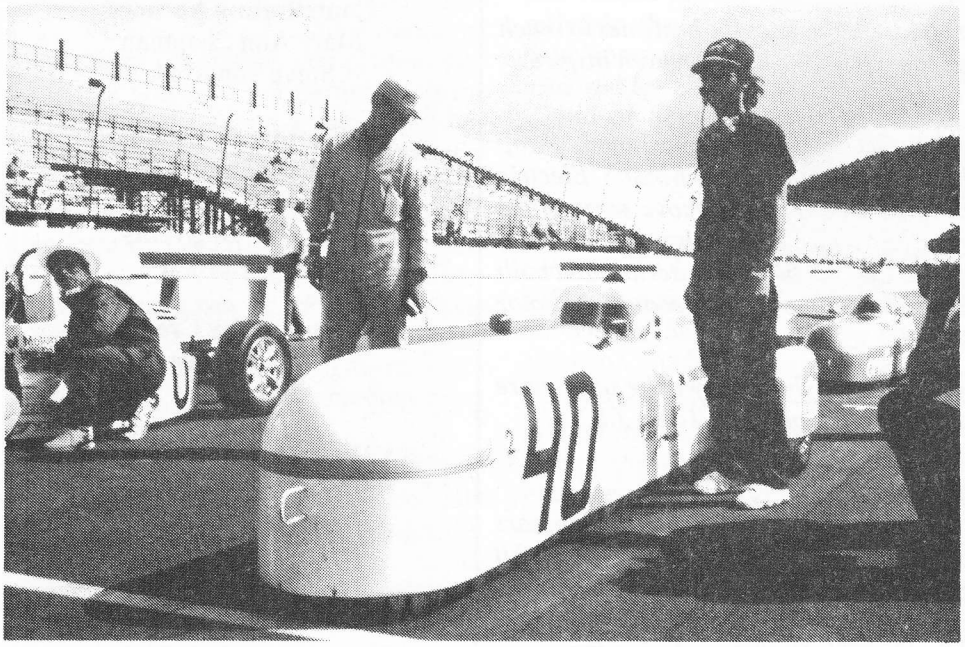
ELECTRIC AUTO ASSOCIATION

CURRENT EVENTS

May 1994 | *Promoting the use of electric vehicles since 1967* | Vol. 26 No. 5



APS Electric 500 Wins Front Page of NY Times

BY CLARE BELL

The Phoenix electric racers were singing in the rain this year, but even the downpour couldn't dowse the spirit of the Electric 500. Participation by Canadian, Mexican and Japanese teams turned the race into a truly international event. Front page coverage from the New York Times boosted the alternate energy competition to national attention (see "Electric Cars are Racing into the Future" by Matthew L. Wald, NYT National Ed. Monday, Mar. 21, 1994) with an action shot of a battery-swap pit stop by Tim Moser in Schneeveis' "SnoWhite".) Page A8's photo showed the Open 3 Feature, with Billy Roe in the Exide EX-11 Lola edging out Moser in the finish. The EX-11 also set a new EV one-mile closed course speed record of 107 mph.

As the NYT said,"If the era of electric transportation is about to dawn...the clues of its shape are here." Running on a new 1 kilo-amp controller designed by Otmar Ebenhoech, SnoWhite smoked the rain-slowed Lola in the Open 3 sprint race by 2 laps. The Schneeveis team reported 850 motor amps at 240 V. Cracking fast battery swaps were critical to the sprint win. Sno White was the second EV to break the double-zero barrier with a 100.228 mph lap during practice.

High efficiency and careful use of battery capacity played a major part in

Continued on page 6

Electric Moose Runs Wild

BY ADI GOLD, SUE-ANN MA & SARA SPETH

In the quiet town of Palo Alto, a group of six students from Jane Lathrop Stanford middle school are producing two solar powered cars, the first of which is nicknamed the "Electric Moose." These six eighth grade students form a diverse group of three girls and three boys. Dave Fidler, Adi Gold, Mike Salzman, Sue-Ann Ma, Dan Fisher and Sara Spieth, together with their Industrial Technology teacher, Bradley Booth, form "Team J.L.S.". They work hard to solve and overcome the many problems and difficulties that arise in the construction of the construction of the "Electric Moose"

The whole dream began with the GM Sunraycer software and video. Students were excited to see that energy from the sun could actually power a car. Some of the students got involved in building a PV (Photo Voltaic) Power

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FEATURES

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Editor's Note

By Clare Bell

Welcome Team J.L.S.

The key to the future lies in reaching young minds. Sometimes the best ones to reach those minds are their young collegues. And sometimes the kids can even inspire us know-it all adults.

This issue, CE is proud to present Team J.L.S., six youngsters from Jane Lathrop Middle School in Palo Alto who describe their all-solar all-kid-built "Electric Moose". Industrial Technology Instructor Brad Booth helped move some of the grown-up obstacles out of the way, but for the most part, the kids hatched the idea, got a proposal together, won funding, designed the car, bought materials and built the car. They wrote the article too. And came up with the name (because the solar panels look like Bullwinkle antlers?).

Enjoy the article. Show it to your kids. Who knows, maybe there will be some more "electric mooses" (meeses?) running around soon. Good job, Team J.L.S.!

Every Crash has a Silver Lining?

The DOE High School race was a real fender-scraper this year. With 36 cars entered and 33 starting, the crowded track was ripe for casualties. Two entries hit the wall; #6 and a Ford Escort. The young drivers were unhurt, though shaken. The crashes, though alarming, had a bright side; they provided needed and rare information about how battery boxes behave in unibodied cars during impact.

Post-race examination of the crunched vehicles showed that simple screw or bolt mounting to the unibody is insufficient — in DOE car #6 the screw mounts tore 4-inch slots in the sheet metal before being stopped by the roll cage. High voltage cables also showed vulnerability — in another wrecked EV the neoprene insulation on the 2/0 welding cable peeled back when the cable was dragged through a grommet hole, exposing a one-foot length of stripped copper. No doubt there will be future guidelines for securing battery boxes and cables, not just in the high school class, but in the Stock and college classes as well.

CE would like to point out that one of the functions of the APS race is to develop EV technology for street use. That also includes safety. If the result of this year's high school competition is a better understanding of how batteries should be contained and mounted in a conversion car, then the event has more than paid back its cost in terms of sweat and tears. We mourn with the high school teams whose lovingly prepared babies got bashed. Hopefully those cars can be repaired and the knowledge gained can be used next year.

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Front cover photo:
Team ELEMATE member eyeballs Cloud #40 (Clark Beasley). "Thousand Amp Fred" stands ready for start.

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Article Submissions

If you would like to submit an article for Current EVents—the preferred form is on a floppy disk, formatted for DOS (Ascii Format) along with a printed copy of the article. Also include camera-ready photos or graphics or include TIF formatted files with your copy. The deadline for articles is the 1st of the month. Articles submitted after the 1st of each month will be retained for future issues of Current EVents. Contact Clare Bell, Managing Editor for further information.

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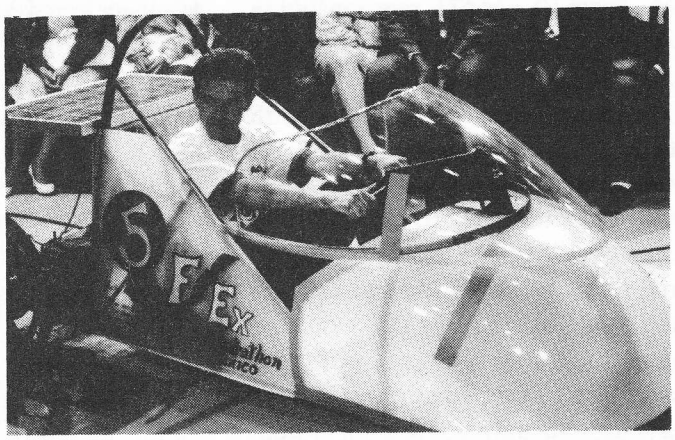
Electrathon Competition News

Season Starts With A Full Race Schedule And New National Cooperation

By Steve Van Ronk

Following two years of isolated development of this exciting sport a new movement to unify the efforts of numerous Electrathon groups is now underway. During the recent SERA Electric 500 several of the original leaders of American Electrathon competition discussed ways to cooperate in joint promotion of the sport. Proposals are being drafted to include both currently defined class rules into the establishment of national competition regions. An international association is also being discussed with possibility of expanding classifications to include new vehicle configurations within the Electrathon format. Current vehicle classes and some of the most active organizers of Electrathon competition include the following.

Electrathon America in Southern California maintains rules for the classic Formula Electrathon (F/E) vehicles. Originally based on the most refined Electrathon vehicles in Australia, F/E racing emphasizes high efficiency streamlined vehicles competing on oval courses for maximum speed and distance. Current F/E record is 36 miles in the one hour competition achieved by Dave Cloud of Seattle Washington. Electrathon America has been active in promoting F/E racing across the United States and into Canada.



F/Ex Electrathon vehicle gets international coverage throughout Latin America.

Clean Air Revival in Northern California developed Formula E-experimental (F/Ex) class rules to emphasize acceleration, braking, and handling in vehicles that are much cheaper and easier to construct than the sophisticated F/E racers. F/Ex races are commonly held in autocross type courses using pylons in a parking lot. Due to the simplicity of both constructing vehicles and come an excellent educational program popular in high schools across the country.

Jordan Energy Institute in Michigan has 29 high schools signed up for their first competition to be held on June 11th. Jordan's competition uses F/E rules writ-ten by Electrathon America. Teams and organizers are considering other races to be potentially held this summer. Although the first race is limited to Michigan high schools, the possibility of opening future races to adult competitors and out of state entries is being discussed.

The Electron Run in Oregon, has already begun the racing season with their first race held on March 12. Using F/Ex rules developed by Clean Air Revival in 1992. The Electron Run has six races planned between now and June. Electron Run participants include 25 high schools who have each received from $500.00 to $750.00 in sponsorship to help with construction of their vehicles. Prizes of over $1,500.00 have been offered to winning teams. These races are limited to participation by high schools in Oregon.

Schools in Mexico have had two races featuring F/Ex vehicles. They are planning potentially 5 to 6 more during the coming year. The Mexican groups are working toward presenting an international invitational competition in October open to all classes of vehicles.

Electrathon programs have emerged in Florida, Nevada, Idaho, Hawaii, Colorado, Kentucky, Washington, Vancouver B.C., Indiana, and Wisconsin. More information on the individual groups and a new newsletter specializing on Electrathon and ultralight electric motor sport is available from *SolarEVolution*, 105 N. 1st Ave. #125; Sandpoint, ID 83864. Photos, articles, and submissions are welcome from all Electrathon and light EV motor sports enthusiasts. — SVR

Team ELEMATE Braves APS 500

Team ELEMATE participated in the APS Electric 500 to gain experience with EV racing and to gather information about the sport with the intent of promoting it in Japan. A Japanese solar and electric race, which will count toward the FIA Cup, is scheduled at the Japanese F1 Grand Prix, Suzuka Circuit, August 6th and 7th, 1994. Team ELEMATE would be grateful for any assistance from experienced EV racers in putting on the first Japanes solar and electric competition.

For more information on the Elemate #1 EV Formula, contact Kiyohito Endo, #201 2-10-11 Aoyama, Minato-ku, Tokyo, tel. 81-3-3401-8751, fax. 81-3-3401-1246.

Because these Japanese EV enthusiasts have not previously organized an EV race, they anticipate some difficulties and suggest that the first event may just be doing demonstration runs of EV racers including Team ELEMATE's electric Formula car.

Team ELEMATE is completely supported by amateur volunteers, who have paid all expenses for building the EV Formula car and participating in the race. The team expressed appreciation to Arizona Public Service, Solar and Electric Racing Association and everyone who organized the race and provided the opportunity to participate.

Team members

Director: Tadashi Taeuchi (automobile critic) Driver: Yasuo Muramatsu (editor, Japanese edition of 'Playboy' magazine) Managers: Kiyohito Endo (manager, advertising agency) Kiyomi Yamada (employee, manufacturing company) PR staff: Naotsugu Mihori (journalist) PR Staff for Japan: Hirohisa Kaneko (journalist) Photography: Osumu Yajima (employee, advertising agency) Chief Engineer: Kotaro Tanaka (auto body shop manager) Electrical Engineer: Tesuya Fujisawa (research institute employee) Friends: Jun Saito, Masanori Taguchi, Kei Kato, Shigeru Osawa, Drey Dirks, Yukari Muramatsu

Current EVents welcomes Team ELEMATE to the 1994 APS Electric 500. They performed well and we hope to see them back next year. — CB, from Team ELEMATE press release.

Tech Spec Box

ELEMATE #1 EV Formula Car

Make/Model: Formula Junior

Style: Open-wheel Formula racecar

Wheelbase: 2.2 meters

Motor: Advanced DC 45 HP

Voltage: Not available

Controller: Not available

Batteries: 12 V starter batteries (used on Honda Civic)

Charger: Not available

Weight: 680 kg or 1496 lb.

Top Speed: 150 km/hr

Editorial

Continued from page 2

The crash results also point out the value of requiring competion class roll cages. Cages are a royal pain in the tail to put in (I know, I helped install two!) but they are vital to driver safety. The battery box in #6 was stopped short of the driver's seat by the rear roll cage member. During an impact, remember that the mass of a 700 or 800 lb battery pack is effectively multiplied by the impulse force, often by a factor of about ten. Instead of holding 700 lbs, the mount has to hold 7000! It is no wonder that bolts shear, screws strip and sheet metal tears. Roll cages, on the other hand are designed to withstand the forces generated by high-speed collisions and roll-overs. Kudos to SERA for making an unpopular but needed requirement.

In a vehicle with a frame, such as a VW bug or kit car, the battery boxes and racks are mounted directly to the frame members for greatest safety. That's pretty straightforward, even if not always obeyed. The art of mounting batteries in the current late-model unibody cars which lack frames, is trickier than it looks. If the batteries are in the passenger compartment, which is usually the case in such cars as Rabbits and Geo Metros, mounting and securing becomes even more critical. Because of the results of the high school crashes, CE plans to run an article on some better ways to mount battery boxes in unibody vehicles. Securing batteries can be done effectively and safely without major additional expense if the installation is planned out beforehand.

Another New EV World Record Set — The Old Fashioned Way!

By Mary Ann Chapman

At 10:30 a.m. on Friday, March 18, during the opening ceremonies of the 1994 APS Electric 500, Diversified Technical Service's Dan Parmly Sr., and Tom Convey rolled across the finish line at Phoenix International Raceway to set a new EV enduarance record of 1048.8 miles in 24 hours.

They did it the old fashioned way — on city streets and freeways, through stop signs and traffic lights, with a well-worn series-wound GE motor, plain old Trojan T-145 flooded lead-acid batteries, in a Chevy S-10 truck that showed 98,000 miles when it was converted in 1992 and has since been driven more than 20,000 miles as an electric. It was the same truck, in fact, which went from Santa Monica, CA to Jacksonville Beach, FL in a little over six days in the fall of 1992. The only high-tech thing about this record was the American Monarch gas-point-detecting battery chargers that kept the five 120 V swap packs charged up throughout the run.

For EcoElectric Corporation, this project began when John Witt and I read in the newspaper on Febrary 17 that Solectria and EPTI had set a new world's record of 831.8 miles on Atlanta Motor Speedway, using a fast-charge system. We looked at each other and simultaneously said, "Hells bells, we can do better than that. Call Dan!" (Apparently this was not a unique thought, as I have located at least three other people who claim to have originated the idea.)

We calculated that in the controlled environment of PIR, we could do 1200 miles using Diversified Technical Service's proprietary quick swap-out system. Unfortunately it was quickly determined that there was No-Way-Jose of getting on PIR anytime soon. It was booked solid. Did this deter us? Of course not. In fact, as Dan pointed out, it would be simpler to just use the swap-out station already set up at the Arizona Public Service downtown Phoenix maintenance facilty and set up a 44-mile course running between there and PIR. Even with traffic, we should be able to make 1000 miles. With his usual zeal for including absolutely everyone, Dan started signing up sponsors and drivers.

And so, with a fanfare of Parmley rhetoric and the humming of video cameras, the first run rolled out of the APS maintenance yard at 10:30 a.m. on March 17. At PIR the driver and passenger swapped seats and headed back. While they bailed out of the truck, the old pack was whisked out and the new one installed in less than two minutes, and the truck was rolling again. After a few turns, the project settled into a routine. With each change of drivers, the mileage was recorded, and each battery swap was videotaped, with a timestamp.

The calm was interrupted late in the afternoon when someone heard on the radio that part of the freeway portion of the course could be closed all night for road repairs! Quickly a new course was plotted, covering several more miles of off-freeway streets. Surprisingly, the new course time was about the same as the original one.

John Witt was concerned about getting through the night intact. He kept saying, "I've run these 24 hour races. Around 3 a.m., it's not fun any more." But the DTS team performed well throughout. As the night wore on, they honed their battery-shlepping skills and actually got the time down to under one minute. There was great celebration and toasting with coffee from the nearby all-night convenience store when the young old record fell around sunrise.

Of course it couldn't have been done without the sponsors: Arizona Public Service, American Monarch, General Electric, Sunbelt Battery, and Todd Engineering. And the enthusiastic crew of drivers: Dan Parmley Sr., Tom Convey, Craig Heathcoat, Dan Parmly, Jr., Matt Lanser, Jon Greer, and Don Reynolds of Diversified Technical Services; Mary Ann Chapman, John Witt, D. Evans, and Don Traicoff of EcoElectric Corporation; Ray Hobbs, David Bentler, and Carolyn Dohrwend of Arizona Public Service; Ed Fiore of American Monarch; Jesse James and Kitty Rodden of Trojan Battery, Brian Goyetche of Nova Scotia Power; and Curtin Harbin of Todd Engineering.

So I guess now there are really two records — Solectria/EPTI have the quick charge record and DTS has the swapout record. But surely you don't have to ask which one we think is the *real record!* And if this doesn't prove that the electric vehicle is ready for everyday service in real life circumstances, using todays's technology, I don't know what would! - MAC

APS Electric

Continued from page 1

Dave Cloud's Open 2 win over an EV Formula car fielded by Team ELEMATE from Japan. Team ELEMATE's pit stops were blazingly fast, with two-battery swap packs hand-loaded on the EV Formula racer while the body was off. But they were up against Cloud's torpedo lightweights and a designer/builder who has honed his edge in high-efficiency Electrathon competition. Beneath a (briefly) blue Arizona sky, the Clouds sailed by — lap after lap. Despite good teamwork and a valiant effort by the EV Formula, the Elemate team couldn't make up the distance lost to pit stops. (See photo essay — A Tale of Two Teams)

The college hybrid competition turned pure electric when some competitors decided to save weight by pulling out ICE components for the 25-lapper. Was the DOE rep irritated? "Hey, this is a fun race," was the reply to a query by cameraman Dick Rahders. The Canadian hybrid entry from Marian Academy, #43, was probably the best looker in the class to start with until it had an argument with the wall. (Details on the college hybrid and high school races in next issue).

A Sunny Side Up egg-yellow GM Impact pace car led the Stock Electric Feature pack. Despite the recent EV speed record of 183 mph set on 3/13/94 by a modified (400 V pack and 3 to 1 gear ratio instead of the stock 11 to 1) Impact at the Fort Stockton, Texas test track, GM declined to put the Impact into competition, although Tom Sneva cooked Sunny Side Up in a 93.594 mph demo lap.

680 lbs of Ovonic nickel-metal hydride batteries and a no-pit strategy sent Solectria's James Worden to a Stock A/B Endurance Feature win. Worden did 125 miles in 1:55 at an average of 65.036 mph, with a fast lap of 71.949 while using only 80% of the pack's energy.

The Ovonics nickel-metal hydrides performed so well that a Solectria employee said that the company hopes to do a 220 mile run during NESEA's May American Tour de Sol. Nickel-metal hydrides have been available for a few years as "green battery" drop-in replacements for AA Nicads. The only drawback appears to be a high self-discharge rate leading to a short shelf-life in the AA version. Zero toxicity and light weight (1/3 that of a comparably energy-dense lead-acid pack) makes them excellent candidate for EV batteries. Power density also looks good. Estimates are that a nickel-metal hydride powered Impact could go 160 - 300 miles on a single charge.

The Stock A victory will undoubtedly strengthen the new alliance between Solectria and Ovonics. GM is also interested in nickel-metal hydride and has announced a joint venture with Ovonic to commercialize the technology.

A nickel-iron powered Solectria Force fielded by Crowder College completed 116 laps at a 60 mph average to take 2nd in the Stock A/B Feature. U.C. Davis' Electracar took 3rd, running on sealed zinc-bromine and running 111 laps at 57.509 with a fast lap of 71.062.

Stock B's, running on lead-acids and required to meet the new gross vehicle weight regulations, depended on hot-charging. The Salt River Project Ford Probe came in for fast recharges from a trackside Norvik Minut-Charger unit running off a diesel generator. Powered by a well-vented Cocconi AC drivetrain and Optima twelve-volters, SRP's entry circled the track at a fastest-lap of 84.674 mph, but speed couldn't compensate for the 4 recharges required by the Probe's lead-acid batteries. The SRP entry took 4th, completing 105 laps.

John Busath's #44 lead-acid Geo Metro completed 98 laps without pitting. Gary Jackson's re-vamped #43 killer Rabbit went 92, recharging at least once from a trackside dump pack. C.E.'s Clare Bell, driving her first Phoenix in the Women's Electric Racing Team (WE'RE-IT) Rabbit #6, completed 80 laps with three near perfect hot-charges. The only glitch was an overheated inline circuit breaker that popped during recharging. The Rabbit was pushed out of the pits to avoid tripping the breaker during acceleration back up to race speed.

Rod Irwin's slick-looking Taurus #7 took the record for fastest in-the-pits assembly, but #7, plagued by a dragging front brake, managed 72 no-charge laps. Previous B-stock terror #13 Porsche owned by Clare Bell and driven by Eco-Electric's Mary Ann Chapman, got over-juiced at the second hot-charge pit stop and boiled several 12V batteries. Quick battery replacement got a determined Chapman back into the race for 70 laps before the checkered flag fell.

The faster stock cars never got a chance to really strut their stuff, since the Saturday 25-lap stock sprint race was cancelled by an Arizona deluge. Oh well, at least the Gila River didn't try to eat the parking lot. *—CB, (with thanks to Chris Yoder, Olaf Bleck and Otmar Ebbenhoech for their Internet postings.)*

Electric Moose

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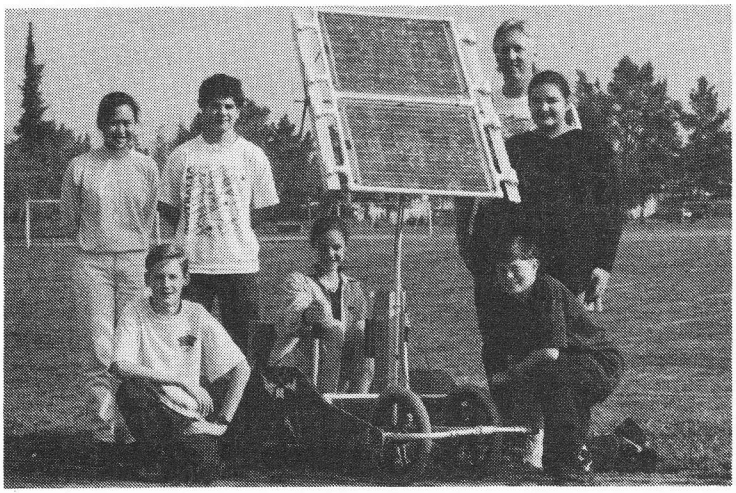


Team J.L.S. shows their Electric Moose.

Station with the objective of learning about electronics, alternative energy sources and transportation.

Last year, a group of four students took the time to propose a grant for $1,500 to build two solar powered vehicles. The grant was funded by the Palo Alto Foundation for Education and was immediately put into good use. With the donated money, Team J.L.S. bought materials needed to build the cars, such as four efficient solar panels, a motor and other necessary materials.

We (Team J.L.S.), researched this project, in part, by going to an electric car workshop in Santa Rosa. There, we saw electric vehicles built by local high school students and adults in the Bay Area, and learned the basic information we are presently using while constructing the "Electric Moose". Also, Bob Schneeveis, an electric and solar car expert, consulted with us and gave us plenty of very useful advice.

The "Electric Moose" is designed in a way that makes it easy to correct or improve any errors. The chassis is made from 3/4 inch electrical metal conduit, which we cut with a standard tubing cutter. The car can be easily taken apart and reassembled since it does not require any welding. Instead it is connected with compression fittings, with U-bolts used to connect round surfaces.

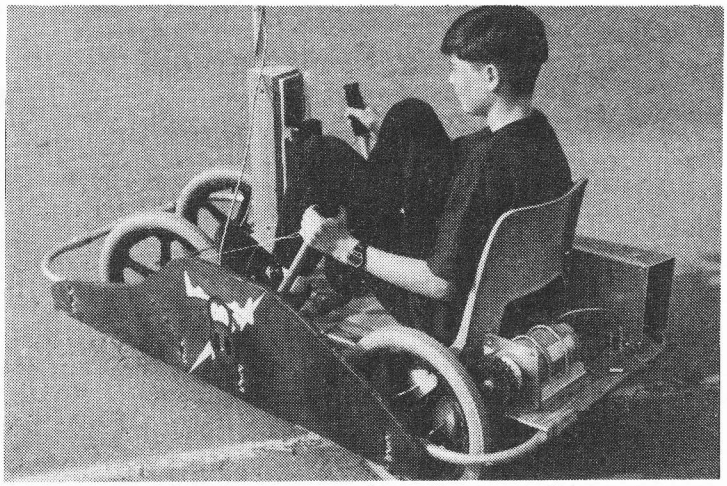
The axles are one inch solid aluminum. They were turned on an engine lathe to accept the ball bearings for the wheels which are small bicycle wheels with plastic spokes. We are also using gears from a ten speed bicycle.

The power plant we are using is a 20 volt DC motor from a computer disk drive. Our steering mainly consists of two levers and pulleys, and is very smooth. Two solar panels power our car, enabling it to go two miles per hour. This is quite an accomplishment since there are no batteries used.

We all believe that this engineering project fits in well with the Industrial Technology program at J.L.S. It allows the students to explore and learn about electricity and transportation, both of which are part of the curriculum in class. In fact, we have already studied and learned about electric circuits, measuring amps and volts, gear ratios, solar energy and group problem solving.

We will continue working on the "Electric Moose" and are pleased with our progress. We hope to meet our initial goals for the "Moose" in the near future, so that we can start on our second car. We intend to drive the "Electric Moose" in the tradional Palo Alto May Fete Parade.

As a young engineering group, we are extremely proud of what we have accomplished with the "Electric Moose". Through building the car, we have gained confidence in our abilities to work with machinery and with the people in our group. We feel lucky to have this experience and hope it will inspire others like us. — AG, SM, SS



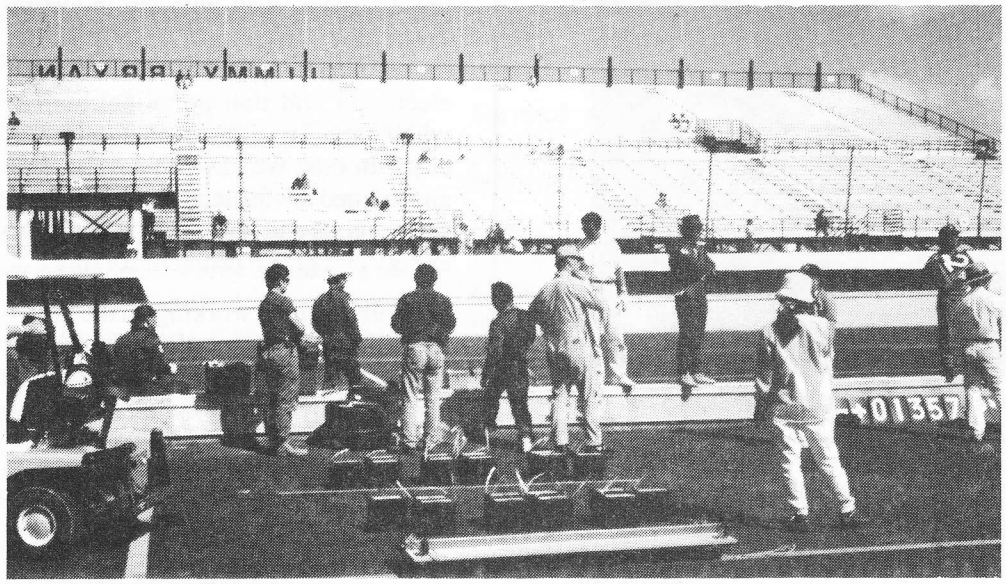
Moose hits 2 mph — running on Sun alone.

A Tale of

Dave Cloud v

PHOTOS BY CHIP B

A contrast in pit strategy.



Team ELEMATE hot pits. Note 2-battery swap packs, ready for hand-loading by nine-member pit crew.

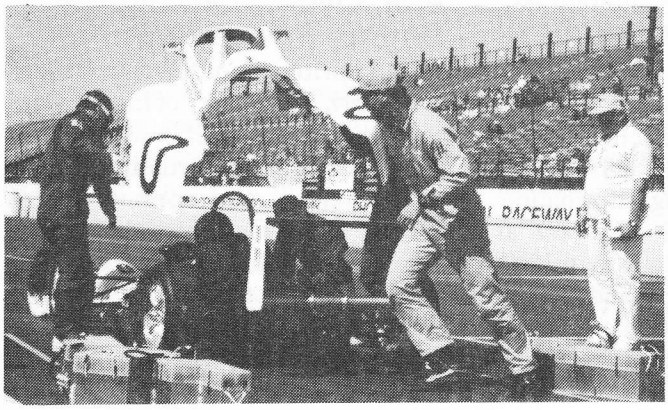
Team Cool Cloud in hot pit. All Dave needed was a tank of air for tires. Highly efficient Cloud lightweights never needed to pit!

f Two Teams

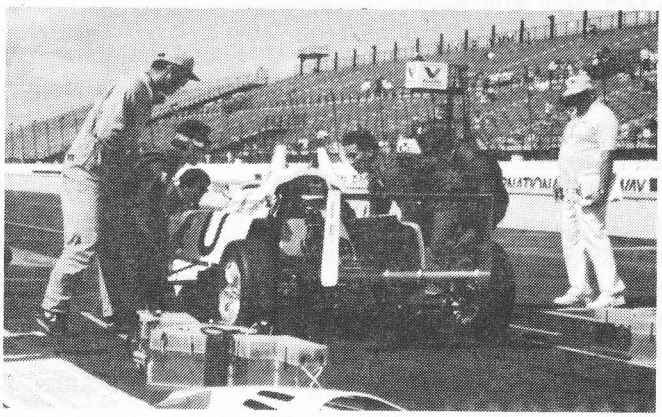
s. Team ELEMATE

yer& Captions by Clare Bell

- Team ELEMATE pit stop scramble.

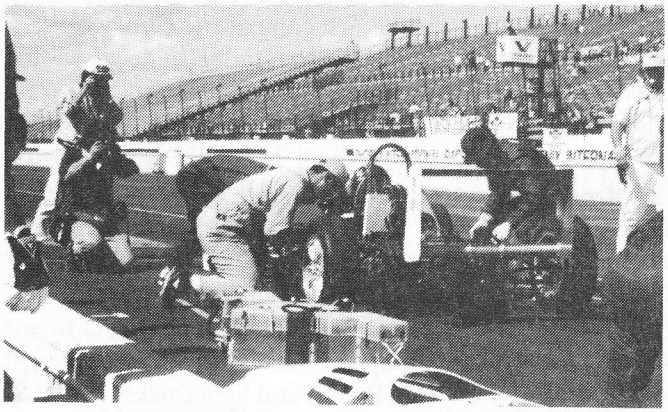


Body up and off.

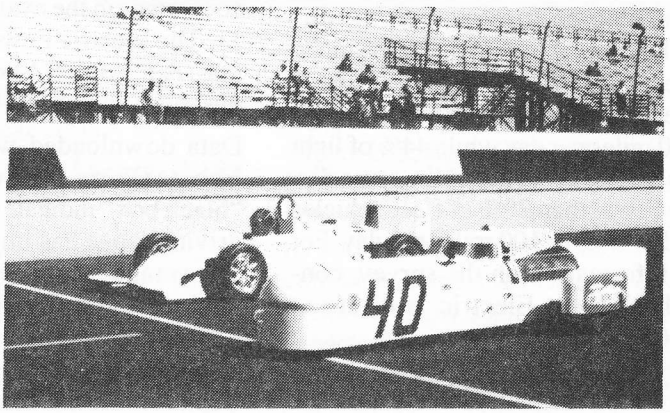


Get the lead IN!

- But the highly co-ordinated effort wasn't quite enough.



Load and go — body back on.



Long nose across the line — Open 2 finish. #40 takes it.

Congratulations to Open 2 winner Dave Cloud. Good job though, Team ELEMATE. We hope your upcoming solar and electric race in Japan goes well and that we see you again at the APS 500 1995!

News in Brief . . .

Compiled by Ruth M. Shipley from Environmental Information Network

Highway Windmills May Charge EVs

Detroit computer consultant Thomas Wither has patented a windmill that can be propelled by air currents created by traffic on a highway. Tests by Wayne State University researchers on a freeway median found that wind averaged 10-12 mph, while gusts of 15 mph were generated by passing cars, and trucks generated 25 mph winds (conventional windmills used to produce electricity can function on winds as low as 9 mph). Such windmills could be a component of the infrastructure used to recharge EVs.

(Boston Globe: 2/23)

Utility Fleets Spur EV Growth — EEI Survey

Vehicles operated by electric utilities often travel within the range of today's electric vehicles, and, according to an Edison Electric Institute survey, this could be a factor in establishing a niche market for EVs. An Edison survey showed that 48% of fleet cars traveled 50-100 miles per day while 44% of light trucks also covered about the same distance. Fewer than 20% of fleet vehicles were driven over 100 miles per day. For more information on the survey, contact the Edison Electric Institute at 202-508-5000.

(EVAA Evolution: 1/94)

SAE EV Recharging Guidelines

The Society of Automotive Engineers (SAE), working with the National Electric Vehicle Infrastructure Working Council, has developed new guidelines for the safe recharging of electric automobiles as part of revisions to the National Electrical Code. For further information, contact David Schwartz of SAE at 313-393-4400, ext. 3023.

(Society of Automotive Engineers News: 2/28)

SoCal Edison Researching EV Interface

Southern California Edison (Rosemead, CA) is researching an Electric Vehicle Interface (EVI) device for EVs. The EVI would track billing information, monitor current house load as well as ongoing kW demand and total kWh needed to recharge the EV, and identify the vehicle, the charger location, and the time of use. For further information, contact SoCal Edison at 818-302-7918.

(Green Car Journal: 2/94)

East Coast Utilities Test Ford EVs

West Penn Power (Greensburg, PA), Con Edison (New York City) and Northeast Utilities, (Hartford, CT), have begun a 30-month test of Ford's Ecostar van, bringing the number of companies in the evaluation program to 11. The Electric Power Research Institute (Palo Alto, CA) will also be testing the van.

Data downloaded weekly from each Ecostar's on-board computerized "black box" indicate that the Ecostar's driving range has improved slightly to an average 98 miles. For more information, contact Pam Kueber of Ford at 313-337-2456.

(Ford Motor News: 3/2)

CARB Says EV Technology Can Meet Mandates

The California Air Resources Board (CARB) released a study suggesting that EV technology will be sufficient to meet the demands of motorists in time for the 1998 zero emission mandates. CARB found that battery technology can serve the needs of most commuters and that the cost of operating an EV will be similar to that of gasoline-powered vehicles.

(Los Angeles Times: 3/10)

GM, Ovonic Co. Sign Battery Agreement

General Motors and Ovonic Battery Company, a subsidiary of Energy Conversion Devices (ECD), have signed an agreement to further develop, manufacture, and commercialize Ovonic nickel metal hydride batteries for electric vehicles. For more information, contact Nannette Wiatr at 810-986-3390.

(General Motors News: 3/9)

U.S. Electricar Acquires Crashworthiness Expertise

U.S. Electricar, Inc. (Sebastopol, CA) has acquired Livermore Research and Engineering Corporation, a consulting firm with expertise in computer-aided crashworthiness simulation. Using this technology, U.S. Electricar expects to be the first company to certify its electric vehicles under Federal Motor Vehicle Safety Standards (FMVSS). For further information, contact Alex Campbell at 707-829-4545.

(U.S. Electric Car News: 3/3)

Santa Clara Buys 8 EVS for $41,500 Each

The Santa Clara County (CA) Board of Supervisors will buy eight converted Geo Prisms and light trucks from U.S. Electricar of Santa Rosa (CA) at a total cost of $332,000. Although the EVs are the most expensive passenger vehicles in the city's 1,314-vehicle fleet, the county says the initial cost will be offset by low fuel costs over the life of the vehicle. County officials also plan to encourage other government agencies to buy EVs.

(San Francisco Chronicle: 3/2)

Continued on page 11

News in Brief . . .

Israeli Battery System Quadruples EV's Range

Electric Fuel Ltd., an Israeli subsidiary of Electric Fuel Corporation (NY), has developed an innovative zinc power cell battery system. A Mercedes van using a 1,200-lb. zinc system achieved a range of 200 miles. The power system makes recharging downtime unnecessary, because it utilizes batteries that are built into easily replaceable "cassettes".

(UTILITY FLEET MANAGEMENT: 3/94)

CALSTART: Clean-Air Laws Spurs EV Innovation

Michael J. Gage, president and CEO of CALSTART, testified before the California State Assembly Transportation Committee during its deliberations on a bill (AB 2495) that would block requirements for zero-emission vehicles unless the vehicles passed arbitrary performance standards set by gasoline-powered- car makers.

Gage cited several examples of new techniques that are lowering EV costs and improving their performance. Among these is a CALSTART California-built 'running chassis' — an EV frame and drive system that can be used as a common platform for several vehicles, cutting production costs substantially. Another is a 'fast-charger' that can recharge an EV in less than 18 minutes.

(BUSINESS WIRE: 3/21)

Bellcore Develops Lithium Battery

Bell Communications Research (Bellcore) has developed a lightweight, rechargeable 3.8 volt lithium battery for use in portable telephones, laptop computers and other electronic equipment. Bellcore executives believe a much larger version of the battery could be developed to power EVs.

The lithium battery can hold more power per weight — two times more power than nickel cadmium and 40% more than nickel metal hydride, and it uses no toxic chemicals. It is completely solid state and cannot leak.

(NEW YORK TIMES: 3/16)

Boom for EVs & Hybrids in Next Century

The University of Michigan's Office for the Study of Automotive Transportation predicts in its Delphi VII study that electric and hybrid cars will each make up about one percent of annual car sales by the year 2003.

(NEW HAMPSHIRE UNION LEADER: 2/18)

Virginia HOV Lanes to Boost AFVs

The Virginia state legislature recently passed a bill that would allow alternative fuel vehicles to use high-occupancy vehicle (HOV) lanes. The bill will work in concert with a bill passed during the last legislative session which authorizes a special license plate for AFVs that have been certified by the state. Any vehicles with the license plate will be able to use the HOV lanes.

(NGV NEWS: 3/94)

PSA/Peugeot-Citroen Eyes CA EV Market

Unlike U.S. automakers, PSA/Peugeot-Citroen Group of France sees a potentially big market in California for its soon-to-be- launched electric subcompacts. Jean-Yves Helmer, director of the company's automobile division, expects PSA's production of EVs to rise to about 50,000 units a year by 2000, a quarter share of the projected 200,000 per year European market. Electricite de France is developing a home recharging station and also plans to open recharge stations in public areas and parking lots.

(AUTOMOTIVE NEWS: 3/14)

Calendar of EVents

April 23 - PG&E Earth Day, Toro Park, Salinas, CA (off hwy 68). Hrs 11-5. Space limited to 35 EVs. Trophies awarded. Our own Anna Cornell is judging! Contact Spencer Erickson (408) 755-3347.

APRIL 24 - SunDay 1994. Nation-wide alternate energy celebration including EV activities. 50 environmental organizations involved. Contact Ken Bossong Tel. (301) 270-2258, Fax (301) 891-2866.

APRIL 24 - Pacific Coast Dream Machines, Half Moon Bay Airport, CA. 10-4. $10 per vehicle fee. May be waived for large group of EVs. Over 1000 vehicles displayed in '93, 20,000 attendees. $10 adults, $3 jrs/srs. (415) 726-2328.

APRIL 28-30 - Electric Vehicle Grand Prix '94. Sponsored by Edison Institute and Dept. of Energy. 22 high schools and colleges to compete. Call 1-800-334-4688 for info. Also Janet White (Edison) at (609) 691-0907, Mike Duoba (Argonne National Labs) 708-252-6398.

MAY 2-6 - UCLA Electric Vehicle Technical Course. Seven lecturers will speak on several subjects, such as Motor Tech. Call (310) 825-3344 or fax (310) 206-2815.

MAY Lightnings race at Richmond International Raceway, Richmond, VA. High School Competition. SERA has not set date yet, but stay tuned. Tel.:(602) 953-6672 Fax: (602) 953-7733.

MAY 21 - Car Show, Princeton Plaza Mall, San Jose, CA. Blossom Hill Rd. at Meridian. Inviting electric cars to display. Show hrs 9:30AM-4:30PM. Call Anna Cornell, 1-510-685-7580.

MAY 21-22 - Tehachapi Wind Fair at Mountain Valley Airport, CA. Displays: solar panels, EVs, wind turbines. Paul Gipe (805) 822-7956 or Warren Grass (805) 822-3222.

MAY 21-28 - American Tour De Sol. NESEA EVent runs from New York to Penn. Contact Nancy Hazard: (413) 774-6051. 23 Ames St. Greenfield, MA. 31301

JUNE 11 - 1994 Michigan High School Electrathon, Berlin Raceway, Michigan, west of Grand Rapids. Starts 5:30 PM. 21 high school teams. 10K in prizes. Sponsor, Jordan College Energy Institute. Call Dan Paulson or Paul Zellar, 800-968-3955 or fax 616-784-0998

MAY - JUNE - The Eyes of The Classics, the Ford estate. Classes of Antique, Indy cars, etc. Would like to invite 15 show quality EVs. Steve Pasteiner (313) 852-2900.

JUNE 20-24 - 10th World Hydrogen Energy Conference, Cocoa Beach, FL. Call Carolyn Burby, Florida Solar Energy Center, (407) 783-0300

JUNE 25-26 - Solar Prosperity has changed its itinerary to create a road rally for electric and solar cars. Electrics will make a 50 mile loop while solar cars traverse a 100 miles. Exhibits at rally site. Call 510-869-2759 or Marianne Walpert at 415-508-1489. Northern Calif Solar Energy Assoc. P.O. Box 3008, Berkeley, CA 94703.

JULY 8-10 - Formula Lightning support race to IndyCar Cleveland Grand Prix. Burke Lakefront Airport, Cleveland, OH. Collegiate teams competing, including exchange pit stops. Contact Kevon Makell, Centerior Energy, Cleveland,OH. Tel. 447-3552.

JULY 15-17 - SEER is happening again! New location: Redwood Empire State Fairgrounds in Ukiah, CA. Approx. 100 miles North of San Francisco, just off Highway 101. EVs, Human Powered Vehicles, Electrathons and Solar and Electric Boats. Call (707) 459-1256, Fax (707) 459-0366.

AUG. 6-7 - First Japanese Solar and Electric race! F1 Grand Prix, Suzuka Circuit, August 6th and 7th, 1994. Counts toward the FIA Cup. Contact Team ELEMATE, Kiyohito Endo, #201 2-10-11 Aoyama, Minato-ku, Tokyo, tel. 81-3-3401-8751, fax. 81-3-3401-1246.

AUG. 1-11 - Alternative Transportation/ EV workshop, Solar Energy International, Carbondale, CO. Hands-on gas to EV conversion using kits. SEI, P.O. Box 715, CO 91623-0715 or call (303) 963-8855.

Anna Cornell, EVents Co-ordinator, (510) 685-7580

Member Want Ads

FOR SALE: 1981 Jet Electricia (Escort), 12,500 miles. Refurbished PMC controller, new USB 2300 battery, on board charger. $8,500. Call (415) 964-3974.

FOR SALE: VW Cabriolet (Profesionally converted.), New KTA Services components, 120 V system, Advanced-DC 9" motor, Curtis controller, US batteries, low miles, excellent condition, white/white/white top. $13,500. Call Chris (818) 398-9750.

FOR SALE: Electro Automotive conversion kit for diesel Rabbit. New, never used. $5000. **1981 Diesel Rabbit,** 4-door/4-speed, good condition, new tires. $600. Both for $5100/ bo. Call (415) 857-5050 or (415) 964-5289.

FOR SALE: Fiero, 108 V system, 21 HP Advanced motor, Curtis controller, on-board charger, power disc brakes, Goodyear ULR tires, completely customized, new exide batteries. Great running EV. 12,600 miles. Can deliver. Tucson, AZ $12,000. Call (602) 575-4687.

FOR SALE: 1971 Volkswagen Squareback, , brand new 96V DMV-OKed conversion. Advanced DC motor, Curtis controller, US batteries, KTA on-board charger, Electro-Auto adater kit, DC/DC converter with gel-cel auxiliary. Great car, wrong lifestyle. Needs some interior trim. $7000 firm. Call Joel, (415) 665-6637 or (415) 269-5192.

WANTED: Ford Pinto converted to electric, semi-finished project car OK, or reasonably priced finished car. Call (201) 839-9053 - NJ

Rates for Want Ads

$5 for the first 30 words. For each additional word, 25 cents per word.

Want Ads are available to EAA members for the sale of electric vehicles and related products. For display ads for commercial products, please see the Advertising Rates. Send your want ads to EAA/ Want Ads, 18297 Baylor Avenue, Saratoga, CA 95070. The check should be payable to EAA and included with your ad. The EAA is not responsible for the accuracy of ads.

Chapter News

Send contributions to:
Contributions to: Ruth M. Shipley 102 Brighton Rd. #3
Pacifica CA 94044 415-359-1541 CompuServe 73043,60

Vancouver BC

Members are busy pricing motors, controllers and chargers so they can spend the $18,598.37 they earned at a local casino. The equipment will be donated to 10 high schools that plan to build Electrathon racers. At a recent meeting, Dave Rowan of Pulse Charge Systems, Inc., demonstrated PulsPak, a device that reduces charging time and extends the life of batteries. Bill Glazier will test the device.

San Diego CA

At a recent meeting, Scott Gossler updated members on the multi-phase AC motor/controller drive system he is developing and invited them to his shop for a demonstration. They also watched a video on Joseph Newman's Energy Machine.

San Francisco Peninsula CA

Danny Ames brought a word processor to a recent meeting and 15 members composed letters to Governor Pete Wilson and the California Air Resources Board (CARB) against AB 2495. The bill, which subsequently died in committee, would have stalled the state's ZEV mandate until the development of more powerful batteries.

Letters to CE

Dear CE:
While I enjoy the news that comes via Current EVents, what I always liked most about the "old" newletter was the helpful hints from fellow members.

—Norman Cox
Rollo, Mo

Dear Norman:
We like the idea too, but we haven't found a technical EV guru for our future "Nuts & Bolts" column. If you have any candidates in mind, please contact CE's Managing Editor.

Dear CE:
I'm enjoying the lively discussion on the EV Discussion List. Special Thanks to Clare Bell for all her efforts. Keep up the good work.

—Mike Kaiser
Alexandria, VI

Dear Mike:
Thanks. It good to know that all the hard work is worthwhile.

Advertising Rates

ADVERTISING RATES

AD SIZE		1 issue	3 issues (PREPAID)	6 issues (PREPAID)
Full page	7.25" x 9.25"	$300	$200 ea	$175 ea
1/2 page	7.25" x 4.50"	$150	$100 ea	$ 80 ea
1/4 page	3.50" x 4.50"	$ 75	$ 60 ea	$ 50 ea
1/8 page	2.0" x 3.5"	$ 60	$ 50 ea	$ 40 ea

- Ads prepaid for 3 and 6 issues will be discounted as indicated in the chart above. Placing 3 consecutive ads will provide the best reader response.
- **Full payment for all issues must be received at the initial order along with the camera-ready copy.** Ad rates are for black and white copy only. For additional color, please add $100 per color.
- Please provide camera-ready copy for each prepaid AD. Ads may be submitted on diskette in TIFF format.
- Due to limitied ad space, ads will be placed in the priority received. Prepaid ads will receive top priority.
- For changes to the ad copy, new camera ready copy must be received *before the 1st* of each month for the next issue and must be the same size to qualify for the discounted rate.
- AD size must fall within the sizes listed above. If ad exceeds the size, the next ad size will be charged or a $10 fee will be charged to reduce the ad.
- Deadline for camera-ready copy is the **1st of the month**. The due date for future issues of Current EVents is as follows:

June issue	May 1st

Effective JUNE 1st, rates for advertising will increase by 25%. Please contact Susan Hollis, Advertising Manager at (408) 374-8605 or by FAX at (408) 374-8750 for additional information or assistance. Camera-ready copy and payment for the ad should be sent to: Electric Auto Association, Attn: Advertising Mgr., 18297 Baylor Avenue, Saratoga, CA 95070

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  Facts about the battery that will change the world.
- ❒ ***Flywheel Energy Storage***
  Dr Richard Post **($5.00)**
  Dr. Post updates 1970's thinking and finds a viable solution.
- ❒ ***Team Tucson Land Speed Record Plans***
  Chuck Lemme **($5.00)**
  A wealth of technical considerations and many power and aerodynamic formulas.
- ❒ ***EAA XA-100 Hybrid* ($5.00)**
  Report on the EAA's Hybrid Vehicle Project (all 3 chapters) *(Includes all tables)*
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