

CURRENT EVENTS



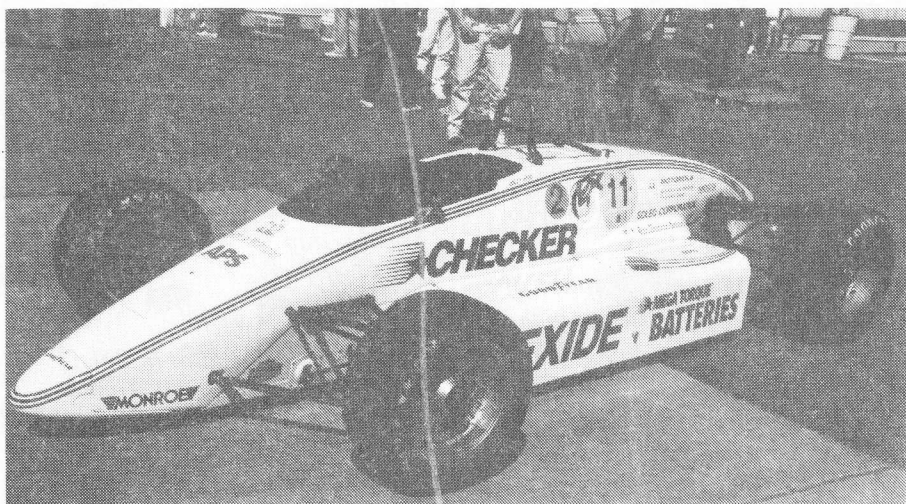
March/April 1993

Promoting the Use of Electric Vehicles Since 1967

Vol. XXV No.3

May/June

Phoenix 500 #3 - Still Goin', Still Growin'



Billy Roe breaks 100 mph lap record at the Solar & Electric 500.

Like a spunky three-year old, the Solar & Electric 500 at Phoenix International Raceway is bigger than ever. Non-polluting high performance cars and drivers strove for official national records. The event was organized by the Solar and Electric Racing Association (SERA) founded by Ernie and Carol Holden, and supervised by the United States Auto Club (USAC) which oversees American motorsports.

This year's emphasis on safety played a major part in preventing injuries to drivers, pit crew or spectators, despite the use of experimental batteries and fast-charging techniques. (See Safety at Phoenix, page 9.)

The 1993 race saw 68 race entries, up from last year's count of 47. Speeds climbed too, with Bob Schneeveis' full-size open class entry hitting close to the big double zero with 95+ mph speeds. Later Schneeveis' "Snow White" briefly hit 101 on the backstretch. Another driver nudging 100 mph was Tim Considine in the

Hackleman-Schless "Red Racer" Honda Civic VX (98.882 mph).

Billy Roe in the electric 1985 Lola Indy Car blazed to official national closed-course one mile oval electric vehicle speed record on 3/6/93. His lap speed of 100.253 mph during the Saturday "Break 100" session marked the first time an electric vehicle topped 100 mph on a one-mile oval. On Sunday, Roe was unofficially clocked at 107 mph down the front straightaway on his 8th lap of the Electric Open Full-size Feature. (The official Phoenix International Raceway speed record is 171.825, set 4/4/92 by Indy Car driver Michael Andretti.)

More "Indy touches" (thanks to the Holdens for lively and informative pit notes!) in this year's Phoenix included 1983 Indy 500 winner, Tom Sneva. Competing in the Electric Stock A class, Sneva drove the SAFT-NIFE NiCad powered Salt River Project/Arizona University 1993 Ford Probe. Tucson's Bill Cheesbourg, 6-time Indy competi-

tor from 1957 to 1965, took the wheel of the Palos Verde High School Courier, entry #77.

Phoenix also got a bit of the Hollywood gleam from actor/driver Tim Considine, who appeared as "Michael" in the TV series "My Three Sons", driving the legendary Hackleman-Schless "Red Racer" Honda VX in the Electric Stock A Feature. Good-natured guy that he is, Considine drove a 1993 stock gasoline Saturn that was beaten 3 times by Billy Roe's DEMI-prepped electric Saturn in the 3-day Phoenix Challenge. (A 2 car gas vs electric 5 lap sprint.)

Amateur driver James Worden, in a Solectria Force NiCad GT surprised everyone by pulling off an Electric Stock A win over Indy winner Tom Sneva. Worden's Force drafted Sneva's 1993 Ford Probe for much of the race and then zipped past Sneva at the last minute to take the Electric Stock A

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EVs Enter Adolescence

by Paul Brasch

With the running of the third annual Solar and Electric 500 at Phoenix Arizona this March 5-7 came the end of childhood for Electric Vehicles and the beginning of adolescence — the final stage to full adulthood and full recognition and acceptance. Why do I say this? At this year's race there were about 70 entries, speeds broke 100 miles per hour, the main EVent was now up to 2 full hours in length and the United States Auto Club (USAC) became involved. USAC sets the rules and standards for many of the big "professional" races across the country. So their involvement means recognition that what we in the EV community are doing is REAL racing. It's not kid stuff any more.

In addition I keep hearing of new businesses planning to offer conversions for sale or planning total new designed-from-the-ground-up cars and trucks. New motors and controllers are in the works. And there is much new battery design activity, both real and not so real, taking place.

All of this is being done by small or independent companies, with the exception of Motorola, GE and Goodyear. Goodyear is the only long time race sponsor in the group. Where are the big company teams? What are the "big boys" doing? They are traveling around the country testifying before state governments that "electric cars will be slow and expensive" as they did on March 23 at California's state capital.

Are they dumb or stupid—as the fire that destroyed the "ultimate driving machine engineers" (BMW E1) electric prototype might imply. Or do they have their own hidden agenda? Such as convincing state and Federal government and the public that what we have already done is not technically feasible? And if it is demanded by government, then they will deliver slow and expensive cars to us. This will allow them to say "We built them, but few will buy them, so change the law."

The major press constantly prints misinformation about EVs, especially the automagazines except for AutoWeek. Even the major electronic and electrical publications do this. I, as one person, cannot find the time to write rebuttals to each misinformed story I come across. This is where our membership can make an enormous difference. If everyone annoyed by a false story wrote even a few

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Upcoming Stories in Current EVents

- ☐ More Phoenix
- ☐ Insurance Issues and EVs
- ☐ Close-up of winning High School Entry
- ☐ Close-up of Bob Schneeveis
- ☐ Fast Charging

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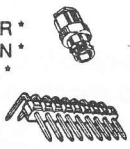
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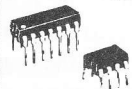
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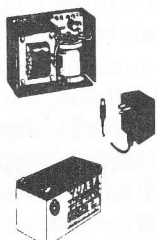
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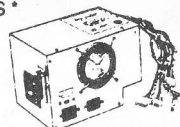
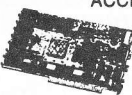
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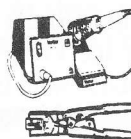


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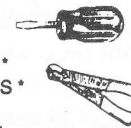


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Phoenix 500

(Continued from page 1)



Start of the Main Event: the 2 hour race.

Final. Ron Rasmussen in his Electro Automotive-converted '74 Porsche 914 gave the later model conversions some tough competition. Qualifying in fourth place, Rasmussen ran first in the B sprint race, second in early endurance laps to come in first in the B class and a solid third overall.

Local high schools made a strong showing this year, with 22 schools fielding 26 entries. The Student Feature was all-electric this year, instead of hybrid. A minimum sustainable speed requirement of 55 mph made the race tougher. The high school cars also compared acceleration and handling in the Student Electric Drag Race. (See High School Events. page 10.)

Worden and Solectria shone in the Solar/Ultralight class, with # 11 Solectria Flash winning both heats and placing second in the feature. The #65 car from Arizona University and #4, George Spellman, were both good performers and strong contenders. Worden apparently used a similar race strategy in the Ultralight as he did in the Stock Electric - conserving power by drafting the lap leader, then sprinting past.

The unsung hero of this year's Phoenix race is probably Electrathon legend Robert Schneeveis. With a tiny

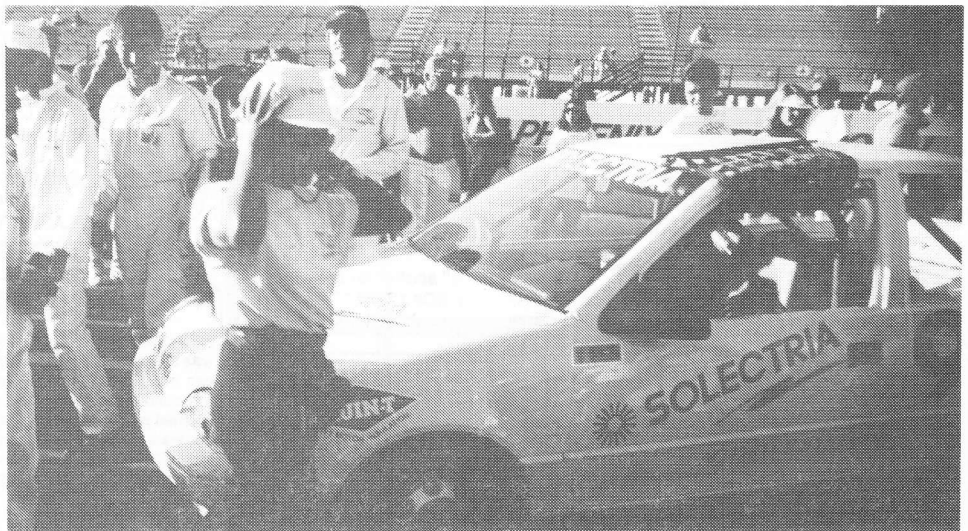
fraction of the resources available to other competitors, Schneeveis put together a crack race team. Tim Moser in Schneeveis' #1 Open Lightweight, came the closest of any other entrant except the Lola to breaking the 100 mph mark, with lap speeds in the mid-nineties. Overheated, disintegrating tires brought #1 into the pits during Saturday's 100 mph session. Apparently Goodyear didn't take Bob seriously when he requested tires that would take 100 mph. Next year, Schneeveis says he wants tires specified for 140 mph and he'll probably need them too.

Even with tire problems, #1 managed to take second in the anything-goes (almost) Open Lightweight class, with fast battery exchanges and canny driving.

The race date was moved up from April to March to avoid the track-melting, skin-blistering heat of the last two years, but even the Holdens couldn't outsmart Phoenix weather. The story this time was rain and a storm-swollen Gila River that overflowed its banks, dumped mud on causeway crossings and ate the riverside parking lot. For a while it looked like SERA might have to run an electric speedboat race, but the sun appeared and the river subsided.

Getting to the Raceway was a challenge in itself, since the only undamaged or accessible crossing was six miles down river. Luckily someone smart set out direction signs to help any lost souls (including CE's assistant editor) find their way across the wily Gila. Some fellow in a four-wheeler evidently decided damn the torpedoes, and the mud-piles. We saw the truck later in the parking lot wearing mud up to the windows.

(Continued on next page)



After winning, Jim Worden and Solectria President, Anita V. Rajan celebrate.

Phoenix 500

(Continued from page 4)

If SERA had run an electric speedboat race, Roderick Irwin would have been well qualified, since he holds the APBA record for the fastest electric runabout class in boat racing. He didn't do too badly on land, taking the Electric Stock C Feature.

Just like last year, activities in the infield drew spectators from the stands. Those who had pit passes flocked to the garage area to watch cars being prepped. Those who didn't had plenty of vendor booths and demos. Alan Cocconi brought his white AC-powered Civic with a power-boost trailer attached, reportedly getting 42 miles per gallon. He came up all the way from LA on the power-boost and had car and trailer parked near the garage area. CE's editor didn't get to see the Civic burn rubber this time, although we heard that it's impressive when he does. CE would have also liked a peek under the cover to the power-boost unit, but couldn't catch Mr. Cocconi. (How about an article on the power-boost unit, Alan? Bob May, who submitted the articles on designing a power-boost trailer would probably get a kick out of seeing how you did it.)

Among the vendors this year was Ken Koch of KTA displaying a prototype new high voltage version of his BC-20 K & W onboard charger. This unit runs on 220V and can charge cars with system voltages from 96V to 144. Good development, especially in view of the rising pack voltages seen at this year's Phoenix. When is general availability on this unit, Ken?

Technology developments used or introduced last year showed up again in improved versions. This time three race teams, Sunbelt Electric, Hackleman-Schless and Team Electro Automotive attempted fast-charges during pit stops. Other teams put their money on super-quick battery exchanges.

12 V deep-cycle batteries and custom-designed controllers helped raise system voltages to 144 and 190 V. Goodyear supplied many entries with the special low rolling resistance Invicta tires. DEMI's zinc-air batteries plus NiCads powered the 1993 electric Saturn in the Phoenix Challenge. Sophisticated packaging prevented any leakage of fumes from the air-breathing batteries.

The Salt River Project Ford Probe driven by Tom Sneva used a Cocconi AC drive system. This car showed erratic performance due to component overheating. Cocconi had the motor in and out of the car reportedly two and a half times. Apparently the motor and controller got mounted in an area that did not have sufficient cooling ventilation. Too bad the Cocconi system didn't really get a chance to show its stuff. We'll look for it again next year, bug free I'll bet.

Solectria's 2-motor brushless AC powerplant helped CEO and driver James Worden run away with the Electric Stock A feature, but the standard lead-acid 6-V and DC drive train has a lot of life left if the performance of #13, Team Electro Automotive's Porsche 914, is any indication. (see interview with Ron Rasmussen, page 6.)

The Formula Lighting prototype appeared on track in several demo laps between races. If it performs as well as it looks (slick!) Phoenix 500 aficionados should have a treat in store. (When is the first Formula Lightning race scheduled, Carol and Ernie?)

The solar car field was down this year, with only two entries, but the Solar Class winner, Chris Martin proved to be a stayer. A blown tire during the Solar/Ultralight Feature Final couldn't

throw Chris — he repaired it and went right back in to finish and win. Martin's #72 pure solar did better than one of the electric ultra-lights.

CE extends thanks to Ernie and Carol Holden and the staff of the Phoenix International Raceway. Also to Ruby and Doug Hargrove of R and D Engineering, whose automated scoring system provided fast and accurate race results.

A GREAT THANKS goes to Hal Munro for the use of his camera and zoom lens. It made possible most of the wonderful pictures in this issue. Thanks also to Stan Skokan for his picture-taking efforts and help at the track. And last, but not least a special thanks to Clare Bell for her tireless work on these stories.

Paul Brasch, Editor. □



Jim Worden questioned about his winning race performance.

Interview with Ron Rasmussen

by Michael Clark



Ron stays in #13 during quick charge.

When Ron Rasmussen talks about his Porsche 914 conversion, he speaks with pride and enthusiasm. He should. Anyone who has seen this conversion can see the care and effort that went into this 12-month project—a sleek, painted body, an extremely full engine compartment, and batteries thoughtfully shoe-horned into every place but the rear trunk (or the passenger compartment).

Ron first became interested in EVs at a solar energy show in New Orleans where he met long-time EAA member Bill Williams. Coupling his interest in cars with his concern for the environment, Ron wanted to build a functional yet fun EV. Living and working in the sunny Santa Cruz, California area, he had always been attracted to convertibles. After weighing all the factors, Ron decided on the Porsche 914 platform.

The conversion project began about two years ago and took almost a year to complete, mostly working weekends. Over half of the time was in the system design phase where Ron researched, measured and considered the optimal locations and mix of electric vehicle components for his car. [See the com-

ponents list shown in the side box].

One of his few regrets about the project is that he didn't really document the conversion with proper drawings, pictures and videotape as he went. With the recent success of the car and growing interest in Porsche conversions, Ron is teaming with Electro Automotive to develop a special

conversion kit, and they are now involved in the arduous process of "re-creating" the missing documentation. Regardless of any future plans you might have for an EV conversion, Ron highly-recommends documenting your project "to the greatest extent possible" while you are building it. He adds that while your conversion car is still fully operational with its gasoline or diesel engine is an excellent time to get it inspected and photographed for insurance purposes. You don't have to carry insurance while the car is in pieces in the garage, but it can help save hassles later.

The Porsche is an everyday commute car for Ron. He commutes 16 miles each way between his Scotts Valley home and his work in nearby Santa Cruz over a 2100-

ft. hill maintaining an average speed of 35-40 mph. Often he takes the car out at lunch, so that his daily mileage is more than 32. His employer, SCO (Santa Cruz Operations) has recently installed two opportunity charging stations in their parking lot which grants them credits from the state under the same program that encourages mass transit and carpooling. Other SCO employees are now planning conversions

Continued on next page

Conversion Information Box

Owner: Ron Rasmussen
Make/Model: 1974 Porsche 914
Style: 2-Seat, Mid-engine
Motor: Advanced DC 9"
Controller: Curtis PMC 1221
Voltage: 120 VDC with 20-6V batteries
Batteries: US. Battery Model 2300
Charger: K&W on-board 115 VAC
Aux. System: Sevcon DC-DC Converter and 12V auxiliary battery
Gearing: Stock transaxle and clutch, 5-speed
Tires: Goodyear Invicta GAL 15" at 55 psi
Weight: Approx. 3,200 lb. after conversion
Top Speed: 90 mph +
Avg. Range: >50 miles/charge (all out)
Best Range: >126 miles/charge

Race Credits:

1993 APS Solar and Electric 500:
"B" Stock Sprint Race: 1st place
"B" Stock Endurance Race: 1st place, 3rd place overall
1992 APS Solar and Electric 500:
"B" Stock Sprint Race: 2nd
"B" Stock Endurance Race: 2nd
1992 Solar Energy Expo and Rally
American Commuter Class: 2nd place
1992 Electric Grand Prix
Commuter class: 2nd place

Ron Rasmussen

(Continued from page 6)

of their own. Meanwhile, Ron continues to drive his car every day, showing the fun and practicality of electric vehicles. He has also been active in racing his Porsche in several events including the last two Phoenix races, where he placed both times. His future plans? Build another electric car, of course.

Qualification for the Electric A and B stocks was a two-lap best time format. The Porsche 914 qualified at 68.345 mph early in the session, second after Tim Considine in #11, the Hackleman Honda Civic VX. Later, Tom Sneva took the pole position, bumping everyone down.

The 914 also merited attention in the pit notes, posting a practice speed of 68.345. During the heat sprint race, the electric Porsche moved steadily up from 5th to 3rd, finishing only 4 laps behind the two leaders, Considine and Worden.

During the Feature endurance race, the 914 shared the lead lap, starting in 5th, moving up to 4th. When Considine went to the pits for a quick charge, the 914 moved into second place, sharing a lap with James Worden.

When Considine came back in, he took back the lead, putting the 914 in 3rd again. Despite several pit stops where he got only a partial quick charge, Ron took back third place and stayed there, finishing 4 laps down from Sneva and Worden.

Rasmussen feels that if the quick charge had worked better, the 914 would have won the endurance feature. Not too shabby for a car that didn't cost a bundle. Maybe when the bugs get worked out of the quick charge, the 914 will be the 94 winner. ☐

Solar & Electric 500 Results

March 5-7 1993, Phoenix, AZ

Electric Stock A & B Feature

- 1st James Worden, Boston, MA #93, 1991 Solectria Force NiCad GT
- 2nd Tom Sneva, Paradise Valley, AZ #90 SRP 1993 Ford Probe
- 3rd Ron Rasmussen, Bonny Doon, CA #13, 1974 Porsche 914

Electric Stock C Feature

- 1st Roderick Irwin, Shelton, WA #7, 1979 Mazda RX-7
- 2nd Roy Rudy, Phoenix, AZ #88, Arizona State University 1987 Mustang

Full-size Feature

- 1st Billy Roe, Phoenix, AZ #11, Lola/Brawner EX Electric IndyCar
- 2nd Steven Dawson, Sacramento, CA #28, SMUD Chevy S-10

Open Lightweight/Racecar Feature

- 1st Ely Schless, N. Hollywood, CA #8, 1982 Zink
- 2nd Billy Roe, Phoenix, AZ #11, Brawner Motorsports Midget

Solar/Ultralight Feature

- 1st James Worden, Boston, MA #11, Solectria Flash
- 2nd Robert Spetz, Battle Creek, MI #65 Arizona State University Custom Solar:
- 1st Christopher Martin, #55 Solar Car

Student Electric Feature

- 1st Marvin Hall, Phoenix, AZ #00 Cortez High School "Electric Colt" Ford Escort
- 2nd Jeffrey Willerth, Los Angeles, CA #3 Agua Fria High School Rabbit

Jr. Solar Sprint Competition

Design:

Ingleside Jr. High AzTec II Teacher: Jim Giles

Performance:

Tortolita Jr. High Cougar Cat Teacher: Jim Lucknow

EV Tax Credit

Anyone converting EVs who wants the California state tax rebate should get their paperwork or at least the "intention to file" documented to the state. The tax credits may get soaked up by CNG (Compressed Nat Gas) vehicles, so EV people should send in the paperwork to hold their place in line now! ☐

Billy Roe Qualified for 1998 Indy 500?

When a guy is born in Indianapolis and grows up 200 yards from the Motor Speedway, you have to figure that he'll end up behind the wheel of a winning IndyCar. What the pundits might not have predicted is that the car would be electric and the race would be the Open Full-size Feature of the Phoenix Solar & Electric 500. On Saturday March 6, Chandler, Arizona resident Billy Roe took the Brawner Motorsports EX 11 Lola to a lap speed of 101 and a peak speed of 107, breaking the 100 mph barrier and setting a national 1-mile oval closed-course electric vehicle speed record.

Roe, who owns and operates a college bookstore in Mesa, Arizona, got his first Indy-related job sweeping floors for Clint Brawner, cousin of Brawner Motorsports Tom Brawner. Roe worked his way up to Chief Mechanic. He switched from manning a wrench to manning the wheel, piloting stock cars, Formula Fords, Super Vees, Sprints, Can-Am and IndyCars. This year he is racing Formula Atlantics and Indy Lites. And, yes, his dream is to blitz the Big One, the Indy itself. But who knows — in a few years the hot cars may be the swift, quiet electrics, skimming ahead of the roaring pack. Roe will be well-qualified for the 1997 or 98 Indy, having already driven the race of the future, the Solar & Electric 500.

—CB

Specs on Checker/Exide EX-11 # 11 - First electrically powered Indy-style car.

Builder: Tom Brawner - Brawner Motorsports, Inc.

Chassis: 1985 Lola IndyCar, radically modified for electric propulsion. Formerly owned by Ron Hemeigarn.

Batteries: Lead-acid Mega-Torque - 16 12V modules series-connected for pack voltage 192 V.

Quick change configuration for battery change-out

Controller: Fault-tolerant transistorized DC, with regenerative braking controls. Multiple 800 Hz. choppers, separately excited motor field and armature. 99% efficient at rated load.

Joint product design from Solec Corporation and Motorola

Motor: G.E. frame-set modified by Moog Inc. Motion Systems Division

Specs on Checker/Exide Midget (1st electric midget racecar)

Chassis: 4130 Tube Steel Space Frame

Body: Aluminum and fiberglass

Wheels: M.R.T. Carbon fiber (15 X 5)

Tires: Goodyear

Weight: 1,300 lb.

Motor: G.E. 21 HP at 96 V. Max RPM 6,500

Controller: G.E. solid-state with onboard diagnostic.

Batteries: Exide Lead-acid deep-cycle (10 12V. in series) with quick

EVs Solution to Urban Pollution

Washington, DC (Mar. 30 — The use of electricity in the transportation sector offers the nation the benefits of reduced airborne pollutants, particularly in urban areas, the Electric Transportation Coalition (ETC) told the House Appropriations Interior Subcommittee today.

Thomas R. Kuhn of the Edison Electric Institute testified on behalf of the ETC. Kuhn told the subcommittee that in addition to air quality benefits, "the development of electric modes of transportation presents a significant opportunity to assert technology leadership for the United States in a new commercial sector."

In addition to ensuring the early and successful introduction of electric vehicles into the marketplace, the ETC urged the subcommittee to support appropriation for funding of those electric vehicle programs authorized in the Energy Policy Act of 1992.

The ETC is a non-profit organization of electric utilities, automobile manufacturers, state and local governments, and other entities that have joined together to advocate the greater use of electricity as a transportation fuel.

The Edison Electric Institute is the association of investor-owned electric utility companies whose members generate and distribute approximately three-quarters of the nation's electricity.

Idea For All Chapters

Phoenix chapter leases out a donated electric car (a Jet Industries Electrica). This is a great idea. It gives people the trial use of a car and the vehicle has the chapter telephone number, which brings in inquiries to the chapter. **Now that is creative thinking!**

Safety at Phoenix A Challenge Well-Met

by Clare Bell

Race speeds are rising. EV racers are getting more powerful. Different teams are experimenting with battery dump-charging or fast-exchange techniques. All this adds up to a real challenge for safety, but the Phoenix safety team has proved equal to the task. No major accidents or injuries marred 1993's race. The only collision involved a low-speed Ultralight that spun out and hit the wall. The driver was unhurt, though shaken. We can thank PIR, SERA and APS for careful planning and well-thought out precautions.

After the 1992 race, Arizona Public Utility formed a safety advisory panel comprised of battery experts, auto manufacturers, electric racecar builders/drivers and academicians. The panel developed new safety systems and procedures.

In the words of Ray Hobbs, Senior Research Engineer for APS, "(The) most time and attention was paid to safety factors and to preparing for mishaps." APS viewed the race as an opportunity to tackle the question of EVs and public safety. For Dave Bentler, project manager of the EV program at APS, "The race is a microcosm of what we face in the public arena in terms of recharging, electrical safety and a host of other issues tied to EVs."

Companies such as Electric Transportation Applications are working on new safety devices for EV recharging. ETA President Don Karner said that his company would install 240 V ground fault interrupters on EV recharging circuits for the race. In an APS press release, he said, — "It (the Phoenix race) is not only about EV advancements, it's an opportunity to test infrastructure concepts".

In addition to PIR's own safety, medical, and fire personnel, APS recruited volunteers from hazardous materials and fire crews at APS-operated Palos Verde Nuclear Generating Station, 30 mi. west of the track. Safety personnel working the race attended special classes and participated in role-playing exercises in order to get familiar with the race vehicles and their associated hazards.

Practice sessions were made mandatory for all race entrants regardless of experience level. An EV safety inspection team had to approve all vehicles and equipment. Exotic batteries such as the one that spewed bromine fumes were either banned outright or required to be sealed. Among those allowed were standard lead-acid, NiCd and zinc-air (with environmental management packaging).

Special precautions and requirements were instituted for battery dump charging. System electronics had to be covered, shielded or switched remotely by the operator. Safety inspectors had to OK each dump-charge set-up and mods were made at the last minute. Some teams kept their source packs in a truck or van so that any battery explosion or boil-over would be contained.

Drivers were required to get out of the cars during charging unless the car was equipped with a metal barrier between the driver and the propulsion pack. Car #13, Team Electro Automotive's 914 Porsche, had no batteries in the passenger compartment and Ron Rasmussen stayed in during re-charge.

During the races, safety officials made infield spectators move back whenever a car pitted for rapid recharge. This was difficult to enforce and a thankless

job for the officials involved. Even though CE's staff were among those chased away, we recognize that such a step was safer. As photographers and reporters we don't look forward to pit barricades, but with high-powered experimental battery dump technologies, they may be required. However no incidents occurred. □

—CB, with help from APS press releases.

Nominations Fellow Awards '93

The EAA Board of Directors intends to recognize members and others throughout the United States and Canada who have made outstanding contributions toward the goals of the Electric Auto Association.

Each chapter may nominate one person for the award of Fellow. Non-chapter EAA members may enter a nomination directly to the Board of Directors.

Each nomination should include a B&W photograph if possible, and 300 words or less describing the EV activities and accomplishments of the nominee. The EAA Board of Directors will make the final cut if necessary. We hope to have at least 10 Fellow awards to report in the Nov/Dec 1993 issue of Current EVs.

Please postmark entries by July 15, 1993 and mail to:

Bob Wing
POB 277
Inverness, CA

High School Events

by Clare Bell

High school students will not only be the EV owners and drivers of tomorrow; they're already involved in building and racing EVs today. High school EV projects have reached a level of sophistication equal in some cases to what the pros are doing, as one letter to Current EVents recently pointed out. And these young people have received little media attention.

Current EVents is starting this column with the intent of making it an ongoing feature. This year's Phoenix Solar & Electric 500 is a great place to start. Student involvement hit a new high this year, with 22 schools fielding 26 entries in the Student Electric Division. Students were also involved with entries in other classes.

Ernie and Carol Holden showed their vision for the future by including the Student Division as a vital part of the Solar & Electric 500. Sponsored and managed by the US Department of Energy (DOE) through the Center for Transportation Studies (CTS), the Student Electric Feature tests the design and performance of student-built vehicles. Last year's race was for hybrid EVs; this year the entries were stock electric.

The centerpiece was the Student Electric Stock 1-hour 25-lap range event, requiring the cars to run as many laps as possible while maintaining a minimum speed of 55 mph. Cars falling below 55 mph were counted out. Performance testing also included a Student Electric Drag Race, run in pairs. From a standing start cars were

required to accelerate down a 3/8 mile straightaway, brake hard at the 1/8 mile mark and then accelerate again to the end of the straightaway.

A computerized acceleromometer measured acceleration performance during the drag race. CTS also managed a design inspection by EV safety experts to assess each car's workmanship, safety, braking, handling and other characteristics. Student teams gave a 15 minute presentation on why they built their car.



Starting lineup of the student competition.

Each student entry was instrumented with a donated watt-hour meter to measure efficiency. A meter was used by each high school team who showed up with a car.

Before getting into the race results, CE's associate editor would like to applaud two developments seen this year at Phoenix. People of color and women have, unfortunately, been too small a part of the EV scene. That is why it was so neat to see the great performance of high school women

and minorities, both as drivers and team members.

CE welcomes Carl Hayden student Lizette Hurtado in her #69 Rabbit. This is Hurtado's first Solar Electric 500. She showed real improvement from the heat race to the final, coming in 13th in a field of 26. The winning Cortez H. S. team (see below) drew much of their strength from student crew chiefs Stacy Cahan (Graphic Arts/Design) Leslie Van Zee (Electrical Engineering) Chao Sha Huang (Public Relations) and Marci Winter (Rules/Regulations/Safety).

Page High's Kathryn Benjamin took her #22 Escort to 5th in the heat race and 4th in the final. A first-timer at Phoenix, Benjamin has crewed on a jet dragster and wants to drive professionally for NASCAR. With her good solid performance at Phoenix, Benjamin is well on her way!

Native American driver Maurice John took the wheel of entry #4, a 1983 Ford Escort converted by students of

Window Rock High School. Window Rock, with an enrollment of 800, serves the 200,000 strong Navajo Nation through academic and vocational education. Window Rock electronics teacher Larry Dunn applied for and received the EV scholarship package given out by APS and GE. With the electric car project, the Navajo students are coming on strong into the technology of the future.

(Continued on next page)

High School Events

(Continued from next page)



The winning student car.

"500" first-timer Cortez High blew everyone away with their first-place winning "Electric Colt", a converted 1982 Ford Escort driven by Martin Hall. The Cortez entry completed all 25 laps at an average of 52.921 mph.

Cortez got off to a shaky start with the project. Initially turned down for an APS grant to build an EV, Cortez instructors Hal Eastin, George Hester and their students started the project without sponsorship. The spirit and enthusiasm of the Cortez racing team caught the attention of corporate sponsors. APS and GE awarded Cortez an EV scholarship package.

By mid-Feb. 92, the Cortez team had completed the electrical installation, including batteries, controller, emergency shutoff, meters, fans and relays. (All work was carried out using proper safety procedures and equipment.) Everything was in, but the car wouldn't run. Eastin, Hester and their students put in a frustrating day and night of testing and debug. At last, at 6:12:30 PM the "Electric Colt" kicked to life and made its first gallop around the parking lot.

Current EVents would like to thank the Cortez students who produced "The Electric Colt Newsletter", "Scratchpad" and professional quality press releases. Also kudos to Window Rock for their flyer. That's the way to get media coverage. Keep it up! (To other high school entrants —

if you had newsletters, spec sheets or press releases on your car, please send them. This column was put together from what Current EVents staff picked up at the race.)

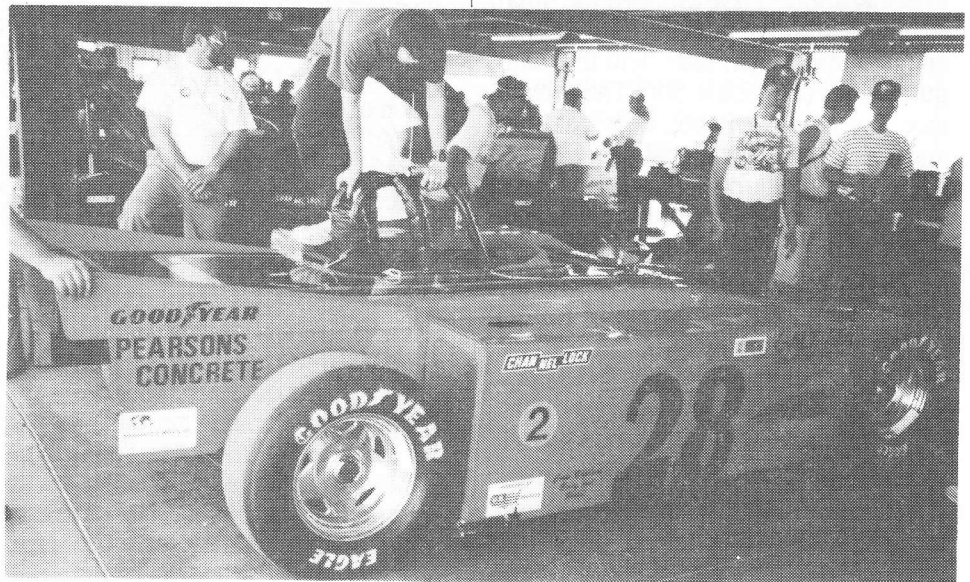
Next High School EVents will have an in-depth profile on the Cortez racing team and their car. More Phoenix student electric race coverage next time.

Wanna have your name in print? Be nationally known and looked up to by student EV enthusiasts all over the country (and even the world?) Write for High School EVents!

CE's assistant editor started this column, but hopes that it will be taken over and written by the folks it is meant to serve — the high school students, teachers and their supporters. You asked for more high school coverage and now you've got it. Go for the gold, folks. And if anyone thinks up a better name for this column, let me know. —CB ☐

Send submissions/comments to:

*"High School EVents"
Attn.: Assistant Editor
c/o CE newsletter.*



Sacramento Municipal Utility District (SMUD) — GALT High School car hit some very high speeds.

1992 EAA Fellows Awards



Ernie and Carol Holden, EAA Fellows

Ernie and Carol Holden, in recognition of their successful planning and operation of the Phoenix Solar & Electric 500.

Nomination by Robert E. May, Chair of the Fellow nominating committee of the Phoenix EAA. Ernie and Carol Holden did the impossible. Nobody thought it could be done. In May 1990, they decided to transfer their knowledge and experience in auto racing to a new arena. They founded the Solar & Electric Racing Association (SERA) and less than a year later held the inaugural Solar & Electric 500. The second race, the Arizona Public Service Solar and Electric 500, was held April 24-26, 1992. The governor of Arizona proclaimed that week as Electric Vehicle Week.

How did they do it? You must say "they" because Ernie and Carol are a team. Ernie, as president of SERA, agreed to line up all the races, and Carol, as Director of Operations of SERA, agreed to run all the races Ernie lined up.

The third Solar & Electric 500 will be held March 5-7, 1992. (*See race coverage this issue—CB*). The Holdens are still coming up with new ideas. The formula Lightning class of racer is on

the drawing board and about to exist. There is a new emphasis on safety. And the world is learning more and more about the performance and range of electric autos.

Nancy Hazard, of the Northeast Sustainable Energy Association, in recognition of co-directing the American Tour de Sol EV race and the annual Solar and Electric Vehicle Symposium.

Nomination by Robert Batson, President of the New England EAA. Nancy has been a major force promoting EVs in the Northeast for at least 5 years. She is Co-director of the American Tour de Sol as well as the Solar and Electric Vehicle Symposium (SEV). The ATdeS has become a model EV race that has gained national recognition. The SEV has become the major annual event to show EVs in both the US and foreign countries. At SEV '92, there were more than 1000 attendees and exhibitors that included Ford, GM, BMW, as well as Electric Vehicles of America Inc., Solectria, and many others.

Nancy is recognized as a hard worker, always promoting EVs and working for a sustainable future.

Steve McCrea, president of the South Florida Chapter EAA, in recognition of co-editing and publishing the second edition of "Why Wait for Detroit?" This book provides a unique source of electric vehicle information useful to the public and experts alike.

Nomination by Bob Wing, Board of Directors, EAA. Steve McCrea received a masters' degree in public administration from Florida Atlantic University in Dec. 1990, where he wrote a paper on the cost/benefit analysis of the LA EV initiative. He compiled a book with Richard Minner called "Why Wait for Detroit?" which has sold 3,800 copies to date. He lives in Fort Lauderdale with his wife Janus (a marketing consultant for the arts in Broward County) and a cat named Barney. Steve

and Janus have decided not to have kids so that they can dedicate their lives to the promotion of sustainable technologies, such as battery-powered transportation.

Richar Minner, President of the Electric Auto Association of Sacramento, in recognition of co-editing the second issue of "Why Wait for Detroit?"

Nomination by Bob Wing, Board of Directors, EAA. Richard Minner is a software engineer, telecommuting 90 miles by modem from his home in Sacramento CA to company offices in San Rafael and Santa Rosa. In December of 1991, he started the EAA of Sacramento, working closely with and receiving tremendous support from Sacramento Municipal Utility District—SMUD—which is considered to have the most aggressive EV program of any utility in the country. In 1992, he assisted Steve McCrea in the creation of "Why Wait for Detroit?" Richard lives in Sacramento with his wife, Angela Pratt, two dogs and two cats. They are expecting a future EV driver and sustainable energy advocate in April 1993.

Paul R. Shipp (deceased) of El Cajon, CA. in recognition of his pioneering testing and evaluation of EV components, batteries, and electric vehicles and his outstanding technical publications.

Nominated by Ron Larrea, President of the Electric Vehicle Association of San Diego, EAA. Paul Shipp's EV Engineering Guidebook: Electric Vehicle Conversions for the 1980's (1981 and the various supplements for many early 80's automobile makes and models), contains the most up-to-date factual data then currently available on the subjects treated. It had been collected and updated continuously during the author's 16 years of active

(Continued on next page)

Fellows Awards

(Continued from prior page)

involvement in advanced road vehicle research design and testing.

Paul started 3E Vehicles, a small advanced-vehicle design, consulting and testing business in the early 70's. 3E Vehicles cooperated on two General Dynamics R&D programs under the US Electric and Hybrid Vehicle Act. Earlier in his career, Mr. Shipps managed the R&D program on zinc-air batteries for automotive propulsion. He holds several patents on advanced battery components.

He was also the author of "Electric Mini-cars for Urban Driving" (1977) and taught a 3-unit course on Electric Vehicle Design at the University of California, San Diego.

Mr. Shipps had a BME degree from Ohio State, was a designated Naval Aviator and former test pilot. He was an Associate Fellow of the American Institute of Aeronautics and Astronautics and a long-time member of the Society of Automotive Engineers.

Paul had long and varied experience in the design, development and testing of advanced vehicles—mostly in San Diego's aerospace community. He began aerospace work as a structural designer at General Dynamics/Convair. Later in Advanced Design, he worked on a design for a manned nuclear-pulse propelled space exploration vehicle.

Paul Shipps was always helpful and friendly in answering questions and the welcome mat was out at his shop. Paul was a true pioneer in electric automobile engineering and design and has contributed considerably to the realization and reality of electric vehicles.

(Mr. Shipps might have liked to know that the electric Saturn at the 93 Phoenix had zinc-air batteries and that DEMI says they are close to commercial availability. Sorry he couldn't have seen the zinc-air Probe that did well in the race.—CB.

The Women at Phoenix

by Clare Bell

First and foremost of all the women at Phoenix is Carol Holden. You may not hear her at the mike, but step inside SERA's downtown office and you'll see who runs the show. She is an essential part of the SERA team and EAA has recognized her role by presenting an award to the Holdens as a couple. Thanks to Carol Holden for giving her behind-the-scenes effort, talents and enthusiasm to EV racing.

Anyone who is familiar with the Arizona EV scene has heard of Mary Ann Chapman and the "Peach Crate", her electric 1979 Chevy LUV pick-up truck. In last year's Full-size Open Feature, her first Phoenix 500, she took fourth. Not too shabby, considering that she sponsors herself and does it all without any corporate funding. With the help of her husband-to-be, she gave the "Peach Crate" an upgrade and drove to a solid fourth place finish.

Chapman is an experienced SCCA competitor, runs her own shop and heads up TEVA, the young and active Tucson Electric Vehicle Association. She's been described as the queen of Arizona electric vehicles, an honor she well deserves. Besides competing in the Phoenix and editing/writing the TEVA newsletter, she's started up her own company, EcoElectric.

She's intent on making Tucson the EV capital of the US. Judging how she's gotten TEVA going, she'll probably do it.

Chapman wants to keep racing and she's looking for a corporate sponsor. Considering what she's done with limited funding, any company who is considering sponsoring a Phoenix entry might want to put their chips down on the queen of Arizona racing.

Last year, Mary Ann Walpert drove her silver Rabbit with the solar roof panel in the electric stock class. This year she's been so busy with Pacific Solar, her consulting company, that she couldn't enter her car, but came

anyway. It was good to see you there, Mary Ann. She wants to put together an all-women racing team for the Phoenix. Any other EV women interested?

Electro-Automotive's Shari Prange is a multi-talented lady. She and her husband Mike Brown have been in the EV field for more than 13 years. She's the one responsible for a lot of those new advertisements, flyers and catalogs that have been coming out of the Felton CA company. Shari handles writing and computers with ease and does impressive easy to use conversion manuals. Anyone who has been reading Current EVents this past year has seen her thoughtful and well-written pieces on electric vehicle safety, crash testing and conversions.

This year she was part of Team Electro Automotive, acting as spotter for their entry #13, Ron Rasmussen's electric 914. And I'll bet she designed the Team Electro Automotive T-shirt too. □

Non-Existent Feb. 93 Current EVents

For our members who have been worrying about missing the February issue of CE:

We are glad to see that people are so enthusiastic about the publication that you yell when it isn't there. Nothing to worry about, however, since there WAS NO FEB. 93 ISSUE. Our December/January was mistakenly labeled number 7, volume 24. It should have been vol. 25, number 1. There will be the usual six issues a year. Due to logistical problems we had to drop February and go right into March/April. If you didn't get the March/April issue, then holler. But forget February; IT DON'T EXIST! —CB □

News in Brief

Gas Tax Increase Probable

The Clinton administration is weighing a gas tax increase of 12 cents/gal over the current tax of 14.1 cents/gal. The Clinton administration sees the additional tax more as a source of revenue for deficit reduction than an environmental issue. Just a one penny increase in the tax nets \$1 billion for the federal government.

Union of Concerned Scientists researcher, Deborah Gordon, says that a tax of at least 50 cents would be needed to push consumers to buy smaller cars.

The auto industry switched from total opposition to complete support for the tax. Automakers hope that the

increase will relieve the pressure on them to achieve higher fuel efficiency standards and help them sell their smaller cars.

According to Philip Hutchinson, president of the Association of International Automobile Manufacturers, the gas tax is a good way to help create "marketplace incentives" for energy conservation and environmental protection.

(AUTOMOTIVE NEWS: 2/1)

Maine Adopts California's Standards

Maine's Board of Environmental Protection recently adopted California's strict vehicle emissions law. The Federal Clean Air Act of 1990 allows states to adopt California's law, which is more stringent than federal emissions standards.

Dean Marriott, director of the Maine Department of Environmental Protection, says, "Ozone is a regional problem requiring a regional solution ... this is a cost-effective approach that actually prevents significant air pollution."

In Maine, the law will begin with the 1996 model year. It is expected to decrease emissions by 23-61% above federal standards and add approximately \$200 to the price of a vehicle.

Other Northeast states are considering or have implemented the California standards, including Massachusetts and New Jersey.

(REUTERS: 1/27)

Supreme Court Orders California Crack-Down on Smog

The US. Supreme Court ordered EPA to draw up clean air plans for the California areas suffering the worst smog — Los Angeles Basin, Ventura County and Sacramento counties.

James M. Lents, California's South Coast Air Quality Management District executive officer said that EPA could cut NOx emissions by 4.7% and reactive organic compounds by 1.6% — the building blocks of the eye-searing ozone component of smog.

"This is a tremendous step forward for the health and environment of Southern California," said Tom Soto, president of the Coalition for Clean Air. His organization filed the suit against the EPA that led to the ruling.

California officials hope the Federal plan will restrict vehicles that were exempt from local rules, such as trucks engaged in interstate commerce, farm vehicles and construction equipment.

EPA stated that the ruling could force even stronger control over pollution sources and quicker development of low-emission cars and fuels. The agency appealed the ruling, arguing that the imposition of measures such as no-drive days would cause widespread inconvenience for automobile-dependent Californians. The Supreme Court justices refused to hear the appeal.

(Continued on next page)

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IEEE Vehicular Technology Society Quarterly Journal

by Bob Wing

In California, however, officials of the South Coast Air Quality Management District praised the ruling and argued that EPA's claims of dislocation were severely exaggerated.

(LOS ANGELES TIMES: 2/23)

Prague Battles Dangerous Air Pollution

Excessive air pollution forced the Czech city officials to prohibit most traffic from the city for two days in early February. Large industrial polluters were told to curb production or face a \$180,000 fine.

Nitrogenoxide (NOx) measured 768 micrograms per cubic meter; the safe level is 100 micrograms. Sulfur oxide measured 401 particles per cubic meter, exceeding the safe limit of 150.

A thermal inversion over the city prevented wind dispersal of pollutants. The heavy smog build-up shrouded the city's historic skyline and prompted radio stations to encourage pregnant women, young children, the sick and the elderly to remain indoors.

(REUTER: 2/5)

Most of the news articles from News in Brief are provided by Environmental Information Networks, Inc. (EIN). For more information, contact EIN, 119 S. Fairfax Street, Alexandria, VA. 22314; Tel.: (703) 683-0774.

New '93 Officers For Phoenix Chapter

The new officers for 1993 will be: William Sowle, President, Gene Cosmano, Vice president and Norm Sirinek, Secretary/Treasurer. Information provided by Lee

The IEEE Vehicular Technology Society Quarterly (76 pp) gives the program for VTS chapter meetings in Atlanta, Boston, Cleveland, Ottawa, Philadelphia, San Francisco and Washington DC. This issue also gives abstracts of papers on mobile communications and land transportation. Automotive electronics will be covered in another issue. Letters and articles are encouraged. Robert W. McKnight, Editor is at 8201 16th St. #1221 Silver Springs, MD 20910, 301-565-0928. Closing dates are Mar. 3, June 4 and Sept. 3 for 1993.

VTS wants to increase membership from the present world-wide total of 4190 (2,505 in the US). An Electric Vehicles Committee has been formed, headed by Keith Hardy, manager Technical Planning, GM Business Unit. VTS president Samuel Leslie noted that no other IEEE society is focusing on the standards and technology of the emerging field. Robert Mazzola, Vehicular Electronics Liaison, 804-948-6195, and Hardy are to develop a plan/charter for the committee.

The most important feature of this VTS issue to EAA members is the four-page questionnaire for IEEE members to indicate their technical interests. pass it on to a friend to complete who is also an IEEE member. In the VTS group "electric vehicles" sometimes means light or heavy rail, so spell out rubber-tired EVs. If any IEEE member wants a copy of the questionnaire, send me a SASE.

As some of you know the October 1992 Spectrum had a 17 page special report on EVs prepared for Wescon '92. The Feb. Spectrum has 5 letters to the editor commenting on that report. Don Mignola had a call from a Spectrum editor saying that starting with March, every other issue will now include an "EV WATCH" page. I urge any EAA member or others to prepare letters to the editor or news articles for Spectrum or other publications to increase public awareness of EVs.

In Anaheim, IEEE Publications gave me the remaining copies of the October Spectrum to help raise funds for EAA. If you want this special report, send a \$3 check made out to "Electric Auto Association" to Bob Wing, POB 277, Inverness, CA. 94937.

SAFETY ELECTRIC VEHICLE HEATER

The RUSSCO Safety Electric Vehicle Heaters heat and circulate coolant through the original equipment heater, replacing the source of heated coolant supplied by the internal combustion engine. The heating system provides temperature control, fan speed, heat and defrost selection for heating, defogging, and ventilation. Model H-15 is suitable for temperatures above freezing. Model H-20 is suitable for temperatures below freezing and is recommended for systems under 120 volts. Heaters are supplied with hose, insulation, clamps, fittings, wiring, mounting hardware and easy-to-follow instructions. RUSSCO Heaters are warranted for one year.

SPECIFICATIONS

- 96-120 Volt input
- H-15, 1.5 KW, 12.5 A, 5120 BTU/H
- H-20, 2.0 KW, 16.7 A, 6830 BTU/H
- Coolant temp. rise, H-15, 1/2°F/sec
- Air temp. rise, H-15, 70°F
- Size 4" D x 8 1/2" H x 16" L
- Weight - 6 1/4 lb

Model H-15
\$345

CALL or WRITE FOR DETAILS

Model H-20
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Board Meeting Highlights — 2/23/93

By Clare Bell



Board Meeting Highlights from minutes prepared by Anna Cornell.

There has been ongoing debate about having Electrathons at EAA Events. A special focus of concern has been 16-18 year old licensed drivers. Board member Bob Wing has urged that EAA not extend liability insurance to cover Events with under-18 drivers, since other groups have been sued for allowing such individuals to participate.

Paul Brasch invited Dann Parks from Electrathon America and Nick Hart from Clean Air Revival to explain each group's role in Electrathon Events. It was generally felt that supporting Electrathon events is in line with EAA's purpose and EAA wants to continue having Electrathons as part of EAA events.

A motion was passed putting forth an explicit statement on liability coverage. Each chapter or group requesting liability coverage for an EAA event will deal directly with the EAA insurance agent and pay the daily premium. The Board will attempt to make the standard policy available for non-nationally sponsored EAA Events.

For any activity to be an EAA event, the Board requires the following: Event organizers/participants must have at least six paid-up memberships on file. Chapter presidents or national Board members who sponsor an event must provide their own names address, telephone numbers and affiliation, and those of the other event organizers. A copy of the event program must be supplied, including participating organizations, news articles and publicity.

Participating drivers 18 and under must supply proof of valid driver's license, liability coverage and a parental/guardian signature on a release form.

A designated safety officer (EAA member) must supervise the event at all times. The safety officer has the authority to disqualify a participant or cancel an activity if it becomes unsafe. After the event, any news items or reports, if prepared, should be forwarded to the Board.

Discussion

John Newell suggested that EAA get a detailed guideline from the insurance carrier. Bill Palmer was concerned that EAA insurance might not cover Electrathons because the race vehicles are not street-legal. It was recommended by Stan Skokan that EAA/Electrathon event guidelines be drawn up, perhaps modeled on the present rules used by Electrathon America and Clean Air Revival. Any further action was tabled to allow individual Board members and committees to research the insurance issue.

The previous policy, as stated in the above motion is now in effect until superseded by Board action. Bob Wing asked to be notified if drivers under 18 were to be in an event so that he could resign from the Board before the event took place.

Product Endorsement Disclaimer

Board members viewed a promotional videotape sent from B. A. T. Technologies. The tape implied that EAA endorsed this vendor's products. Paul feels that EAA could be sued over this tape and wanted the Board to issue a disclaimer. EAA has a policy not to endorse vendors or products.

A disclaimer letter is being drafted. It will be sent to B.A.T. and the TV station whose broadcast segment was made part of the promo tape as well as to Don Mignola who made the endorsement.

1992 EAA Fellow Awards

Award certificates were signed by the Board for presentation to the six EAA Fellows selected for 1992. Their names and photographs, if available, will be published in Current Events.

Other Board Actions

The national EAA Symposium will be held at Wescon/93 (Sept. 28-30 at the Moscone Center, SF) if a Wescon/93 EV program is scheduled.

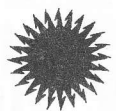
In the Current Events publication information box, the text will state "Published by the Electric Auto Association". The listing of membership will be "Membership Information", followed by the Munro's name and address.

Board membership terms shall be for 3 years unless a retiring Board position is being filled. Terms will be measured in calendar years. Sept. 1994 will be the beginning of a new election year. More Technical Advisors will be appointed in order to 1) get more ideas from younger people and 2) provide a source of interested/experienced individuals as future Board members.

EAA Fellow nominations for 1993 are now open. Chapters may nominate candidates for the Fellow Award and non-chapter EAA members can send nominations directly to the Board. Nominations should include a description of the nominee's accomplishments (300 words or less) and a B&W photograph, if possible.

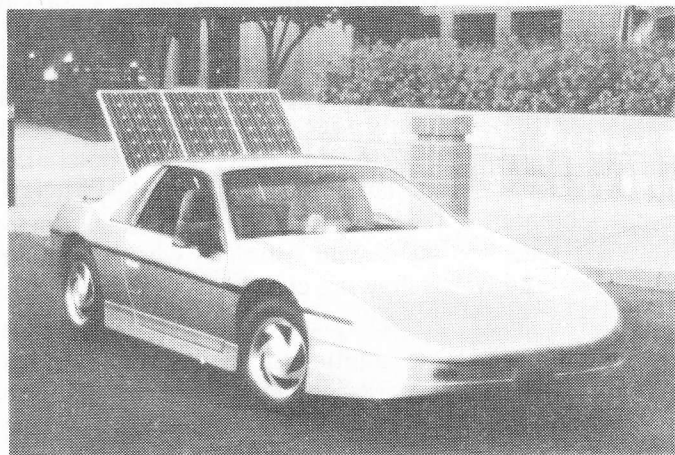
There will be 10 Fellow awards for 1993, to be reported in the Nov/Dec issue of Current Events. Please postmark entries by July 15, 1993 and mail to Bob Wing, P.O. Box 277 Inverness, CA.

The next Board meeting has been delayed, since member Stan Skokan was away. Now that he is back, a meeting date will soon be announced.



SOLAR ELECTRIC

DEMOS, SURPLUS EV'S & PARTS SALE!!!



DESTINY 2000 - 250 watts of photovoltaics, originally \$28,500 - Now \$21,000



1992 S-10 Blazer - 200 watts of photovoltaics originally \$30,000 - Now \$24,000

*** Many more EVs in stock (\$10,000 - \$25,000).
Call to arrange test drives.**

PARTS

CONTROLLERS (used)	GE EV-1	NEW \$750	NOW \$250
	PMC 96volt in	NEW \$750	NOW \$350
	Bikor DC-DC 65-120volts	\$450	NOW \$225
CHARGERS (new)	220volts AC	96volt 50 amp \$1,200	NOW \$500
	110volt AC	96v/12v 15amp \$750	NOW \$350
BATTERIES (used)	6volt 220AH	NEW \$55	NOW \$25
SOLAR PANELS	As low as \$5/watt - call for size and configuration		

**CALL: (SF) (707) 542-1990
(LA) (310) 352-1353**

Precision DC Energy Monitor

by Clare Bell

For the first time, EV drivers can quantify their energy usage in the same standardized units used by the rest of the world. Your house has a Watt-hour meter on your AC line and the utilities bill you for kilowatt-hrs. You know exactly how much energy is going into your house. Now, with the introduction of the **Brasch Labs Precision DC Energy Monitor** (Watt-hour meter), EV users can know exactly how much energy is going into or out of their batteries. They can see how much their car is using while driving down the road. Owners or prospective buyers have a direct way to compare the efficiency of one car versus another in terms of watt-hrs/mile. EV drivers can monitor the efficiency of their car over time so that they can notice and take action if the efficiency value falls.

The automotive world speaks in miles/gal, a value the public and the industry easily understands. When your car's mileage falls off, you know that it's time for a tune-up or repair work. There should be something similar for EVs. For a long time the EV world has needed a common equivalent "language" of measurement—one that is equally intelligible to the general public as to the EV engineer or designer.

Now, we in the EV community have the means to speak a common measurement language to ourselves and the rest of the world. The Precision DC Energy Watt-hour meter is an instrument that has been specially designed to measure energy flow in and out of an EV battery pack. In addition to precisely tracking amps drawn over time, it also tracks battery voltage, eliminating errors due to battery pack voltage fluctuations.

The unit consists of two modules, a display that can be mounted in-dash or in an instrument enclosure and a sensing module that incorporates a non-

contact current sensor. This sensor is in the shape of a ring or donut, so all you do is feed a battery cable through it. There are no external shunt resistors to install and wire. You can mount the sensing module anywhere in a series pack. The four-place digital display serves as an up-down counter. When energy is pumped in with a charger, the display counts up. When the motor is pulling energy to go down the road, it counts down. Simple and straightforward.

In the internal combustion automotive world, racing has pushed the development of car parts and systems. This DC Watt-hour meter has been developed with experience gained from rallies and racing. A prototype unit was installed in the electric 914 Targa Porsche driven by Ron Rasmussen in the 1993 Phoenix Solar and Electric 500. Rasmussen, who placed third overall in the Electric Stock Feature endurance race, said that the instrument was a definite factor in his performance. It enabled him to compete effectively with a lead-acid pack in a stock conversion against entries with specially designed or one-of-a-kind drivelines or batteries.

Rasmussen credited the instrument for allowing him to determine his strategy for the race and how many pit stops he would need for fast-charging.

"No guesswork, no voltmeter reading and increased confidence in my car's range," he said. "I can't believe I have driven for two years without it."

Do I really need this instrument?

You may ask why you can't just read your pack voltage on your car as an end-of-range indicator. Or use an amp-hour meter or a state of charge meter, such as the ones used on fork-lift trucks. The pack voltmeter is generally a very poor indicator of how much energy is left in the batteries. Only

when the pack is nearly flat will you see a definite drop-off and by then your controller may already have started to cut out. (As better batteries appear, with lower internal resistance, the drop-off won't show up until the cell is nearly gone. Measuring the un-loaded voltage of a battery pack to determine its state of charge is generally useless. Measuring the loaded voltage (looking at your voltmeter when the motor is drawing current) isn't much better.

The state of charge meters operate by sampling the loaded voltage of the batteries and comparing with a reference. A state of charge meter can act as an approximate indicator, but they are not accurate or precise enough to give results that can be used in exact energy calculations. They can also give misleading "false alarms" or miss a genuine "low on juice" condition.

An amp-hour meter is a step in the right direction, but because an amp-hour meter is an integrating ammeter, it does not take into account the battery pack voltage fluctuations. It also usually requires a shunt resistor and is subject to perturbation by electrical noise spikes. An amp-hour meter does not give a true indication of power used over time (Power (in watts) = volts X amps) A Watt-hr meter DOES. Isn't this really just another electric fuel gauge?

The DC Energy Monitor can serve as a fuel gauge. Its primary purpose, however, is as an instrument to measure the performance of electric vehicles without oddball calculations that yield values in non-standard units such as batteries/mi.

Numbers of EVs with different weights and battery packs can be directly compared without having to resort to elaborate calculations.

Precision D.C. Energy Monitor

(D.C. Watthour Meter)

Brasch Laboratories

Features:

Tracks battery energy level

- ☐ Four-place digital display
- ☐ Accuracy of +/- 2% FS, or +/- 1 digit
- ☐ Up-down counter tracks energy drawn or added

Provides greater accuracy than amp-hour meters

- ☐ High impedance voltage input corrects for battery pack voltage variation

Noise resistant — tolerates high current environment

- ☐ Non-contact magnetic Hall-effect current sensor
- ☐ No wiring for external meter shunt — eliminates noise pickup and ground loops
- ☐ Specified operational range of +/- 600 A
- ☐ Withstands transient peak currents of 1200 A
- ☐ Accepts battery pack voltage of 50 - 400 V
- ☐ Connections between signal and display board are 5000 V opto-isolated

Compact and flexible

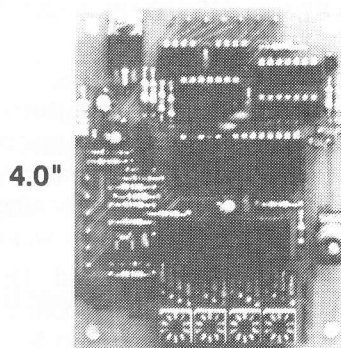
- ☐ Uses 2 pc boards — input and display
- Display board may be remotely mounted in dash

Additional Features:

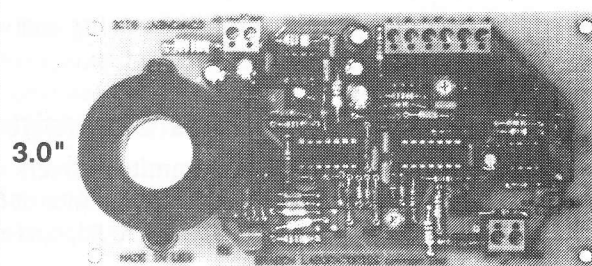
- ☐ Instantaneous indication of power output. (With optional meter)
- ☐ User pre-settable count register (use to set battery capacity)
- ☐ User-settable alarm output (use to set under or over charge limit; 5000 V opto-isolated outputs)
- ☐ Power-conserving display-blanking, in standby mode
- ☐ 12 V nominal power input to both boards
- ☐ 750 V isolation from voltage sense inputs. Provides safety even when charging with non xfmr chargers.

Now EV users can easily:

- ☐ and precisely monitor battery energy flow
- ☐ Quantify vehicle efficiency (whrs/mile) as a baseline for improvement
- ☐ Troubleshoot power losses
- ☐ Determine charger efficiency (by comparison with AC powermeter at charging location)
- ☐ Use as an electronic "fuel gauge" for your EV



4.0"
3.25"
Display Board



4.0"
6.0"
Input Signal Processing Board

- ☐ Accurate Energy accounting ends guesswork
- ☐ Race-tested performance — tested and proven at 1992/93 Phoenix Solar & Electric 500

Ordering Information:

The complete Precision Energy Monitoring system consisting of the signal processing board, the display board and user manual are stock to 12-week delivery. Brasch Laboratories — Phone: (408) 371-7276 FAX: (408) 371-5978.

3/1/93

EAA Board 1992

Annual Report to the Membership

Comments from the Chair

In case you are wondering who your directors are, see p. 2 of Current EVents. Lee Hemstreet and Stan Skokan were added during 1992. Bill Palmer is Chair of the Board and of the Finance Committee. Paul Brasch chairs the Activities and Communications Committees and also edits Current EVents. Bob Wing chairs the Membership and Chapter Relations Committee. Your suggestions will be appreciated. Please send them to the appropriate Director.

As most of you know, the main objective of EAA is to promote the use of electric vehicles. Efforts toward that end include publishing Current EVents, sponsoring rallies, vehicle demonstrations, displays, conducting symposia and encouraging members to form chapters and hold informative meetings.

EAA members know more about electric cars and have more experience designing, building and driving them than all the auto manufacturers, IEEE members, EPRI's etc. in the world combined. Yet we are considered tinkerers and hobbyists instead of authorities. IEEE didn't even mention EAA in its special issue of Spectrum on electric vehicles last November. Why are we not recognized? Your directors have been wrestling with this question and what to do about it without much progress. We hope many of you will give us constructive suggestions. We will publish them in Current EVents.

Finance Committee Report

We started 1992 with a bank balance of nearly \$9,000. Income for the year was a little over \$40,000, mostly from membership dues with a little bank interest and income from ads in Current EVents. One chapter donated \$500. Expenses were nearly \$48,000. Publishing Current EVents was by far the largest item, but other significant expenses were dues rebates to chapters, membership list maintenance, send membership renewal notices and promoting EAA membership. Most activities are self-financing. At year-end the bank balance was down to about \$1600. We had spent nearly \$8,000 more than we received.

Early in the year we recognized the trend. The only significant expense that we could reduce without jeopardizing membership services and growth was to postpone paying dues rebates to chapters. To increase income, we raised dues and concentrated on efforts to increase membership. Now membership and income are increasing and we are starting to pay both overdue and current dues rebates to chapters.

We have adopted a new budget which holds Board committees responsible for prudent spending within budget, yet allows increases when income increases and requires decreases when income decreases.

In closing: Please tell us what we should be doing and what **you** will do to help to make your association better.

Bill Palmer

Activities and Communications Committee Report

The Activities and Communications Committee covers activities that EAA has participated in that took place mostly in the San Francisco Bay Area. It also included attendance at SEER (Solar Energy Expo and Rally) in Willits, Calif. and the Solar & Electric 500 Race in Phoenix Arizona. We hope to expand this participation and reporting to nation-wide coverage soon.

If you know of an EVent coming up that you think we should try to participate in, please call Anna Cornell, Activity Coordinator at 510- 685-7580 or Paul Brasch at 408-371-5969. We can't promise to be at every event, but we will try to help out.

Here is a partial list of EVents that EAA participated in for 1992. (Thanks to Anna Cornell for most of the co-ordination of these EVents).

April 24-28 - Second APS Solar & Electric 500. About 2000 brochures were given out. Race coverage appeared in Current EVents as feature article.

May 9 - Stanford University Earth Day - 3 cars on display, public attendance was about 1500.

June 28 - Stanford Concours de Elegance - 3 cars on display, public attendance was 25,000.

August 7-9 - Solar Energy Expo and Rally (SEER) at Willits. Several EVs on show and competing. Public attendance was 15,000 and many brochures were given out.

Annual Report

(Continued from previous page)

Aug 8 - East Bay EAA Chapter Rally at Hayward, CA. Rides and competitions, good public exposure.

Sept 19-20 - EAA's main EVent. 20th Rally/Expo in downtown San Jose on 19th. Over 30 EVs and 2,000 spectators. Best-ever Symposium presented by Silicon Valley chapter on 20th. Symposium write-up in the Dec/Jan and Mar/April CE.

The communications part of this committee (Paul Brasch) presented talks to the following groups or events and more:
May- Combined SAE (Soc. of Automotive Engineers) and ASME (American Society of Mechanical Engineers) at the University of Santa Clara.

Oct - De Anza College's "Renewables are Ready" Fair.

Nov - South Bay Transportation Officials Association.

Dec - Bay Area Action Schools Group in Palo Alto, CA.

Dec - SAE meeting in Berkeley, CA.

Dec - Rotary International in Milpitas, CA.

The publication of Current EVents is done under the communications committee by Paul Brasch, Editor in Chief with invaluable assistance from Assistant Editor Clare Bell who came on board starting with the Oct/Nov issue. Sue Hollis of PCTEK is layout and publications manager who has been instrumental in bringing Current EVents to its present form. And let's not forget the EAA members who contributed articles and letters. There are too many of you to list, but many thanks to you all. We have all worked very hard to bring you the best EV publication in the world. We intend to improve and expand it even more this year.

EAA Membership and Chapter Relations Committee Report

Bob Wing, Chair; Committee Members: Peter Barnes (San Carlos, CA), Don Mignola (Salt Lake City, UT) Jim Naylor, (Lodi, CA) John Newell (Belmont, CA) , Hal and June Munro (Mountain View, CA)

1992 has been a good year for EV developments and increasing public and government interest. 1993 should be even better for EAA.

At the invitation of Wescon board chairman Bill Murray, Bob Wing, Don Mignola and Stan Skokan attended the Wescon/92 EV Showcase in Anaheim. The intent of the trip was to explore the possibilities of EAA participation in technical shows and to distribute brochures. The Anaheim Wescon was the destination of Joe LaStella's BAT Metro 450 mile distance run from Stanford University in Palo Alto. The publicity run was organized by Bob Wing and witnessed by Bob Wing and Don Mignola, among others. 3000 brochures were distributed.

As a result of the Wescon 92 trip, Wescon/93 will have a similar EV Showcase at Moscone Center in San Francisco, Sept. 28-30, 1993. IEEE magazine will have an "EV WATCH" page in every other issue, beginning with p. 15 of March 93.

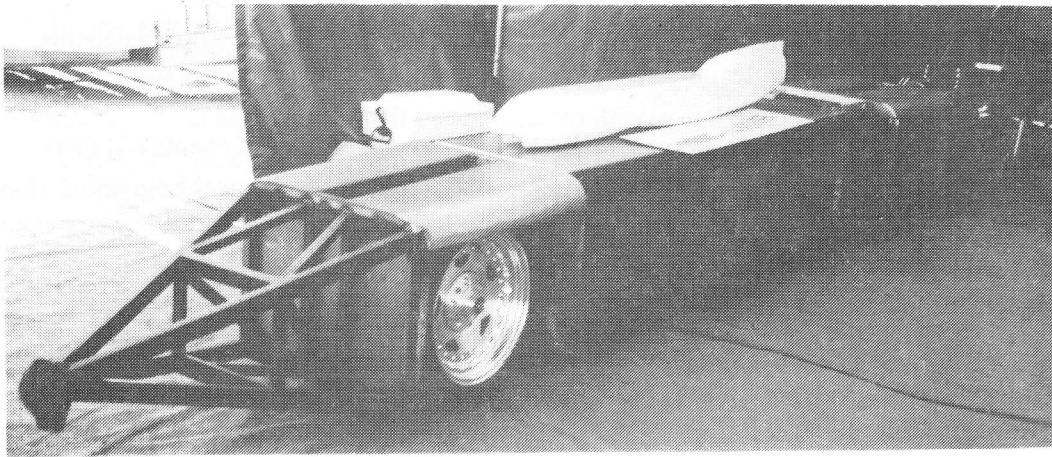
It is a continuing challenge to bring in new EAA members. Last year only 23 % of new members renewed for a second year. Peter Barnes is conducting a survey to find out why this rate is so low. The renewal rate for 2-year members is 98 %. Localities with EAA chapters have more members.

Three of the new EAA chapters have grown fast in 1992. San Diego EVA had their first meeting in fall 1991 and have had good attendance due to public announcements to the media. San Diego members had cars at the 92 and 93 Phoenix 500's. President Ron Larrea and his associates' efforts to publicize EVs through news stories and rallies in the San Diego area have definitely paid off.

Sacramento EAA had its first meeting on Feb. 22, 1992 at Sacramento Municipal Utility District. Chapter president Richard Miner has done a lot of advanced planning to make the chapter a success. If all areas of the US had an environmentally committed power company like SMUD, there would be more EVs on the road.

Lawson Huntley of Monroe, North Carolina has just organized the Southeast Electric Vehicle Association, with members in AL, GA, VA and SC. Huntley is president of SEVA.

EV Lands Speed Record Needs Dollar\$



Ed's partially built racer and model.

Ed Rannberg told me at Phoenix International Raceway March 6, 1993 that he already has 20% funding for his land speed record attempt, but he needs more. Ed holds several world records

and was a part of the Team Tucson group (see Oct/Nov '91 C.E.). They were not able to obtain the approximately \$2 million they felt that they needed. Ed feels that he can do it him-

self for much, much less. He definitely has the know how and experience.

The critical need for money **RIGHT NOW** is due to the up coming attempt by the Japanese as described in Oct/Nov '92 C.E. Ed hopes to be ready to set a very tough to beat goal before their attempt.

If he can do that, the record would not leave the U.S. What a great way for a corporation or utility to show their environmental commitment and involvement by setting a new EV land speed record. Interested

parties may reach Ed at (714) 829-2011.

Lets keep the record here and show off U.S. technical expertise. -Ed □

1993 PHOENIX SOLAR & ELECTRIC 500 "B" STOCK HEAT RACE WINNER: ELECTRIC PORSCHE 914

COMPONENTS: DELUXE KIT
FROM ELECTRO AUTOMOTIVE

VIDEO AVAILABLE:
"PORSCHE 914
COMPONENTS
PACKAGING TOUR"
RUNS 30 MIN.
\$30.00 + \$3.00
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FELTON, CA 95018

SINCE 1979

BOOKS & VIDEOS
COMPONENTS & KITS
TAX CREDIT CERTIFIED
TRAINING & CONSULTING

Editorial

(Continued from Page 2)

paragraphs of their outrage and the correcting facts to the offending publication, then the public would start to hear the **truth**. And the news media would find out the facts and realize that we are not going to stand for distortions anymore.

What else can members of EAA do? Well for one thing, we need to develop an identity with the public. (See Bill Palmer's comments in the annual report) Who are we? Where are we headed? Our new logo is a start and now we have identifying bumper stickers.

Several people have requested them as now more and more members are proud of their EVs and want to identify what they have. If your car doesn't perform well enough for you to be proud of it, then you should fix it so that it does. Then identify it as electric with our bumper sticker.

The EAA needs to better understand its own members and their vision for the future. A survey was discussed a year

ago. Little was done on it. Then recently a great opportunity presented itself. Runzheimer, a world renowned marketing firm which researches the costs of gas cars for the IRS, contacted us at the urging of Solar Electric. They want to develop similarly researched numbers for electric cars by surveying our members and Solar Electric's customer base. You should have already or shortly will receive their questionnaire. They are paying our expenses to mail it out, since we will not give out our membership list. Please fill this out as best you can. We will get the summary information from them.

This is a great start in our search for self identity and self-awareness, but we need more. So, in this issue we have some questions about Current Events and the EAA that we need your input on. This is a start. In the near future we plan a detailed technical questionnaire about your EVs and yourselves.

All of this is to get to know ourselves so that we can tell the world who we are and what we know. We must prove the technical feasibility of EVs to the world over and over again. To do this, we need a solid reputation to stand on. These are our first steps toward this goal. Please help us make it happen. Answer our questions.

On the different subject of low rolling resistance tires: On your behalf I obtained a list of the sizes and their order numbers from Mr. Bill Egan of Goodyear. He has told me that any Goodyear dealer should be able to special order those SUPER tires using these order numbers. I do not know if that includes franchised dealers as well as company-owned stores. If you have trouble, write to:

Goodyear Marketing Department
1144 East Market St.
Akron, Ohio 44316

Indeed, I can't stress enough the importance of our full membership writing to them to request/demand that they bring out these tires for sale nationwide. They are presently in 3 test markets only, but can be special-ordered. See the last issue (March/April) of CE for details.

Keep on charging ahead. Our enthusiasm can have an effect on the world because we are using the truth. Editor
—Paul Brasch

Goodyear Tires

Invicta GFE

P185/70R14	746	748	647
P195/70R14	746	827	647
P195/75R14	746	645	647
P205/60R15	746	913	647
P205/65R15	746	299	647
P205/70R15	746	688	647
P205/70R15	746	727	647
P225/75R15	746	692	647

Invicta GLR

P165/70R13	772	564	465
P175/70R13	772	904	465

Invicta GAL

P185/70R14	779	055	433
P195/75R14	779	854	433
P205/70R14	779	707	433
P205/60R15	779	896	433

DORAN MOTOR COMPANY

Electric Vehicle Innovation

Doran three wheel electric commuter car

Doran electric Mini-bike kit

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30 mph - 25 mile range on a 110v charge.

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Build your own electric vehicle now with inexpensive and reliable components. Drive at freeway speeds on a 110v charge. Learn about construction techniques with our 96 page manual with over 100 photos and illustrations. Plans cover both the electric and Subaru gas powered performance versions. Includes valuable information to assist you in building your own design or for converting any car to electric.
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Plans

"The Electric Vehicle Experience" Video
This all new comprehensive video covers the latest in electric vehicles, racing and technology. Demonstrates motors and controllers, and discusses battery developments and charging. Also includes demonstrations of the Doran 3-wheeler and EcoScoot. Take a 90 minute ride into the future!
VHS \$19.95 plus \$4 p&h
Video

Product Brochures and Parts Catalog
Information on all Doran products including ordering information on the EcoScoot, Electric Mini-Bike Kit, 3 wheeler plans, motors, controllers, and other parts for building your own electric vehicle.
\$5.00 postpaid

Or send card # and exp date or Check or M.O. to
1 (702) 359-7356
Doran Motor Company
1728 Bluehaven Dr., Dept. R
Sparks, NV 89431 USA
overseas orders add \$5



"Leave the Dinosaurs in the Ground!"

What is an Electrathon?

An electric vehicle competition started in England in 1978. It is now found in Australia, the US, and is becoming international. The basic format of this exciting electric motorsport consists of:

- ☐ One hour rally for maximum distance
- ☐ Closed course
- ☐ Electric powered vehicle with limited battery weight
- ☐ Must use conventional lead-acid batteries
- ☐ Three or four wheels

The object is to demonstrate and develop ultralight electric vehicle technology. The winner travels the greatest distance in the allotted hour.

Electrathon America is a sanctioning organization whose charter is to standardize rules for Electrathon competitions. It does not actually organize Electrathon events. Anyone who is interested in building a vehicle or running an Electrathon competition is urged to write for the current Electrathon America rulebook. Cost is \$10.00 plus \$1.50 postage.

Electrathon America Rulebook
Gary Ramon
P. O. Box 1722
Thousand Oaks, CA 91358
Tel: (805) 492-5858

For people in the Bay Area, Dan Parks is a local Electrathon America contact. He can be reached at (408) 733-2539. Electrathon America provides an Electrathon vehicle registration service. Contact them for details.

Clean Air Revival (CAR) is a non-profit organization dedicated to educating the public about renewable energy

technologies. They provide hands-on access to the hardware and equipment. CAR works primarily with high schools. Their Electrathon Scholarship Program encourages and assists students to build vehicles and compete in events.

Clean Air Revival also publishes the Electric Motor Sports Guide for \$10 and the Clean Air Revival Newsletter for \$20 per year.

Clean Air Revival, Inc.
55 New Montgomery Street
Suite 424
San Francisco, CA 94105
Tel: (415) 495-0494

See you at an Electrathon Event!
—CB

Electrathon America '93 Events

May 1st

Labor Day Clean Air Revival
Electrathon of De Anza College,
Cupertino, CA
Calif. Industrial Arts Teachers
Association

May 22

Denver EV Council - Electrathon,
Denver, Colo.

May 22-23

Tehachapi Wind Fair Electrathon
America event Gary Ramon

June 11, 12, 13

Virginia City Electrathon organized
by Rick Schrenk

July 3

Denver EV Council - Electrathon
event 4 Alameda Parade - EV parade
sponsored by Clean Air Revival

Automakers Fight as NE States Follow CA's Emissions Lead

Battling state by state, General Motors is fighting adoption of new pollution standards being imposed in Northeastern states, which parallel tough California regulations.

New Jersey says it will adopt strict standards by the 1996 model year if four neighboring states do so. New York, Massachusetts and Maine already have adopted the program, but automakers have so far succeeded in blocking New York's implementation of the laws in court.

With passage of the legislation, manufacturers would be forced to sell cars and light trucks that conform to much higher standards. In some instances this will be achieved by using natural gas or methanol, but gasoline burning cars will require new catalytic converters. Car makers are predicting that the gasoline cars will be about \$1,000 more and that cars will be harder to sell, but California does not believe the cost will be that high.

Along with the mandate for less pollution vehicles, the California plan also calls for zero emission vehicles — presumably electric — which must represent 2% of the automobile population by 1998 and rise to 10% incrementally over succeeding years.

It was the 1990 Clean Air Act that allowed California to set its own tailpipe standards and allowed other states to adopt the California program, rather than the federal one. A year and a half ago, representatives of the six New England states plus Virginia, Washington, D.C., Delaware, Maryland, Pennsylvania, New Jersey and New York agreed that each state would adopt the program, but since then Virginia has backed off and Connecticut is in a holding pattern.

A group consensus of 40% in acceptance of the plan is necessary for New Jersey to adopt it, and observers fear that if the manufacturers succeed in thwarting New York's plans, it will be a difficult figure to reach.

(NEW YORK TIMES: 3/25)

EAA Battery Testing Service? A Proposal

by Clare Bell and Don Gillis

Are you driving an EV with an older battery pack? Chances are that you have had or will soon have one or two weak batteries. You try a heavy equalize charge, but that doesn't bring them up.

What do you do? Let it ride and plan on eventually replacing the entire pack? Replace them with new cells? Find some used ones in the same approximate condition as your pack? Buying used batteries can be a real crap-shoot. Setting up to test them can be more involved and cost more effort than the battery is worth.

Wouldn't it be neat if EAA had a number to call and a place to get your batteries tested? Or perhaps even to get pre-tested low-cost used batteries labeled with amp-hour capacity?

EAA members are continually replacing packs and old packs often contain good batteries. Those batteries could be salvaged and made available to members who just need to replace one or two to keep an older pack in good shape.

Setting up this sort of battery exchange and test service could be the most valuable thing EAA could do for its members. If the word gets out, it might even help attract a whole flood of new folks (imagine that!)

We (Don Gillis and Clare Bell) have been tossing this idea around for several months. The equipment is available. The idea, we think, is workable. We'd be doing it ourselves if we weren't up to our collective keisters in work, commitments and other things.

The plain fact is we need to recruit some other warm bodies to make this into a reality. We can supply equipment and direction. What we need are people who are willing to:

- ☐ Put together and debug the battery test stand.
- ☐ Test batteries.
- ☐ Label and store batteries.
- ☐ Set up a clearinghouse number and be willing to answer inquiries.
- ☐ Keep a record of who has used batteries available and who needs them.

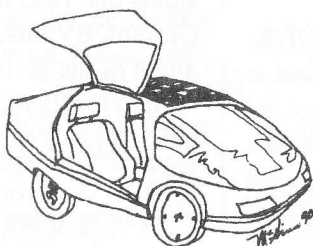
And last, but most important, be willing to OWN the project once it is started. A degree of commitment might be rewarded by a degree of profit, once this service gets rolling. Anybody out there up for it? The batteries you save may be your own.

Setting up and instrumenting the battery amp-hour capacity tester might be the kind of project that a college student could do for a thesis.

If you are interested, reply to us care of Current EVents or call the editorial number.

If you are getting ready to change a pack, please let us know, as we already have a least one member who needs some used batteries.

Three gallons of the B.A.T. Ultraforce additive has been donated by the company. An outgrowth of the battery testing project might be an evaluation of this additive so that we can settle the question of whether the stuff really works. Again, this could be a good self-contained opportunity for a student thesis and a real help to EAA. ☐



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then try powering your home
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HOME POWER MAGAZINE

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Letters to the Editor

Dear Editor:

I read the article "Electric Vehicle Heaters" by Russ Kaufman and decided to share with you some of my observations and opinions. I feel that this article misdirects those members who need heat and not in a meager quantity offered by RussCo. What Russ is trying to sell was rejected by me in the early stages of my business as impractical. His H-20, the most powerful, only offers 6830 BTU/H, a small part of the heat required. He is luring the customer by a calculation which is absolutely absurd. Most of the heat coming into the interior is lost with ventilation, whereas in the house it is through the construction elements. It is no accident and obviously not a present from the auto manufacturers that an average car is equipped with a core able to throw in to the interior an average 25,000 BTU/H. This is the needed heat amount able to defrost defog and provide comfort. It may be different in California, but I am from New Jersey and have studied this problem long ago and helped hundreds of VW owners. Not only will it be completely impractical to use traction batteries for generating a proper amount of heat, but the author displays a lack of knowledge that the market has excellent alternatives to his solutions.

I am ready to offer your members expertly restored gasoline combustion heaters, German and American, at

18,000 BTU and up. I have for sale BRAND NEW heaters and am ready to assist in solving their heating problems.

Cordially,
Ark Mirvis
31 Byram Bay Road
Hopatcong, NJ 07843
Tel: (201) 398-6363

Dear Ark:

It is a false assumption that auto manufacturers supply you with 25,000 BTUs because they must do the job. Even an idling engine wastes that much heat, so it is easy to offer it to the driver. In fact there is so much heat (read that as energy) wasted, that they can even offer to heat the cold outside air on its way through the car. This is as ABSURD as running your house furnace with the front and back doors open in a Nor' Easter.

A reader in Michigan says "why all the plumbing?" Just a small fan and a resistance heater element works for him. Longtime member Bill Williams has said in the past that as little as 200 watts of heat was enough for him.

What Russ is talking about is running your car heater in the recirculate mode, NOT in the vent mode. In recirculate, 6,000 BTUs should be plenty. His design is a "natural" good idea! However, everyone's needs/wants vary. We need to offer any and all options to the EV buying public. I therefore encourage you to advertise your very high powered heaters with us for those who

want them. I also hope that Russ and our readers will continue this debate.
—Ed.

Paul,

I can give you a little insight on why some members don't renew their membership. I'm a medical writer/editor who joined EAA just one year after moving to California from the Midwest. I learned about EAA at SEER in Willits in August 1990. I decided to join so that I could learn about EVs, keep up with developments and use the expertise of your members when I eventually buy an EV.

I have been unable to attend the monthly chapter meetings since 10 AM on Saturday is inconvenient for me. Although I have attended two Symposiums and read most of the articles in Current EVents, I don't understand much of the material in them. I'm not an auto mechanic or an electrical engineer — just a consumer who wants an EV!

I have often thought of dropping my membership, but since I don't know an onboard charger from a controller, I really want to stay in touch with those who do when I eventually buy an EV.

Many of the people who drop out of EAA might be like me. You could improve member retention by publishing more topics that we can under-

(Continued on next page)

Letters

(Continued from next page)

stand. (It would also help if you invited more speakers like Ruth MacDougal!) You could also promote your professional members as experts who can advise members like me. I think it is imperative if you want to open the association to people other than mechanics and engineers. It was hard for me to ignore the fact that I was one of only four or five women at the Symposium!

I think the Board should seriously consider whether you want more non-scientists to join EAA. If you are unable or unwilling to do this, you may have to settle for being a professional association with a limited membership.

Ruth Shipley

Reply from CE's assistant ed. (who happened to be one of the women at the Symposium).

I agree with the points raised in your letter; EAA is at a decision point. We have to choose whether we want to be just a technical/hobbyist society or whether we can become a real public advocacy and consumer information group. For that reason we are doing the short survey in Current EVents to see where members want the newsletter and the organization to go. Please don't drop your membership. There are more women entering the EV field and that is one reason why things are changing, although slowly. Not all of what we print is hard-tech. See this issue's coverage of the '93 Phoenix race. —CB

EV Safety Notes

by Clare Bell

In VW-based conversions, inspect the energy-absorbing portion of your steering column whenever you check your batteries.

Recently a fellow EV-er described an experience that he had with his VW-based kit-car conversion. The energy-absorbing section in his steering column broke, resulting in a loss of steering control. Luckily he managed to bring the car to a safe halt and neither car nor driver came to any grief. Since I have a converted 1970 VW Baja with the same type of steering column, you can bet I paid attention.

His car uses a later-model VW bug chassis that has the energy-absorbing steering column. This was a collision protection feature installed on bugs from 69-70 on. You can tell if your EV has it by inspecting the steering column at the lower end, near the coupling to the steering gearbox. The energy-absorbing feature is a cylindrical open-mesh grillwork at the bottom of the steering column. Don't assume that having an early model chassis will spare you — VW's are notorious for having different model-year parts in the same car. I found that my 70 Baja had a '73 transmission. Inspect that sucker.

The Bentley Volkswagen manual (1970 and later) says that the energy-absorbing section "should be inspected for cracks and distortion any time the car has been in an accident." The energy absorber should also be periodically inspected in VW-based EV's, since the extra weight of batteries in the front of the car can stress the steering column and a heavy jolt to the front wheels might cause the energy-absorbing section to crack.

If you have a VW-based conversion, inspect the energy-absorbing section of the steering column whenever you check or water your batteries. Use a trouble-light or a flashlight. Turn the steering wheel so you can see the entire surface of the energy absorber. If you find the slightest crack or distortion, replace it. The best fix is to install a pre-70 solid steering column without the energy-absorbing section. You can also reinforce the energy-absorber with thin wall aluminum or steel piping. Cut the pipe lengthwise to form two half-cylinder jackets and use hose clamps to fasten them on. This will help take the stress on the energy-absorber. If it does crack or break, you will still have steering control.

1972 and later VW's also had an energy-absorbing steering wheel in addition to the impact-absorber in the steering column. Not too many conversions were based on 72's or later, but if you have one, check the steering wheel.

EV-er's who are machinists might consider making a solid cylinder to replace the meshwork grid in the steering column. There might even be an after-market replacement, although I haven't checked into it. Does anyone know?

If you do reinforce your energy absorber, make sure that the steering column can turn freely without hanging up on other parts of the car, such as battery boxes, etc. Happy and safe EV-ing! □

Calendar

April 25 Concord Earth Day wants cars for display. This event is being organized by Anna and Scott Cornell, so lets support them by getting cars out there, folks! Concord Pavillion.

April 25 Pacific Coast Dream Machines at Half Moon Bay Airport wants cars for display. Contact Peter Barnes (415) 592-2099.

April 30- May1-2 11th Annual SF Whole Life Expo, Concourse Exhibition Center, 635 8th St. and Brannan. San Francisco. 415-587-1079. They want cars too. Contact Anna.

May 13-15 Clean Air Vehicle Conference, Expo and Grand Prix, Atlanta, Georgia (404)237-1980.

May 20 San Jose Lung Association's Clean Air Week. San Jose Hilton. They would like 3 cars for display.

May 22 Princeton Plaza, San Jose. Car show and BBQ. Open to all cars, entry fee \$5. They expect 200 cars (majority not electric). Chapters are encouraged to pool cars for show. Partipants get fed, so think of it as a \$5 lunch. Possibility of EAA paying the entry fee or reimbursing. Contact Anna.

May 23-29 1993 American Tour de Sol and Electric Car Championship. Over 50 cars will race from Boston, MA to Burlington VT. Sponsored by NESEA, Northeast Sustainable Energy Assn, 23 Ames St., Greenfield, MA 31301,(413)-774-6051. NE EAA members - enter cars!

May 29-31 Memorial Day Carnival and Parade in San Francisco.Sponsored by PG and E. They want 5 cars in the parade, 2 in the display. Let's impress PG&E with some spiffy good performers that can handle moderate SF hills. Anna has details.

June 18-20 Fourth Annual Midwest Renewable Energy Fair, Amherst, Wisconsin. Box 249 116 Cross St. Amherst, WI 54406 (715) 824-5166

June 25-27 Sunfest 93 3 day energy expo, includes finale of SunRayce 93. Minnasota Zoo. (218) 546-5369

June 28 Palo Alto Concours De 'Elegance wants 6 cars. 30,000 people in attendance.

Many thanks to Anna Cornell, the EEvent coordinator. For more information on events, contact Anna at (510) 685-7580.

Advertising Rates

What do you sell? Are you looking for great new ways to promote it?

The Electric Auto Association (EAA) will help you tap into a wealth of opportunity through advertising in our newsletter, CURRENT EVENTS. Our membership extends worldwide and consists of members who share one common interest — electric transportation.

CURRENT EVENTS is renowned for the latest information on electric transportation. With an ad in CURRENT EVENTS, you will reach a target audience of members who understand the value and importance of your product.

Advertising Rates:

	1 issue	3 issues
Full Page	\$300	\$200 EA
1/2 Page	\$150	\$100 EA
1/4 Page	\$ 75	\$ 60 EA
Full Page	7.5" x 9.5"	
1/2 Page	7.5" x 4.9"	
1/4 Page	3.65" x 4.9"	

Ad rates are for black and white copy only. For each color, please add \$100 per fountain.

Deadline for camera-ready copy is due the 1st of the month. Please contact Susan Hollis, Advertising Manager at (408) 374-8605 for additional information.

Camera-ready copy and payment for the ad should be sent to:

Electric Auto Association
Attn: Advertising Mgr.
18297 Baylor Avenue
Saratoga, CA 95070

Current Events Questionnaire

We at Current Events have welcomed your enthusiasm about the publication. In order to give EAA members more of what they want/need and to help Current Events grow in the right direction, we are doing this short survey. All information will be used only by EAA. If you complete and return the questionnaire, CE. will send you the first (ta-da!) official EAA bumper-sticker with the logo and "The SWITCH is ON to ELECTRIC CARS"

1. Why did you join the EAA?
 - ☐ I wanted to learn more about Evs.
 - ☐ I wanted to promote the use of EVs.
 - ☐ I wanted to meet other EVusers.
 - ☒ I wanted to build an EV.
 - ☐ Other _____
2. How long have you been an EAA member?
 - ☐ less than 1 year
 - ☐ 1-2 years
 - ☒ 2+ years
3. Are you (check all that apply)
 - ☐ a high school student
 - ☐ a college student
 - ☒ working full-time
 - ☐ working part-time
 - ☐ homemaker
 - ☐ retired
 - ☐ other _____
4. As an EAA member, which of the following describes you best?
 - ☒ EV hobbyist/tinkerer
 - ☐ EV promoter/advocate
 - ☐ EV industry professional
 - ☐ other _____
5. Did you receive the March/April issue of Current Events on time?
 - ☒ yes
 - ☐ no
 - ☐ other _____
6. Do you read Current Events?
 - ☒ entirely
 - ☐ about half
 - ☐ at least one article
 - ☐ quick scan only
 - ☐ don't read
7. If you don't read Current Events, why?
 - ☐ no time
 - ☐ intend to read later but don't get to it
 - ☐ other _____
8. How often do you usually read the newsletter?
 - ☐ front to back
 - ☐ editorial first
 - ☒ other on lunch breaks
9. Do you pass along the publication to friends or colleagues?
 - ☒ yes (to how many?) _____
 - ☐ no
10. Do you discuss contents with friends or colleagues?
 - ☐ often
 - ☒ sometimes
 - ☐ no
11. Would you recommend Current Events/EAA to your friends?
 - ☐ yes
 - ☐ no (if not, why?) _____
12. Do you save Current Events?
 - ☒ yes
 - ☐ no
 - ☐ some issues
13. In the last year, have you (requested information/attended an event/purchased a product or service/volunteered/made a donation) as a result of something you read in the newsletter?
 - ☐ yes
 - ☐ no
 - ☐ don't recall
14. Do you presently drive an EV?
 - ☐ yes
 - ☐ no
15. If you wanted an EV, would you prefer to (check one)
 - ☐ buy a new EV
 - ☐ buy a used EV
 - ☐ convert a gas car using a vendor kit
 - ☐ convert a gas car without a kit
 - ☐ build from the ground up
 - ☐ other _____
16. What kind of EV's do you want more information on (Check any that apply)
 - ☐ street-legal cars/trucks
 - ☐ experimental solar/ultralights
 - ☐ Electrathon vehicles
 - ☐ other race vehicles
17. What sort of ongoing columns would you like to see? (Check all that apply.)
 - ☐ High school EV activities
 - ☐ Women in EV's
 - ☐ Chapter activities
 - ☐ Technical advise "Bolts and Volts" column
 - ☐ Recent EV conversions
 - ☐ Other _____
18. What type of stories would you like to see more of?
 - ☐ technical articles
 - ☐ interviews/profiles of EV vendors
 - ☐ interviews/profiles of EV owners
 - ☐ new product announcements/evaluations
19. During the past year, have you (Check all that apply)
 - ☐ attended EV events listed in the Calendar
 - ☐ bought/sold/swapped anything through the Classified Ads
 - ☐ sent in a request for Reprints
 - ☐ contacted a vendor by using an Advertisement
 - ☐ sent a Letter to the Editor?

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Survey

(continued from page 27)

20. Would you prefer a montly newsletter rather than bi-monthly (every two months)?

- ☐ yes
☐ no

21. Would you support an increase in membership fees to make the newsletter monthly?

- ☐ yes
☐ no

22. Would you be interested in promotional items for EAA (Check the one that apply)

- ☐ mug with EAA logo
☐ T-shirts
☐ car bumper sticker
☐ calendar
☐ resource booklet
☐ membership directory
☐ Other _____

23. Would you be interested in contributing to Current Events by (Check all that apply)

- ☐ writing a technical article
☐ writing a non-technical article (i.e. interview)
☐ covering an event
☐ taking photographs
☐ managing a column (making sure it gets done and in on time)
☐ writing a column
managing the Calendar
☐ If yes, please fill in the information below.

name _____

address _____

city/state/zip _____

phone _____

Thank you for completing this survey.
Please return this survey to:

Electric Auto Association
Attn: Current Events Survey
1968 Elden Drive
San Jose, CA 95124-1313

Want Ads

EAP CHARGERS!! 10 AMP, 10 amp, Transformer isolated, \$100 each - 120 volt traction pack. Add \$20 for 12 volt isolated. Approx 25 lbs each. No frills. Leave message (510) 525-3636.

FOR SALE, 73 Fiat 128, 114 vdc (19 x 6v), 12v dc-dc converter, Russco controller, on board 240 v charger, battery monitor computer. Needs batteries. Extra parts. \$2500. Call Larry (206) 365-4335.

WANTED, Sebring Citicar or commutacar in driveable condition. Call (313) 464-9657 M-F day/evens.

FOR SALE, NICE, Lectra '81 Centurian Hatchback 20 HP Prestolite DC Series wound motor, 114 volts, PMC transistor controller, AC & gas heater, 5-speed, new paint (silver-gray), grey interior, needs new batteries. \$4495. Call (415) 388-0838.

ELECTRIC PORSCHE, award winning red 914 Targa, high quality conversion, fast, quick, and great range. 120V system, on-board charger, upgraded suspension, PMC controller, Advanced DC 9" motor, Sevcon DC-to-DC, am/fm/cassette, etc. Additional items for car include custom tow bar, bolt-in race items (roll-bar, window net, 5-point seat belt). \$13,750/OBO. Call Ron (408) 427-7677.

Rates for Want Ads

\$5 for the first 30 words.

For each additional word, 25 cents per word.

Please send your want ads to EAA\Want Ads, 18297 Baylor Avenue, Saratoga, CA 95070. The check must be included with your ad. Please use abbreviations whenever possible. The EAA is not responsible for the accuracy of ads.

EAA Reprints

EAA reprints available:

- 1) **\$1.00** Editorials - 100th Monkey, Market Size, Twilight or Dawn, Public Acceptance
- 2) **\$1.00** Discovered: The Perfect EV Battery
Facts about the battery that will change the world.
- 3) **\$5.00** Dr Richard Post - Flywheel Energy Storage
Dr. Post updates 1970's thinking and finds a viable solution.
- 4) **\$5.00** Chuck Lemme - Team Tucson Land Speed Record Plans
Includes many power and aerodynamic formulas. A wealth of technical considerations.
- 6) **\$5.00** EAA XA-100 Hybrid (Includes all tables)
Report on the EAA's Hybrid Vehicle Project (all 3 chapters).
- 7) **\$3.00** Back issues of Current Events

ORDERING INFORMATION: Please send donation (check payable to EAA) for your choice of reprints to the following address. Include SASE/w 2 stamps for \$5.00 items and 1 stamp for \$1.00 items each to cover postage cost.

EAA/Reprints
1968 Elden Drive
San Jose, CA 95124-1313

EAA Membership Application

Did you know that EVs

- ☐ Can travel at highway speeds
- ☐ Utilize energy efficiently—less than 1/6th the energy use of a combustion engine
- ☐ Need little maintenance, no tune-ups, oil changes or smog inspections!
- ☐ Have less than 1/10th the moving parts
- ☐ Can be easily charged from any household receptacle
- ☐ Have less than 1/2 the total operating costs of combustion engine vehicles
- ☐ Can also use alternative power sources such as solar, wind, and small-scale hydro
- ☐ With hybrid systems can travel long distances

National Transportation studies show that 95% of all vehicle travel is less than 30 miles per day. Typical EV's can cover 2 to 3 times this distance on a single charge — proving them more than adequate to meet your needs.

You can learn more about EVs by attending EAA chapter meetings. The EAA welcomes the public, and will be glad to share our experience with you. Many members drive electric vehicles which they have either built or purchased. Watch for announcements of our public shows and rallies.

The electric vehicle industry is young, but growing. Join the EAA and help advance the role of EVs in society. Help improve the environment and our use of energy resources.

The Electric Auto Association (EAA) is a non-profit, educational organization for the promotion of clean, quiet electric vehicles (EVs) for personal transportation.

Membership Benefits

- ☐ Chapter meetings with informative programs and opportunities to exchange information with other members.
- ☐ A newsletter, *CURRENT EVENTS*, with industry and EAA news, technical information, helpful ideas and more.
- ☐ Yearly symposia and awards to outstanding members.
- ☐ Opportunities to compete in electric vehicle rallies and participate in shows.
- ☐ Participation in plant tours and special events.
- ☐ Savings on component costs through participation in group purchases of batteries, controller, etc.
- ☐ Savings on commuting cost. You can drive twice as far in an EV for every dollar you spend. This savings is like getting a raise at work.

EAA Membership Application

Name: _____ Address: _____
City: _____ State: _____ Zip: _____ - _____ Country: _____
Phone: () _____ - _____ Date: _____

Please check:

- ☐ \$35 EAA annual dues, including newsletter. Dues are tax deductible in U.S.A. EAA is a non-profit, tax exempt organization. Your returned check is your receipt.
- ☐ \$40 Canada. Other countries \$45. Please remit payment payable in U.S. dollars.

Mail your membership application along with the annual dues to:
Electric Auto Association, 2710 St. Giles Lane, Mountain View, CA 94040

KTA SERVICES

944 W. 21ST STREET UPLAND CA 91786 909/949-7914

Established in 1984, KTA SERVICES caters to electric vehicle hobbyists and manufacturers by supplying EV components, publications, and design/consulting services. We are a complete supplier of EV components and certified kits....everything you need except for the batteries.

All components we recommend and sell have been selected with safety and reliability foremost in mind. All components have been proof-tested in electric vehicles. All components are new, competitively-priced, and come with full manufacturer's warranties. We proudly stock the following:

- ◆ Curtis-PMC Motor Controllers
- ◆ Advanced DC Series-Wound Motors
- ◆ Albright Engineering Contactors
- ◆ General Electric Circuit Breakers
- ◆ Bussman & Reliance Safety Fuses
- ◆ Sevcon DC-DC Converters
- ◆ K & W Engineering Onboard Chargers
- ◆ An ever-growing lineup of EV Publications
- ◆ 5 Kits Certified for California \$1000 Tax Credit & Sales Tax Exemption
- ◆ Curtis-PMC Throttle Pots
- ◆ Curtis Instruments Battery 'Fuel' Gauges
- ◆ KTA Services' Expanded-Scale Meters
- ◆ Deltec Meter Shunts
- ◆ EVCC Adapter Plates & Hubs
- ◆ Carol Ultra-flexible Welding Cable
- ◆ Thomas & Betts Welding Cable Lugs
- ◆ Battery Cables custom-made to spec.

You can purchase your components from us with the confidence of knowing that we specialize in user-friendly customer service. With 10 years of EV experience and engineering expertise, we can answer just about any EV question you can come up with. Additionally, we offer engineering services:

- ◆ Complete System Quotations (free)
- ◆ Project Consulting/Engineering Design
- ◆ Project Overview w/Schematic & Recommendations
- ◆ Computer-based EV Performance Predictions

Call or write us with your EV needs!

For a COMPONENTS & PUBLICATIONS CATALOG, send \$5.00 (refundable)



ELECTRIC AUTO ASSOCIATION
May/June 1993

ELECTRIC AUTO ASSOCIATION

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