Electric Auto Association NEWS

MAY 1991 VOL. XXIII No. 5

REPORT from PHOENIX

by Paul H. Brasch

Its a beautiful Sunday morning, temperatures are in the low 80's. The sunlight is bright and warm after a thin patch of Cirrus clouds drifted away. All of the normal introductory speeches and platitudes have been spoken. Most of the speakers have left the podium and joined the hundred or so others at the inside track wall, looking with anticipation at the starting grid of cars. There are few crew members back in the garage/pit area as everyone wants to witness the start of the main event here at Phoenix International Raceway.

The moment approaches. This is truly historic! "Gentlemen: ..... Let the Dueling begin." WHAT? No "start your engines"? Of course not! There are NO engines to start. The roar that I hear is from the crowd, not from the starting grid, which moves off silently down the track.

This is the beginning of the first closed-course-race-for-money electric car competition. This is the REAL Thing. First place pays $20,000. It is the brainchild of Ernie Holden to promote electric cars the way that the Indianapolis 500 has promoted internal combustion cars for the last 80 years. This is the Inaugural Solar and Electric 500, put on by the Solar and Electric Racing Association (SERA) of Phoenix, Arizona.

Thirteen battery powered vehicles ran on the Phoenix mile, competing for a win, or just to test their cars in REAL race conditions. Two cars used Nickle-Cadmium batteries as their source of power. The rest used lead-acid, except for car #1, which used a combination of Ni-Cd for acceleration and an experimental Zinc-air battery for long distance energy. This battery hybrid '91 Honda CRX was sponsored by Arizona Public Service and Southern California Edison with the battery made by DEMI of California.

After Friday's initial practice session, driver of car #49, entered by California Electric Cars (Monterey) Darrel Clark commented on the Real Practicality of electrics today. "We drove 51 laps (51 miles) in less than an hour, doing about 59.7 miles per hour." "Calculate that as a commute. You've got a one-hour drive to work. It takes 5 hours to charge and costs about 7 cents an hour and it'll get you home from work. You don't need to worry about gas lines and the rest." Saturday during qualifying laps, the cars set lap speeds ranging from a low of 51.365 mph to the top of 69.440 mph set by #1.

Although no battery replacement is allowed during the race, recharging is permitted. This prompted Michael Hackleman to enter an old Ford station wagon, #27, with 20 golf cart batteries and try a quick recharge scheme. Whenever a low gauge reading told driver Tim Considine (writer and former star of TV's "My Three Sons") to pit, his crew would hook up a higher voltage set of fully charged batteries to the vehicle batteries. This allowed charging for 5-10 min. at about a 600 amp. rate. Michael complained that he did not have all of the equipment he needed to charge all of the car's batteries. What he did have helped to move the huge, just under the 4,000 lb. limit, Ford into a very respectable 6th place finish.

In addition to Tim Considine, other famous people at the race were, Ed Begley Jr. as the Grand Marshal/opening ceremonies host, and Thursday Mario Andretti was here testing his Indy-car. Mario took time out to test drive the DEMI powered Honda #1 car. He was so impressed with the performance of the experimental CRX and enjoyed the ride so much, he spent close to an hour guiding it around the track.

During the race Tim Considine brought

the #27 car into the pits on the 47th lap while running third behind the #1 APS-Southern Cal. Edison Honda and the #99 Solectria entry. He came out of his car with tongue firmly tucked in cheek.

"There's a lot of banging going on out there. This is very tough. Banging and drafting. I'm taking down numbers as these guys go by. Seriously, this (the pit stop for recharging) is where we find out what we're doing. This is the real test. This is where we learn if our theory is right. I just ran out the battery, but that's what I'm supposed to do."

Pit chief Gregory Glenn reports Considine's first recharging went "beautifully." "I wish we had more batteries," said Glen. "We could use more than we have. Everything is working. Nothing is showing strain."

A second pit stop went off without a hitch for the former "My Three Sons" star. As Considine waited for the charge, he joked, "I'll tell you that the guy who's been hanging on my tail all day (the #91 Solectria machine) is sure missing me." Considine's high-profile station wagon is easily the most desirable machine to draft out of the whole field.

This reporter was consulting on the charging of the beautiful red California Electric Car entry #49. They had just gotten the car together about a week before the race and had to borrow my old variac charger from my car VOLTS to charge theirs. Even with no lead-acid battery charging experience and little practice or strategy development time, they pulled off a very good fourth place win against the Zn-air car, a very experienced EV racer -Jim Worden in his Solectria and Gary Jackson driving a 3 wheeled Doran. The team of Darrel Clark and California Electric Cars will definitely be one to watch in next years 500. They averaged 43 mph for the two hours. Outstanding for a first try.

The winning car, #1, covered 108 miles in the 2 hour limit, for an average speed of 54 mph. They still had lots of battery power left but were limited by their motor. I overheard them to say that on the last lap they were 2 degrees from the panic point temperature on their Prestolite motor. With a larger motor installed by next year, who knows how fast and far they can go. There was talk of having different battery classes for the next race.

Another highlight of the race, especially for those of us in the San Francisco Bay Area, was the entry of Scott Cornell's shinney red Carmen Ghia. He was a one man band. He was the owner/builder/driver/sole sponsor and crew for his daily use car, and he managed to pull an 8th place despite it all. Congratulations Scott, you are a real tough pioneer!

On the solar side of racing, nine vehicles were entered and all finished both the Saturday 150 km heat and the 150 km of Sunday, however the M.I.T. car almost did not. "It was a very interesting race," said Swatch Spirit team manager Fredy Sidler. "We knew the goal of MIT was to win this first half of the race because they don't have the eight square meters of panels we have," reported Sidler. "We knew we had the energy to beat the field, but we didn't know about our tires. We know now we have the tires and we're confident the results will be the same for us tomorrow."

The highlight of the back-and-forth battle between the Swatch Spirit and MIT came on the 88th lap when MIT driver Peter Rexer took the high line in the first turn to pass the Swatch Spirit. As Rexer steered his three- wheeled machine around the Swatch entry, the single rear tire blew, sending the car into a triple spin.

"The tire died of old age," lamented Rexer. "I remember seeing the wall, and the TV people told me I spun two or three times." "We don't know their (Swatch) strategy and they don't know ours for tomorrow. We have the capabilities and it'll be a lot of fun. We'll stay close, that's for sure." The story goes that when the tire blew, it wrapped around the axle and locked up the wheel while they slid to a stop. This caused a flat spot on the magnesium wheel and the team had no spare wheel. They did not give up and after searching Phoenix for a welder with mig/tig equipment and magnesium experience and an all night effort, the valiant MIT team was ready Sunday for the final heat.

The Swatch sponsored Spirit of Biel team won with average speeds in the 69 mph range, topping those of the straight electrics' speeds. Remember, these are ultra aerodynamic and ultra lightweight --

typically under 5-6 hundred pound vehicles. The MIT team pulled in a reasonably close second.

The only disappointment in this entire fantastic adventure for this reporter was the small press coverage by the "big boys". Only one of the two local TV stations in Phoenix mentioned the race. There appeared to be no national coverage.

A reporter in the press booth was overheard to say that his editor refused to send him here to cover the race, but he came on his own time and cost as "this is the inaugural event and I'll be damned if I was going to miss it. It's just too important!" My sentiments exactly.

Paul Brasch (Pb) 4-91

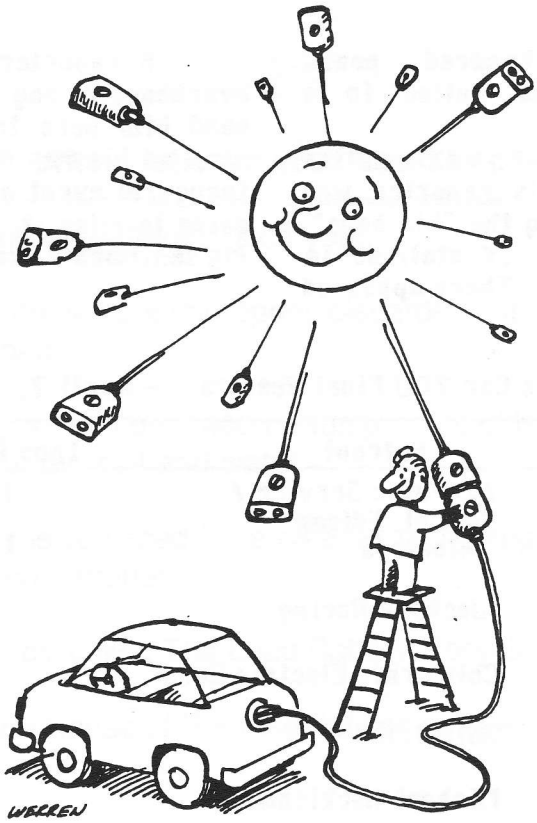
Electric Car 200 Final Results -- April 7, 1991

No.	Driver	Entrant	Laps in 2 hours	Notes
1	Chris Smith / Palos Verdes, CA	AZ Pubic Service / So. Cal. Edison	108	Zn-air / Ni-Cd
99	James Worden / Arlington, MS	Solectria	104	AC motor
43	Gary Jackson / Poway, CA	Jackson Racing	95	Doran
49	Darrell Clark / Monterey, CA	California Electric Cars	86	
91	Ed Trembly / Arlington, MS	Solectria	84	AC motor
27	Tim Considine / Los Angeles, CA	Michael Hackleman	74	Quick charge
30	Lealand McSpadden / Tempe, AZ	Max Clawiter	73	
90	Scott Cornell / Pleasent Hills, CA	Cornell Racing	64	
20	Ron Shuman / Tempe, AZ	AZ Electric Auto Association	61	
7	Bruce Mabrito / San Antonio, TX	Reliable Battery Co. / BF Goodrich	52	
10	Mike Allen / New York, NY	Pacific West Supplies / Popular Mechanics	34	Ni-Cd
11	David Twine / Portland, OR	Lectric Leopard	26	Ni-Cd
1x	Jim Creech / San Antonio, TX	Gasless Carriages	18	

Unoffical Solar 300 Results

No	Entrant	Laps Sat.	Laps Sun.	Total Laps
100	Swatch Spirit of Biel	93	93	186
5	M.I.T.	88	83	171
19	Cal. State Los Angeles	74	83	157
77	Western Michigan University	71	79	150
74	Rose-Hulman Inst. of Technology	65	68	133
101	Cal. Poly San Luis Obispo	52	57	109
12	Mauro Spa	48	60	108
7	AZ. State University	58	41	99
6	Virginia Tech.	51	46	97

PS: Dr. Steven Visco from Lawrence Berkeley Laboratories is still on tap for the May 18, '91 Santa Clara chapter meeting at the 5301 Stevens Creek Blvd. H-P plant at 10:00 AM. He is scheduled to tell us about the new Lithium/polymer battery.



ENGINEERED LIKE NO OTHER CAR IN THE WORLD

AUTO AIRCONDITIONER systems can now be built using HFC-134a refrigerant instead of CFC-12. Substitution of the new material greatly reduces the effect of escaped refrigerant on the earth's ozone layer. In system tests it has also shown that it does as well or better in keeping an automobile cool. The development of this new system will insure that EVs sc equipped will be kind to the environment. Taken from **Refrigerant changes for A/C systems** in **Automotive Engineering** for February 1991, page 25 ff.

A HOT CAR by VW is the **Polo G40**. It's 82 kW, 1.3 litre engine will give it a nearly 100 kW per ton power-to-weight ratio. That will make the 32 kW version seem rather tame. Such high power-to-weight ratios point out the difficulty of getting high performance from EVs since a ton of lead-acid batteries can deliver about 50 kW under reasonable assumptions. From **TECH BRIEFS** on page 58 of **Automotive Engineering** for February 1991.

Science Panel Wants to Fight Global Warming

A panel of the prestigious National Academy of Sciences yesterday recommended a prompt and aggressive regimen of energy-conservation measures to counter the climatic trend of global warming.

The call for early action reversed a hands-off recommendation made by a similar academy panel eight years ago and called for a far more aggressive posture than the cautious approach adopted by the Bush administration.

The panel noted that the goals can be achieved with existing technology at "modest cost. In other words, insurance is cheap," it said.

RECOMMENDATIONS

Among the report's recommendations to reduce greenhouse gases and prepare for global warming:

- **A moderate domestic reforestation program.**
- **Improved energy efficiency standards for cars, appliances and buildings.**
- **Encourage public education and information programs for conservation and recycling.**
- **Reform state public utility regulation to encourage electric companies to promote efficiency and conservation.**
- **More government support of mass transit.**
- **Research into fighting back if global warming develops.**

April 3, 1991 at Stanford University: A seminar was presented on:

Electro-Mechanical "BATTERIES" for a High-efficiency Electric Automobile

by

Richard F. Post

Specifications of Example Storage Module

Outside dimensions	25 x 25 x 25 cm.	(10 inch cube)
Radius of spherical rotor housing	10.0 cm.	
Total weight of module	5.8 kilograms	(12.75 pounds)
Rotor radius/height	7.0 cm./ 14.0 cm.	
Weight of rotor + field magnets	3.8 kilograms	
Rotation speed (full charge)	200,000 RPM	
Operating vacum (gettered)	10^{-5} torr.	
Kinetically stored energy:		
@ 500,000 psi stress (comp.):	0.65 kwhr	
@ 700,000 psi stress (comp.):	0.93 kwhr	
Stored energy/total weight:		
@ 500,00 psi stress:	112 whr/kgm*	
@ 700,00 psi stress:	161 whr/kgm*	

*note: Compare led-acid battery at 25 -35 whr/kgm

Advantages of small modules

@ Increases both power-to-weight ratio and electrical efficiency (because of higher rotational speed).
@ Facilitates control of failure mode.
@ Is advantageous for standardization and mass production.
@ Reduces gyroscopic effects.
@ Increases flexibility of location within vehicle.

The rewards and positive consequences of a successful program to develop and introduce modular electro-mechanical storage batteries would be very large.

Practical, long-range electric cars.
A major reduction in the need for petroleum for transportation.
Major energy consevation in the transportation sector.
Major reductions in auto-related air polution.
Availability of mass-produced energy storage modules for other needs (solar power, load leveling, etc.).
Minor impact on electric utilities (less than 10% increase in their load if all autos were of the E-M type).

"SCIENTIFIC AMERICAN" Dec. 1973 has a good article on composite flywheels by "Post" that gives more information for those that are interested.

A VHS vidio tape was made of this seminar on April 3, 1991 and is available on loan to EAA chapters by contacting EAA member:

Bob Wheeler
619 Flynn Avenue
Redwood City, CA. 94063
(415) 368-2491

Here's a good reason to write a letter to your Member of Congress

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Americans use over 70 million batteries each year.

Over 23 million of these batteries are improperly discarded, either in incinerators, landfills or along the side of the road.

These 23 million batteries contain over 400 million pounds of lead (that's 200,000 tons!!) and this lead can enter our air, soil and water.

Until the lead-acid battery is replaced by a cleaner technology, we need incentives to encourage recycling of lead batteries.

Congress is considering a bill called The Lead Battery Recycling Incentives Act of 1991.

The bill has been filed in the House of Representatives as H.R. 870 -- sponsored by Rep. Torres (Calif.)

The bill has been filed in the Senate as S. 398 -- sponsored by Senators Heinz (R-Penn.) and Wirth (D-Colorado)

The bill proposes a system that is economically and technically efficient as well as environmentally sound. For more information on the bill, contact Rep. Esteban Torres, 1740 Longworth Building, Washington, DC 20515; (202) 225-5256.

If you support this idea, then write to your legislators:

Rep. _____	Senator _____	Senator _____
The House of Representatives	The U.S. Senate	The U.S. Senate
Washington, D.C. 20515	Washington, DC 20510	Washington, DC 20510

The 87 cents you spend today (three stamps at 29-cents each) will ensure proper disposal of lead-acid batteries.

Do legislators really read letters? Do letters really make a difference?

As one legislative aide explained, "It takes a lot for anyone to write a letter. We are always asking, "How many people have written on this issue?" when we are figuring out what our priorities should be. We take constituent mail seriously, and the more who write, the bigger a difference it makes."

Announcing EV Battery Evaluation Report
U. S. Battery Deep Discharge Batteries

This practical battery evaluation report is a must for anyone wanting to understand the realistic figures about lead acid batteries being used to propel electric cars. You will have a fairly good idea of how long your batteries will last by reading this report. To order your own postpaid personal copy complete the order form provided below, enclose a check or international U.S. currency money order for $7.00 (payable to Bill Williams), and mail to:

Williams Enterprises
Department 1B77
P. O. Box 1548
Cupertino, CA 95015

ORDER FORM FOR
Battery Evaluation Report

NAME _____ ADDRESS _____

CITY, STATE, ZIP _____ _____

___ I have enclosed a self-addressed-stamped envelope (9 by 12 inch) to speed delivery.

On January 16, PG&E's Board of Directors elected Norm Bryan to the new position of Vice President of Clean Air Vehicles (CAV).

The former Redwood Region vice president can now devote his full attention to the company's programs to increase the use of clean-burning natural gas as a motor-vehicle fuel and to support research and development to make electric vehicles commercially available. For several months Bryan headed the CAV program in addition to his region vice president duties.

"Clean air vehicles are an essential part of the program to improve air quality in California and across the country," said Chairman Dick Clarke. "The action taken by our board reflects PG&E's commitment to this important environmental effort."

In his new position, Bryan will lead broader and longer-range market development activities: "It's become apparent that development of the clean air market requires my full time. Although the advent of electrically powered vehicles is still a few years down the road, natural gas vehicles are here today."

Election of officers for the Board of Directors of EAA is planned for the near future. Please submit names and qualifications to:

EAA
1249 Lane Street
Belmont, CA. 94002

CALENDAR

May 11, 1991 East Bay (CA) chapter meeting, Show & Tell; Flywheel video (Dr. Richard Post)
May 18, 1991 IEEE-SSIT Conference, San Jose, CA $15 registration fee, Cindi Anderson, 408/285-2511
May 20-26, 1991 3rd Annual Tour de Sol, sponsored by Northeast Sustainable Energy Assn. 413/774-6051
June 14-23, 1991 Lightwheels Festival 1991, Trade Show, Ride, Conference; NYC to Washington DC; 49 E. Houston St, NYC, NY 10012; 212/431-0600
June 17-23, 1991, Save California Drive, Sacto-LA
June 23, 1991, Concours d'Elegance, Palo Alto, CA EAA is particpating
July 13, 1991, East Bay (CA) chapter meeting, RALLY
August 3-9, 1991 Intersociety Energy Conversion Engineering Conference, Boston, MA 708/352-6611
August 4-5, 1991 Clean Air Revival. Solar Expo and Motor Sports Show. 55 New Montgomery St. San Francisco, CA 94608 415/495-0494
August 9-11, 1991 SEER 1991, Willits, CA (Final Round Electrathon Champ Trail)
August 18-22, 1991 1991 ASME Int'l Computers in Engineering Conference, Marriott Hotel, Santa Clara CA
FOR SALE Electrica 007 (Dodge Omni), new Trojan batteries, runs good, $4,100; can arrange delivery in continental western US. Two wheel dolly trailer available; 206/675-3648 (24-hr. answering machine)

Caveat Emptor: The EAA takes no responsibility for the accuracy of ads.

SPECIAL NOTICE NORTH BAY : Bob Wing (415) 669-7402 seeks EAA members and friends in Marin, Sonoma, Lake and Mendocino Counties for reactivating the North Bay Chapter. An organization meeting will be held in May or June. Regular Meetings are planned in the Fall. POB 277 Inverness, Ca. 94937

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VEVA 604/987-6188
543 Powell St.
Vancouver, BC V6A 1G8

American Solar Car Assn.
Robert Cotter
P.O. Box 158
Waldoboro, ME 04572

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For information on the association, send SASE to the address below or phone weekdays 415/591-6698 or 415/685-7580 Please call Weekdays Between 10AM-5PM PACIFIC TIME

EDITORS: JOHN NEWELL, BILL PALMER, PAUL BRASCH, E.W. AMES
Send your chapter news, coming events, articles to the address below

ELECTRIC AUTO NEWS

EAA

1249 Lane Street
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MAY 1991

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