starr, chairman of Solar Electric, said he expects the first customers to be utility companies and other fleet users.

Chrysler and Ford plan to produce electric vans next year, but they will not be sold to the public.

Big Three May Join Forces To Develop Electric Vehicles

Consideration Of Joint Venture Comes As GM Reassesses Impact Program

By Paul A. Eisenstein
In Detroit

The Big Three automakers are discussing the formation of an unprecedented consortium that would allow them to share the costs of developing — and perhaps also building and marketing — electric cars.

Separately, General Motors Corp. could decide as early as today whether to continue or cancel the company's Impact electric vehicle project. The

Research

Impact, sources say, has been plagued by cost and technology problems and projections that show potential demand is likely to be far less than originally estimated.

The idea of an industrywide consortium is being driven by California's strict clean-air laws, which will require most carmakers to offer electric cars as part of their vehicle fleets beginning in 1998.

Until recently, GM has doggedly insisted on going it alone on electric car development, but suddenly that has changed, sources said.

The Impact "is an expensive program," said one GM executive involved in electric car development. "In better times, we might have been able to go it alone. Right now we can't."

This time, General Motors approached both Ford Motor Co. and Chrysler Corp. about pooling resources. The idea has received a warm

response from the other domestic automakers, which also are struggling to come up with viable, cost-effective electric vehicles.

"We are totally open" to the idea, said Alexander Trotman, Ford's president of worldwide automotive operations. "Everything is on the table."

Suppliers May Be Invited

Sources say leading suppliers also may be invited to participate, but the doors will be locked to the Japanese.

"We're going to be very parochial about this," said Trotman.

The Big Three already participate in a joint venture called the U.S. Advanced Battery Consortium, which is designed to foster development of more powerful electric car batteries. And they have discussed another joint venture to develop standardized charging systems that would allow electric vehicles to be plugged into the charge as easily as today's gas pumps connect to conventional automobiles.

But the newly proposed program would go much further.

"Right now, they're fighting over just what shape it will take," said one executive who expects to play a role in the ultimate consortium. "But I expect they will announce something by next week."

The most likely scenario, according to various sources, would be a joint R&D program.

"Where they could most effectively put their money is in the area of battery, motor and controller devel-

opment," said an executive with a leading supplier already heavily involved in the industry's electric car research. "They'd break it down into systems, and then, if one of the companies wanted to take its own approach, say, to batteries, it would go off and fund that piece on its own."

The battery consortium required federal authorization. It is likely the government also would take a keen eye to any larger joint venture. But the supplier executive believes the effort would not be blocked on antitrust grounds.

"I don't think you'll see any problems with the Clinton administration," he said, "considering their theme of restoring American competitiveness."

Push To Market

The domestic automakers are all committed to market their first electric vehicles even before the California law takes effect.

This month, Chrysler will begin production a battery-powered version of its popular minivans.

Next year, Ford will deliver the first 100 of its new Ecostar electric utility trucks, based on the same platform as its Escort passenger car.

The most aggressive of the Big Three programs, however, has been the Impact, a teardrop-shaped two-seater. To increase potential demand for the vehicle, GM has been trying to maximize its acceleration, billing it as much for its performance as its environmental benefits.

But GM's initial internal forecasts

now appear to be far too rosy. Sales projections, according to one source, have been cut by as much as 60%.

Reduced sales projections earlier this year prompted Rockwell International Corp. to bail out of the Impact program. Rockwell had been chosen to provide Impact's lightweight plastic body panels but determined it was unlikely to recover its investment.

That is the same problem faced by GM President John F. Smith. Desperately looking for ways to cut GM's multibillion-dollar losses, Smith has been slashing unprofitable programs. A source within the company's executive suites says the future of Impact has been a hot topic in recent days. A decision on Impact's future is likely to be finalized by next week.

"The problem is low volume and the fact that some of the (planned) technology doesn't work," said a GM source.

Tough Sell To Individuals

Even those industry officials bullish on electric vehicles concede initial demand is likely to be minimal because of the limitations of electric vehicles. With current technology, they will have a range of barely 100 miles and could require as much as eight hours to recharge.

Individual consumers aren't likely to find that attractive, so initial buyers are likely to be power companies and other ecology-conscious fleet operators.

To develop a consumer market would probably take government tax incentives and sharp cost-cutting by the manufacturers.

12-10-93

Volume Electric Car Production Is Put On Indefinite Hold By GM

By Paul A. Eisenstein
Investor's Business Daily

General Motors Corp. is pulling the plug on its plan to mass produce its Impact electric car within a few years, but the project could be switched back on as the result of an unprecedented new industry consortium.

GM had planned to introduce the Impact, a teardrop-shaped two-seater, by the mid-1990s. But it has revised its once-optimistic sales forecasts down to the point where it seemed impossible for the program to operate in the black.

"There's still a lot of uncertainty in the marketplace," said Frank Schweibold, the Impact program's director of finance and strategic planning. "We think we may be a little ahead of the game."

GM announced Friday it will build 50 Impacts next year as part of a prototype-demonstration fleet. They will be tested in California by fleet users and individual motorists.

But the company has put on indefinite hold its plans for high-volume production of the car at a plant in Lansing, Mich.

The decision, according to GM insiders, was forced by the automaker's ongoing financial problems. President John F. Smith has vowed to eliminate any project that can't make money.

"If economic times were better, it would have made things easier," said Schweibold.

But GM can't simply drive away

from electric cars. Under strict clean-air rules that will go into effect in California in 1998, virtually all carmakers will have to market electrics as a small part of their fleets.

That's where GM is counting on help from its Big Three rivals.

On Friday, GM, Ford Motor Co. and Chrysler Corp. announced that under the umbrella of an industry consortium, the U.S. Council for Automotive Research, they plan to investigate cooperation in the design, development, testing and manufacturing of electric vehicle components. Sources say it is possible that the carmakers could even jointly assemble electric vehicles.

"We have agreed to meet to look at whether it makes sense for us to cooperate on any or several aspects of electric vehicle development, and if so, which ones," said Don Walkowicz, USCAR's executive director.

Such a venture likely would require federal approval because of possible antitrust issues. Through USCAR, the Big Three already participate in a consortium aimed at developing more powerful batteries.

Batteries are the biggest weakness of the Impact and other electric vehicles. They typically limit an electric car's range to about 100 miles and normally need up to eight hours to recharge.

"If this effort with USCAR works out," said Schweibold, "it should come up with a better way to get an electric car the marketplace can accept."

GM REQUIRES SUPPLIERS INCLUDE PART MASS DESIGNATION ON DRAWINGS

USMA member, Larry Stempnik, an engineer who is working on developing the General Motors Corp. Impact electric vehicle, forwarded an interesting excerpt from a memorandum the company issued for suppliers. Subject of the memo was *Requirement of Part Mass on Electric Vehicle Drawings*, and it states:

"... part mass is required on all released drawings. Mass is a property of a part just like dimensions or materials. All parts will be inspected relative to mass and this part information on the drawing is essential to this process. Mass is an engineered property and the information on the drawing will give the supplier manufacturing immediate feedback on the correctness of the part & the estimate. Mass is an important program imperative and this will aid the process of controlling mass.

"... Based on typical GM car programs, we have set our build variation and we will establish 3-sigma limits to insure this level of mass control."

Stempnik notes, "Although it is not stated explicitly in the memo, it is understood by the reader that mass will be recorded on the drawings in kilograms or grams."

**Stanford Ovshinsky insists
he and his wife, Iris, are
making scientific advances,
building new industries**

BY HIAWATHA BRAY
Free Press Business Writer

Stanford Ovshinsky, a machinist with a high-school education, thinks he has invented the ideal battery for powering pollution-free electric cars. Ovshinsky's Ovonic battery will power a car for up to 250 miles on a single charge, and recharge in 15 minutes on less than \$3 worth of electricity. It'll last for the life of the car, and the chemicals inside will be as harmless as rainwater.

Ovshinsky's company, Troy-based Energy Conversion Devices (ECD), has yet to garner a major contract to produce the battery in large quantities. But Ovshinsky says that he's tested smaller versions of the battery so rigorously that "putting them in a car is kind of anticlimactical."

No one has ever accused Ovshinsky of lacking confidence. But since he and his wife founded ECD in 1960, the company has been criticized for making exaggerated claims for inventions that emerge from its labs.

Nobody denies Ovshinsky's remarkable record as an inventor. The self-educated physicist has won international renown for his work using amorphous materials, rather than silicon, in making electronic components. Companies around the world use Ovshinsky's discoveries in video displays, copiers, solar power cells and computer memories.

But so far, Ovshinsky's inventions have brought little profit to ECD shareholders. The Ovonic battery could change that. Major battery producers have licensed ECD's patents and are making Ovonic batteries for use in laptop computers and cellular phones. In May, the electric car consortium formed by the Big Three automakers awarded ECD a contract to develop a version big enough to power a car.

Says Ovshinsky, "I think there's going to be a new automotive industry now."

Ovshinsky and his wife, Iris, a biochemist and ECD vice president, seem inseparable, often holding hands as they stroll through the firm's factories.

"We work incredible hours, seven days a week and no vacations," said Stanford, "and it wouldn't be possible to achieve anything if we weren't working together as a team."

Ovshinsky's father Benjamin was a junk peddler who hauled his wares through the streets of Akron, Ohio, in a horse-drawn carriage. A committed socialist, Benjamin refused to own a scrapyard.

"He felt it was exploitative of other human beings," Ovshinsky recalled. His mother, also of Russian descent, was a factory worker.

Ovshinsky remembers himself as just one of the boys, but he was a voracious reader.

Inventing is team effort

STANFORD R. OVSHINSKY

AGE: 69

JOB: President and chief executive officer, Energy Conversion Devices, Troy.

PERSONAL: Born in Akron, Ohio, educated at Akron public schools. Lives in Bloomfield Hills with wife, Iris; couple has five children.

LAST BOOK READ: "Niels Bohr's Times," by Abraham Pais.

BIGGEST ACHIEVEMENT: Meeting Iris. "That changed the world for both of us, and since then we're both of us trying to change the world."

BIGGEST DISAPPOINTMENT: "I won't have several lives, because I've got so many things I'd like to still do."

I was leader of our gang" — he notes that the gangs of his childhood days knew nothing of Uzis and drug deals.

He often joined his father on junk-buying trips to factories. There he came to love complex machines and also saw the economic devastation wrought by the Great Depression.

"It was an experience that seared my mind," he recalls. Contrary to his father's distrust of capitalism, Ovshinsky saw that the best way to fight poverty was to build up strong businesses.

Meanwhile, his future wife was living a very different childhood just outside of Peekskill, N.Y. Iris' father was a translator specializing in Romance languages. Her mother was a teacher.

Iris entered Swarthmore College planning to major in French, but the work began to bore her. "My advisor had said that every well-rounded French major had to take biology," Iris recalled. "Within six months I had changed to be a biology major."

She graduated in 1947, then earned a master's degree from University of Michigan in 1950. Over the next decade she married, had two children and divorced. In 1955, she met Stanford, who himself had three children from a previous marriage. They were married in 1959.

"I decided I ought to go ahead and get a PhD so I could work with him." So, in 1960, she earned a doctorate in biochemistry at Boston University.

By contrast, Stanford taught himself physics in his spare time while working as a machinist.

These studies led to his development of amorphous semiconductors, which can perform many of the same tasks as traditional silicon semiconductors at far lower cost. Stanford and Iris founded ECD to commercialize

IRIS M. OVSHINSKY

AGE: 65

JOB: Vice president, Energy Conversion Devices.

PERSONAL: Born in New York City; holds PhD in biochemistry from Boston University.

LAST BOOKS READ: "Race," by Studs Terkel and "Plagues and People," by William O'Neill.

BIGGEST ACHIEVEMENT: "All five kids are working out great, and being so happy working with Stan."

BIGGEST DISAPPOINTMENT: Criticism that she and Stanford have not made ECD a more successful firm.

Today, major Japanese electronics firms like Sharp use ECD technology to make solar cells for pocket calculators. Matsushita makes an optical computer memory based on an ECD process. And Hitachi Maxell Inc. announced plans in September to make 2 million Ovonic batteries a month by the end of 1993.

But ECD has rarely turned a profit in its 32 years. Between July 1989 and June 1991, the company lost \$11 million. Still, ECD survives on revenue from patent license agreements, royalties and government research contracts.

Results aren't yet in for the 1992 fiscal year, which ended June 30, but ECD's vice president of finance, Nancy Bacon, promises a profit.

In the past, disgruntled shareholders have caused Ovshinsky some grief. In 1989, a shareholder group led by New York investor William Manning took ECD to court in an effort to make changes to the board of directors. As part of a settlement, Stanford and Iris agreed to take pay cuts.

Ovshinsky's defenders say his scientific accomplishments matter more than ECD's bottom line. Florence Metz, general manager of new ventures for Inland Steel Industries, works with ECD on superconducting materials. "I know Stan has his antagonists," Metz said. "Most of them are the hard-nosed business types. In my view, he is truly a genius."

Ovshinsky insists he's a businessman, not just a starry-eyed inventor. But he also has little time for people who look only for short-term profits.

"Iris and I are dedicated and committed to this not only as a business," he said. "We're doing something about pollution, we're doing something about war, we're doing something about building new industry and jobs. . . . I

Talk about an Electrifying Race

Making their way up Pikes Peak, electric and solar-powered

vehicles sped quietly toward the finish | by AMY NUTT

ON A FRIGID MORNING LAST OCTOBER, the narrow road that zigzags steeply up Pikes Peak was dotted with strange-looking vehicles. Their drivers seemed to be speeding around the road's 156 curves, but the roar of revving engines was eerily absent as the cars raced against the clock. When 41-year-old veteran race car driver Jerry King crossed the finish line of the 5.5-mile course in electric car number 54, his car had literally hummed its way to victory over the three others in the electric stock division of the inaugural Pikes Peak Solar/Electric Challenge.

A recent renewal of interest in alternative-energy automobiles led the Pikes Peak Auto Hill Climb Association to sanction the unique event. Before the race Pat Riley, its organizer, said, "It is the most challenging test ever staged for zero-pollution vehicles. We're hoping it will educate the public, provide ideas for engineering advancements and, of course, be a lot of competitive fun."

Neither fun nor the thrill of competition seemed to be on the minds of the participants at prerace powwows. As one race official said, "When entire pit crews have Ph.D.'s in engineering, you don't hear the usual chalk talk before a race. These guys definitely have a different agenda." That agenda included two pressing issues: 1) Where could extension cords be found? (Owners were having problems plugging their electric cars into

their motel room sockets.) And 2) Why did race officials insist that each car carry a fire extinguisher when a box of baking soda—in case of battery leaks—would be more useful? (Apparently the organizers didn't know any better.)

Lon Gillas, owner of E-Motion, a McMinnville, Ore., company that specializes in converting gasoline-powered vehicles into electric ones, had another concern. Two days before the race, he and his wife, Laura, had received a message at their Colorado Springs hotel. Mike Allen, an editor at *Popular Mechanics* and a part-time stock car racer, would not be able to drive the Gillases' converted electric Triumph as planned.

After a few frantic phone calls, the Gillases reached King, a veteran of a dozen Pikes Peak auto climbs. He agreed to race in the Triumph, but there was one hitch: King had never driven an electric car. So the next day, just 24 hours before the start of the race, he went for a spin in the TR-7 during the morning rush hour.

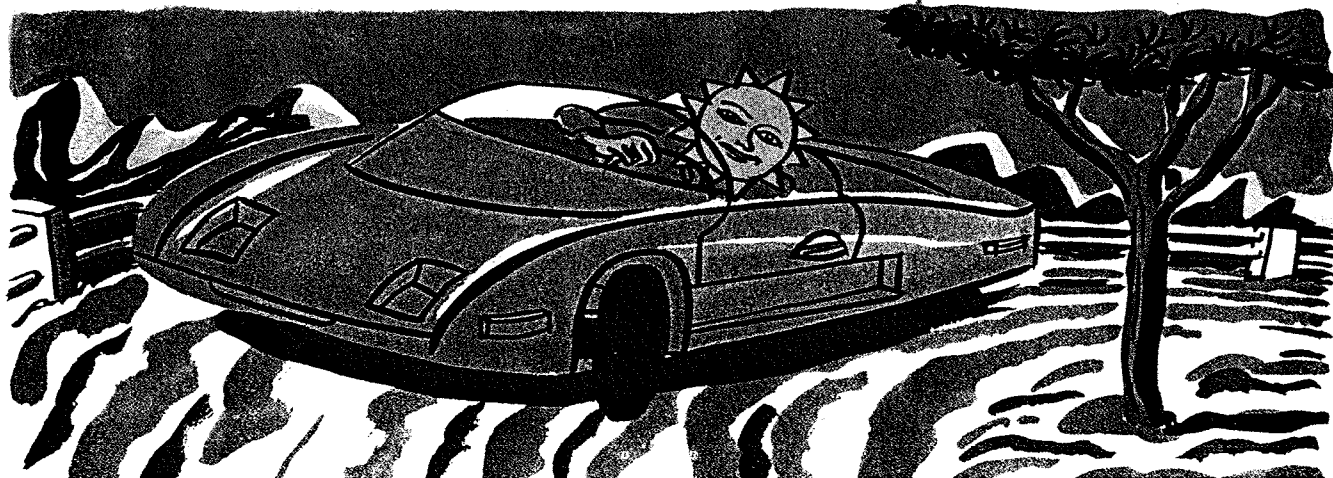
King's lack of practice time, however, was not his main worry the morning of the race. It had snowed the night before, and the four-foot drifts on top of Pikes Peak threatened to cancel the event. An hour before the scheduled 10 a.m. start, organizers decided that the cars, instead of racing 12.5 miles to the summit, would run up Pike's halfway course to Glen Cove, at 11,440 feet, a little less than half the original distance.

When the first car whined off the starting line, the temperature was only 19°, but a brilliant sun had turned the mountain road into a meandering river of mud. Many of the lightweight solar-powered cars had difficulty getting traction, and they sometimes spun dangerously close to the sheer drops at the edge of the dirt-and-gravel road. The Gillases' Triumph, which was loaded front and back with a total of 1,500 pounds' worth of six-volt golf-cart batteries, was able to speed around the course's many curves with minimal skidding and loss of time.

And what were King's impressions of his first electric car race? "The biggest surprise was when I went into the first turn and realized the car wasn't decelerating," he said. "A gasoline engine will automatically brake when you shift gears, but these electric motors just keep spinning. You have to adjust by taking wider turns and braking a whole lot more."

The Gillases' win was further vindication of their commitment to improving air quality while saving money. Chauffeuring their children to various after-school activities in the family's electric car costs the Gillases only about 25 cents on a typical day, \$2.35 less than it would with a conventional car. Of course, having to juice up the station wagon overnight does add one more item to the family's checklist at bedtime. Let's see. Bring in the dog, lock the doors, turn off the lights and—oh, yes, plug in the car. ■

ILLUSTRATION BY EDWARD BRIANT



Plug In and Commute

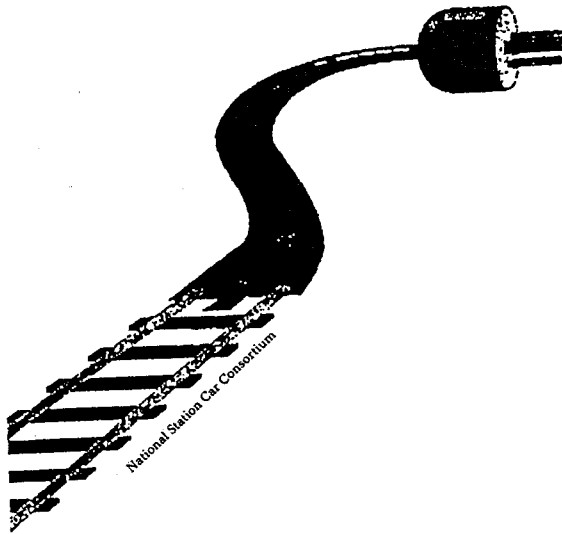
"Using the body electric," wrote Walt Whitman. And now a group of modern-day enthusiasts is waxing poetic about the possibilities of the highway electric. They're promoting the use of the electric car as a "station car" to ferry commuters home from the station and back again in the morning.

In June, representatives of transit agencies and utility companies from eight metropolitan areas met in Chicago to talk about the feasibility of the idea—particularly where the money would come from. The group, which was to meet again this month in San Diego, agreed to form a National Station Car Consortium to develop the idea further.

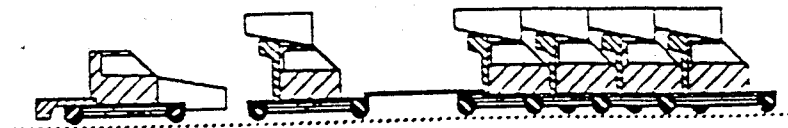
The transit agencies and the utilities appear to have somewhat different aims in this project. Key goals of the transit operators are to expand parking capacity at transit stations and to reduce emissions from conventional vehicles (thereby meeting federal Clean Air Act standards). The utilities are interested in promoting electric vehicles.

According to one of its organizers, Martin J. Bernard III, the consortium would evaluate various schemes to reduce battery charging time, and would consider such issues as whether the vehicles should be leased or owned by commuters. Bernard is a principal of Bevilacqua-Knight in Oakland, California, and a consultant to the Electric Power Research Institute in Palo Alto.

All this may sound familiar. In 1968, the Stanford Research Institute issued a two-volume report on "future urban transportation systems." It included a description of a "public automobile service" that would "provide rental automobiles on a trip-by-trip basis." The writers added that the "principal technical challenge of the PAS system is the development of an adequate and economical propulsion system," most likely a battery-powered car. Almost 30 years earlier, literary critic Granville Hicks described something similar in *The First to Awaken*, a futuristic novel set in 2040.



A solar-powered charging station at the University of South Florida. The Tampa facility, operated by the College of Engineering, is used to evaluate electric vehicles for potential commuter use.



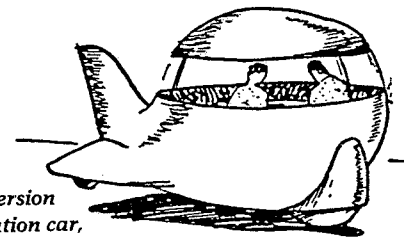
Proponents say six two-passenger "stackable" cars would fit into one regular parking space. The front and rear sections would fold up, allowing the vehicles to stack together like a line of grocery carts.

Details are now being worked out in the Boston area for a test of the station car concept. James Hogarth, the electric vehicle product manager for Boston Edison, says a group led by the Massachusetts Division of Energy Resources intends to buy up to 50 electric cars and park them at rail stations for lease to commuters. In addition, one or more parking garages owned by the Massachusetts Bay Transportation Authority would be equipped with a solar-power charging station. Eventually, if the scheme works, up to 50 garages, topped with photovoltaic solar panels, could ring the city.

A major reason for the state's interest, says Bernard, is the recent decision to adopt California-style air pollution standards in Massachusetts and New York. The new standards will require that, by 1998, two percent of all cars sold in those states must be "zero-emission vehicles." By 2001, five percent of all car sales must be zero-emission, and by 2003, 10 percent.

Part of the Boston project's estimated \$3.3 million cost will come from the state, utilities, and MBTA. But 80 percent will come from the congestion mitigation and air quality section of the new Intermodal Surface Transportation Efficiency Act. According to George Schoener, chief of the intermodal division of the Federal Highway Administration, such activities are clearly eligible for funding under that section "and probably under the surface transportation section as well."

Transit agencies elsewhere are inter-



A 1940 version of the station car, drawn by architect Richard Bennett for a futuristic novel by Granville Hicks.

ested, too. Last year, the Chicago-area Regional Transportation Authority hired Packer Engineering to study the feasibility of developing a "stackable" electric car as a way of getting more cars into commuter station parking lots. "We concluded that it was workable," says Michael W. Rogers, a transportation engineer for Packer. "The technology is potentially out there for a foldable electric car that would be safe enough for highway use."

How to charge the batteries of electric station cars is a question that may be answered by a demonstration now getting started in the San Francisco area. The Bay Area Rapid Transit District is working with Pacific Gas and Electric to install a charging mechanism, manufactured by Hughes Aircraft, at BART's Lafayette station. Victoria Nerenberg, BART's senior research and development administrator, says PG&E will supply the vehicles.

Ruth Knack, Planning

Developing electric car prototypes has become a growth industry. This one is from Volkswagen.

How It Would Work in Southern California A decentralized region like Southern California requires a transit system that serves not only a huge number of origins but also a huge number of destinations. We need an integrated system that can provide door-to-door service.

Imagine this scenario. It is a Monday morning in the year 2002, and you're off to work. You jump into a two-seat electric vehicle—owned by the Southern California Transportation Cooperative—that has been recharging overnight in your garage. You insert your membership card into a slot in the dashboard to start the car and record your use.

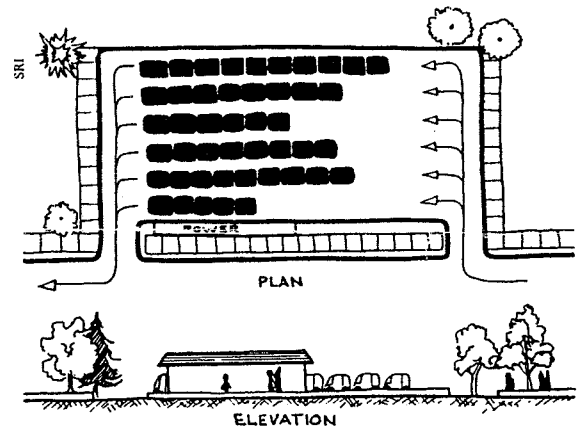
When you reach the nearest station of the high-speed line, you park at the end of a long row of similar vehicles and remove your membership card, thereby recording your use in a central computer. The same card admits you to the transit station. From there you are whisked at a speed of over 60 miles an hour to a station near your office. There, another line of small electric cars awaits you, many of them dropped off this morning by commuters like you.

You enter the first two-seater in line, insert your card, and begin the short hop to your office. At lunchtime, you might use the vehicle to drive to a nearby restaurant. At the end of the day, you reverse the whole process to return home. No electric cars would be available at the relatively few downtown transit stations. Rather, downtown employees would walk to their offices or ride a shuttle or people mover.

The idea of the transportation cooperative is at the heart of this system. In Southern California, it now costs about \$4,000 per year to own and operate an automobile. If each of the region's six million households gave up its second car and put that money into a cooperative, \$24 billion would be available in just one year to start the new system. Even after subtracting operating costs—let's say \$2 per passenger trip, or about \$6 billion per year—we would have \$18 billion a year to service a one-time construction debt of more than \$180 billion. That's enough to buy three million electric cars (at \$10,000 each), build 3,000 miles of high-speed line (at \$50 million a mile), and refund more than \$1,000 to every household.

The system I am describing essentially creates a new public transit grid that overlays the existing street and freeway grid, allowing passengers to transport themselves at each end of the trip. It requires no new technology. The electric vehicles are already being manufactured, speed rail systems are being put in place across the country. I believe that we could pay for such a system without adding a single dollar to our transportation budget. Most important, such a system would maintain the high standard of personal mobility that's the hallmark of decentralized regions like this one.

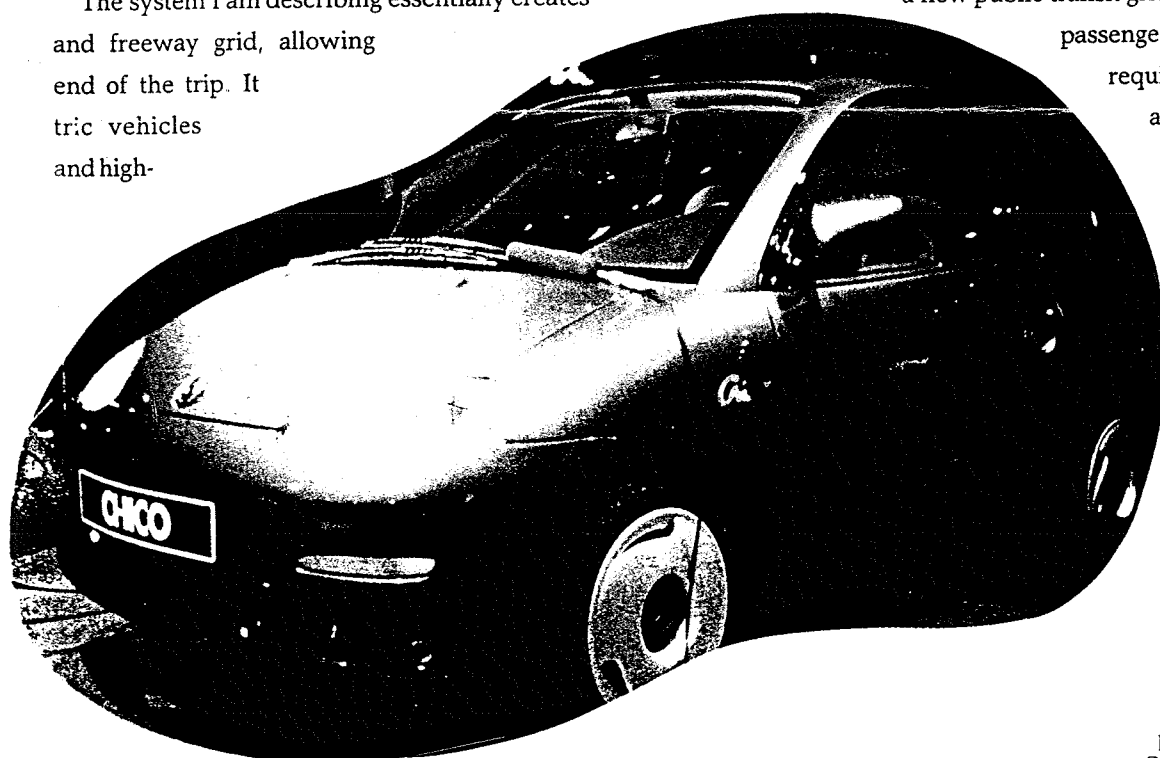
SRI's 1968 report for HUD's Urban Transportation Administration included a plan for a parking lot for electric cars. It was to be equipped with battery chargers.



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Robert J. Paternoster, AICP

Paternoster is the director of planning and building in Long Beach, California.



Courtesy: Bevilacqua-Knight