



MAY 1987

Association

Vol. XIX No. 5

SOLAR & EV COMPONENTS FAIR

STANFORD ELECTRIC VEHICLE RALLY

ALL EXHIBITS WELCOME !! LET'S MAKE THIS A REALLY REALLY BIG SHOW !!

Mark your calendar now because the STANFORD ELECTRIC VEHICLE RALLY is just around the corner and we certainly hope you will be able to be a part of it.

May 16 is the date and we would like to have all cars and drivers arrive at the parking lot across Campus Drive from the Maples Pavilion by 10:00 AM.

This rally is being held in conjunction with the Stanford University Centennial Celebration and we are expecting 1500 to 3000 alumni and guests to be on hand, making this the biggest Bay area electric vehicle rally ever. Please don't miss the opportunity to display your electric car and/or other exhibit, educate an interested

public about electric vehicles, and take spectators for a tour of the campus as well.

Also, this will be the debut appearance of the Stanford Solar Car Project's electric Chevette that we have been working on since last fall, and we are pretty excited about this.

The Centennial Celebration is a very future oriented event and we think that this showcase of electric vehicles will be a very important display of the technology of the future. We hope you will be able to join us on May 16th!

Solar Car Project
Governor's Corner
Stanford University
Stanford, CA 94305

(415) 322-8886

Thanks Bob Ansdorf

IMPROVING EV RANGE & BATTERY LIFE

Improved range and increased battery life are two subjects that many of us with electric cars want to know more about.

Let's start by looking at the performance of a battery during charging as shown in Figure #1. Note the gassing rate and also the variations in the specific gravity of the electrolyte at the top and the bottom of one cell. As you know as you charge your batteries gas bubbles form and rise. This tends to mix the electrolyte until, as you see in Fig. #1, the top and bottom specific gravity become the same after about 6 hours of charging.

You can see that if we undercharge we are not mixing our electrolyte. The stronger acids solutions are in the bottom and tend to settle there as the battery stands idle. The weaker acid in the top is not a good conductor of electricity. When

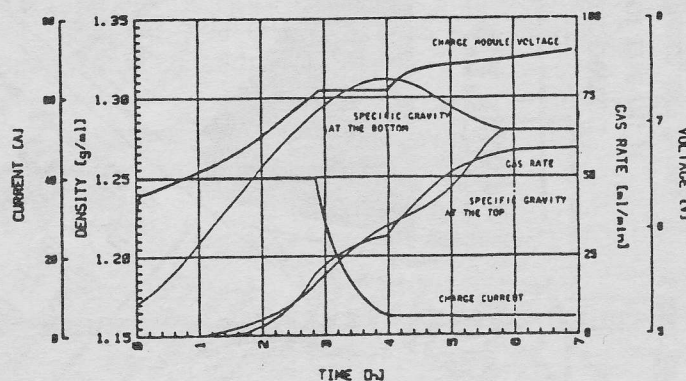


Fig. 1 Characteristic performance parameters measured during charging of an ALCO 2200 module: specific gravity measured at the bottom and the top of one cell, charge current, charge module voltage, gas rate in one cell. (Ref.1)

Con't on pg. 3

Batteries from pg. 2

you start discharging most of the chemical and electrical reactions take place in the bottom portions of the plates. This more rapid utilization of the bottom of the plates is obvious if you have removed old batteries from their case. Of course this is wrong. We need to utilize the entire plate, top and bottom.

Jon reported that some research had been done for the Department of Energy.* Some batteries were examined for microscopic changes after thirty cycles of charging and discharging had taken place. During these first thirty cycles no stirring of electrolyte was performed. Then from thirty to sixty cycles the electrolyte was stirred. After sixty cycles it was apparent that the chemical actions had moved up into the top of the plates much more than in the normal charging/discharging of the previous thirty cycles. To accomplish this stirring the electrolyte was removed from the bottom of the cell on two sides and returned by plastic tubing to the top thru the center cap. Removal of the acid from side of the cell was not adequate as measured by small samples of the electrolyte for specific gravity measurements. Hypodermic type needles were used to take samples at the bottom, center and top of the cell.

Next the researchers ran the electrolyte stirring during charging and discharging cycles. They discovered that 10 to 20% more total energy was available while mixing the electrolyte. In addition the number of cycles before failure was doubled. These results indicate that there should be a significant improvement in battery capacity and the cost for battery replacement reduced greatly. The main difficulty is that the battery plates and separators are so closely packed that the electrolyte in the middle of the battery cannot be easily circulated. The Chapter is planning to investigate this further. Member Lloyd Wensel has already installed some equipment for externally assisted electrolyte (EAE) circulation in his EV.

Jon did not stop here. He reported on research into the temperature control of batteries.** See Figure #2 showing how discharge energies changed as the ambient temperature changed. The difference in California. Batteries tend to cool down at night and are probably cooler than we realize thru the daytime. The charging acceptance is lower and more gas is generated. More important is the difference in charge acceptance in the different cells such as those exposed in the periphery of the battery pack.

These exposed cells will become deeper discharged when used. It should be remembered that these unequal conditions become greater with each cycle. This means one should try to keep their batteries uniformly warm while charging. You seem to get the worst of everything when charging cold batteries.

Jon's discussion concentrated on temperature control which is normally more practical to accomplish than electrolyte circulation. He used four 80 watt battery warmers, each about 5" X 4" He wraps them around the sides of his battery pack. A solid state temperature controller turns them on if the temperature drops below 93° F. A regular thermostat is unsafe in this application because an arc across switch contacts could ignite the hydrogen from the batteries. With the large thermal mass of a battery pack and some insulation, you

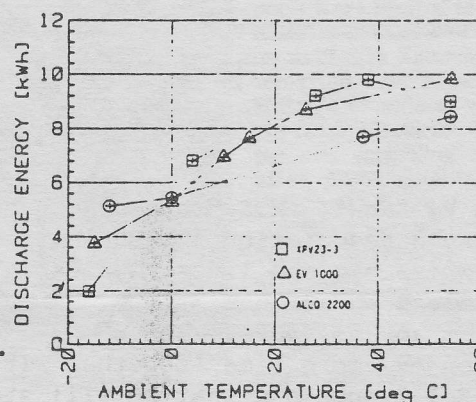


Fig. 2 Discharge energy as a function of ambient temperature

should find an AC type of heating system adequate for most EV applications.

Another area of research was regenerative braking.*** Some experiments were done to simulate a normal city driving cycle with and without regenerative braking. The calculated or expected recovery of energy was expected to be 15% but it was better than 30%. This is difficult to explain but John's theory is that regeneration charging occurs in the center of the core of the tightly packed battery cell where it is difficult for electrolyte to move about or circulate.

Now you see we are not getting the most out of our batteries. What can we each one do to improve our system. Perhaps you members can suggest something more than the above.

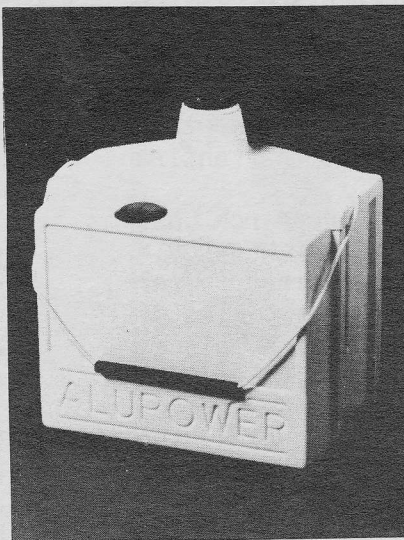
Jon Gabel as reported by John Newell

REF:

* "Battery Microstructure Changes With Cycling." DOE/CS/51042-t4 From MITS, Springfield, VA 22161 (703)487-4650

**"Methods To Improve Electric Vehicle Performance At Low Temperature, Based on an Analysis of Battery Tests" By Dieter K. Nowak, Univ. of Alabama in Huntsville, EVC Expo '83, EVC no. 8338 Electric Vehicle Council, 1111 19th St. N.W., Washington, D.C. 20036 (202)828-7516.

***"Evaluation of Battery Performance for An Electric Vehicle with Regenerative Braking" By E.A. Rowland, General Electric Co. EVS-5 Electric Vehicle Council, 90 Park Ave. New York, NY 10016, EVS 5 No. 783106 (E)

Water activates power source

Portable power source with virtually unlimited shelf life, developed by Alupower Inc., Bernardsville, NJ, generates electricity when simple salt-water solution is added. The solution reacts with an aluminum-alloy anode and an air cathode to provide steady power up to 1 A at 2 V for extended periods with a flat, long discharge curve. The unit can either run continuously for 3 to 4 weeks at 0.5 A or be used intermittently by merely emptying, rinsing, and adding fresh salt water when the time comes to reactivate. Because the Alupower I battery contains no dangerous electrolyte, it can be shipped safely, making it well suited for emergency power generation in remote locations, and for emergency and camping lights, radios, and other moderate-power devices. Measuring 6 by 8½ by 9 in., the unit weighs 2 lb before activation.

WALTER MOVES TO TEXAS

A VERY FOND FAREWELL TO OUR FOUNDER

Walter V. Laski, M.E. the founder of the Electric Auto Association in 1967 has retired to Texas where his son lives. Walter is very proud of his son who has been with N.A.S.A. for more than 25 years. There he and his wife can enjoy more time together with the family. But I suspect that he will stay in touch with the local EAA chapter which he helped start.

In 1947 Walter was designing and developing the automatic feeding of auto body parts into giant presses at Ford Motor Company's River Rouge Plant in Dearborn, Michigan. Working in their Automation Section, he also developed a totally automated shell-moulding process for casting steel parts, as well as a heat-treating operation design and a completely automated plant for engine exhaust valves.

In 1950 Walter founded and operated a technical school in Detroit under the name of Laski Institute of Technology. There he trained immigrants in mechanical drawing and designing, in machine shop techniques, and in tool-making. He then established a second school in Chicago which operated successfully for over ten years, having trained nearly 3,000 students. This school was then transferred to the American Institute of Technology in Chicago. Walter moved there in 1953 to pursue his career in research and development. He spent the next thirteen years working in R&D for various leading companies such as Armour Research, IIT

Research, and General American Research, among others.

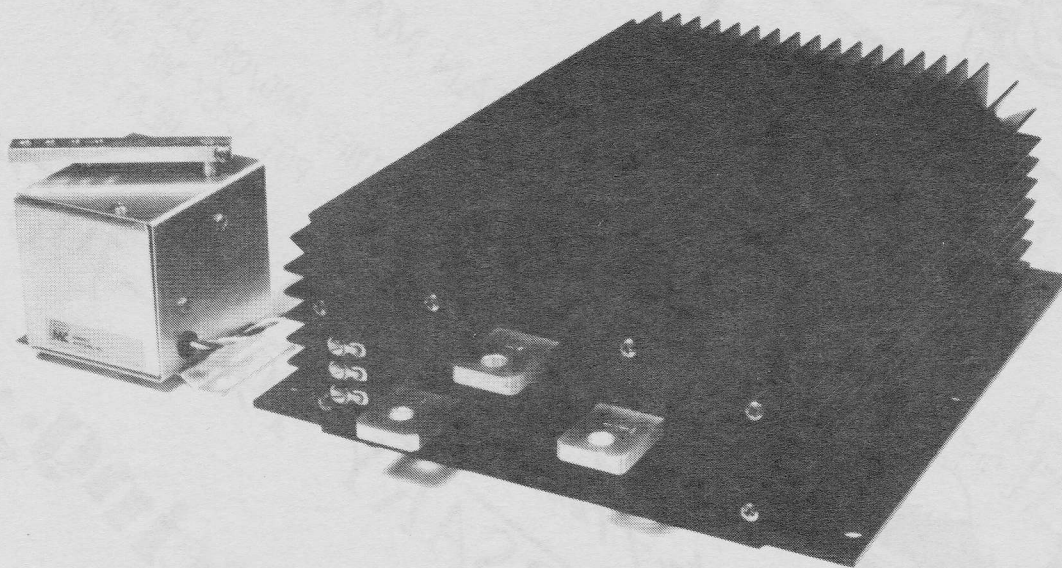
Walter moved to California in 1966 where he joined the FMC Corporation within the Ordinance Division's engineering staff. At FMC, he converted military personnel vehicles to electric power. He moved to Lockheed Missiles and Space Corp. (LMSC) in Sunnyvale, to participate in their Deep Sea Rescue Vehicle (DSRV) project until his retirement in 1968.

In 1967 a National Electric Vehicle Symposium was held at San Jose State University. Walter participated and the enthusiasm he saw convinced him to found the Electric Auto Association. Over these past twenty years he has served in various capacities including National Chairman, President and newsletter Editor. Walter is indeed the founding spirit and longtime heart and sole of the club. We wish him all the best in Texas and consider his move California's loss.

The entire membership joins me in thanking you for all your efforts, Walter! __PB__

[Note: Send all EAA correspondence to 1249 Lane St. Belmont, CA 94002. DO NOT send to the old Merrill Ave. address. Personal letters to Walter may be sent to him at 2000 Bay Area Blvd. #103 Huston, TX 77058]

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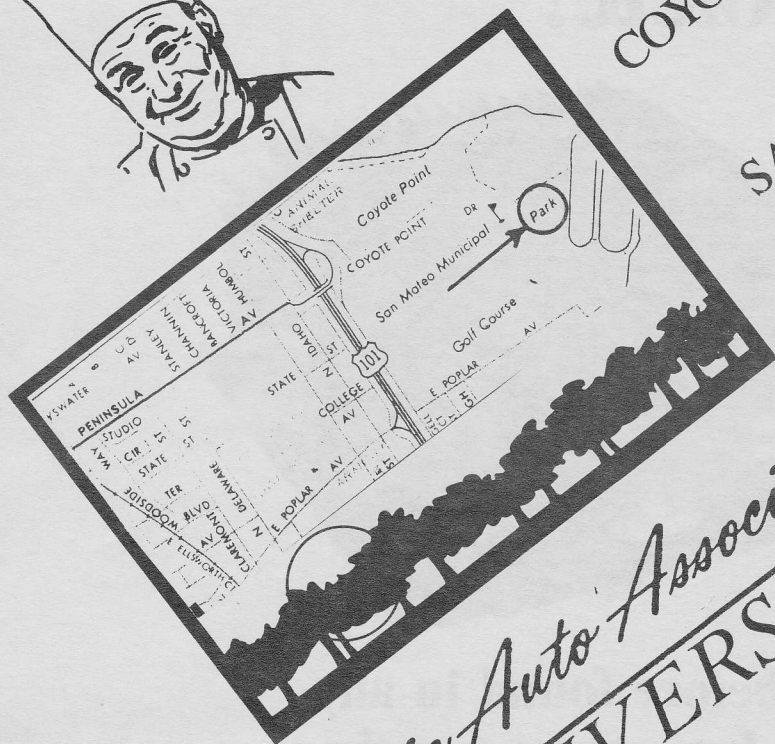
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Electrifying new compounds

Physicists throng to N.Y. for superconductor 'Woodstock'

New York Times

NEW YORK — No sooner was a breakthrough announced than it was obsolete, and only the coming of dawn Thursday ended what participants called the most extraordinary scientific meeting in memory.

Physicists from three continents converged on the New York Hilton for a hastily scheduled special conference on a string of discoveries that seem certain to produce a rapid cascade of commercial applications in electricity, magnetism and electronics.

The doors opened early Wednesday evening to a roar, a blur of color and a stampeding abandonment of professorial dignity. Within three minutes, the crowd had filled all 1,200 seats, and nearly 1,000 more physicists jammed the aisles and pressed against the walls. Outside, hundreds more strained to get in.

'Woodstock'

Several scientists called it the "Woodstock" of physics. "It's a phenomenon — there's never been anything like it in the history of physics," said Theodore Geballe of Stanford University.

Recent fast-breaking research on superconductors, which are materials that carry electricity with no loss of energy, has overwhelmed the ability of scientific journals to communicate it. The meeting, called by the American Physical Society, brought new revelations, "some incredibly exciting results," as Neil Ashcroft, chairman of the society's division of condensed-matter physics, said in opening the meeting.

"What we're seeing here is one of the most exciting developments in decades," he said. "It's utterly remarkable, and I think there's more to come."

The reason for excitement is the discovery of novel new superconductors. Until now, the only known superconductors required temperatures so cold — close to absolute zero, minus 460 degrees Fahrenheit — that they were impractical for most purposes.

Easy, practical

But in recent weeks, compounds have been made that are superconducting at temperatures as warm as 92 degrees Kelvin, or minus 294 degrees Fahrenheit, a



J. Georg Bednorz, left, and K. Alex Mueller, IBM physicists in Zurich, made first of new superconductors last year.

temperature easily and inexpensively attained.

Before the breakthroughs, superconductors were a multibillion-dollar business, but they were limited to applications that justified the enormous expense of cooling the materials almost to absolute zero.

With a host of everyday applications in sight, scores of laboratories around the world have joined the effort to understand the materials, to discover new ones and to turn them into shapes that can be used in technology.

K. Alex Mueller, of the International Business Machines Corp.'s laboratory in Zurich, announced the development of a superconducting thin film for electronics "which has been done over the weekend." Bertram Batlogg of AT&T Bell Laboratories stunned the crowd by plunking down on the overhead projection a washer-size semiconducting ring and then pulling out of his pocket, wrapped in notebook paper, a sheet of wide tape made of the material, like vinyl to the touch.

Amid the intensity, the jostling, "the madness," as one theo-

rist said, the audience strained to see chart after chart of technical data. Then, giving in to the revival-meeting fervor, Batlogg set aside his graphs and said simply, "I think our lives have changed," and the hall erupted with shouts and applause.

The physicists cheered colleagues from overseas whom most had never met: Mueller from Zurich, Zhao Zhongxian from Beijing, Shoji Tanaka from Tokyo, along with C.W. Chu of the University of Houston and Batlogg.

Data on phone

Among the developments announced at the meeting, in some cases by scientists telephoning their laboratories to get the latest data, were these:

✓ At least eight new materials, all relatively easy to make, share the ability to become superconducting at around 92 degrees Kelvin, or minus 294 degrees Fahrenheit, several laboratories have found.

✓ Real-world applications have progressed more quickly than expected. Speakers described magnetic fields greater

than any that have been seen on Earth and prototypes of electronic circuits that would operate at high speed and without generating heat.

✓ The discovery of yet another compound — especially surprising because it contains a magnetic metal, gadolinium, that is ordinarily known to prevent superconductivity — was reported by researchers from the Los Alamos National Laboratory in New Mexico.

Dawn breaks

The dozens of telegraphic reports were limited to a bare five minutes each. Even so, they went on until 3:15 Thursday morning, televised over monitors in the Hilton's corridors, where more physicists clustered, drinking coffee and scribbling notes. Even after adjournment, many lingered until 6 a.m.

Some suggested that billions of dollars in energy costs could eventually be saved by superconducting transmission lines and energy storage devices.

Other applications of the superconductors include such things as advanced magnetic imaging machines for medical diagnosis and levitated high-speed trains supported by magnets. The powerful magnets and increased efficiency of superconductors could make possible electric motors one-tenth their present size as well as supercomputers that would be considerably smaller and faster than current ones.

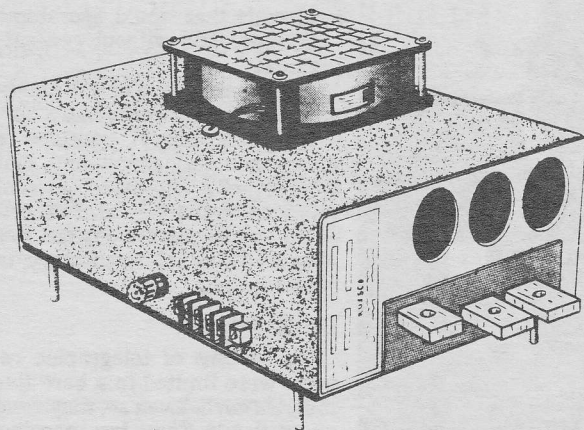
Brittle

The materials are brittle, baked in ovens from mixtures of powders. But the ability to make sheets of them, ready to form any shape imaginable, seemed like strong cause for optimism.

Because they are ceramics, the materials already have a highly developed manufacturing technology waiting, the same technology that mass-produces ceramics in everything from toilet bowls to delicate electronic devices.

Applications aside, the breakthrough in superconducting poses a challenge to the fundamental theory of physics. The present highly successful understanding of superconductivity seems to break down completely when it comes to explaining the new materials.

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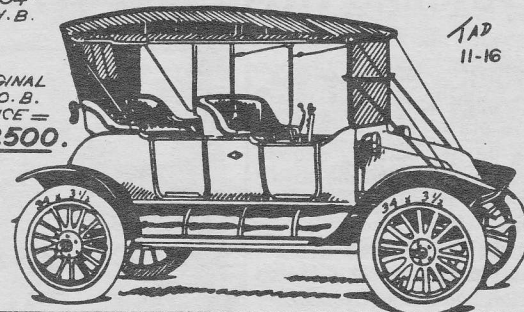
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AUTOS

By TAD BURNES

We're grateful to Ray E. Amundsen of Denver, who provided special details on the rare Fritchle Electric — plus a reprint of a hard-to-find 1914 catalog showing the various models available.

Most electric cars were stagecoach-like vehicles: high, boxy, usually painted black, and fully enclosed — most often seating three or four. Many of the various brands of electrics produced in the early teens were of this same general style, and most resembled one another. Fritchle produced one of those models, as well: the three-passenger "Colonial Brougham," priced at \$3,600.

However, Fritchle also built open electrics, such as a \$2,400, two-passenger "Torpedo Runabout," and the illustrated "four-passenger roadster" which was actually a phaeton (a body type commonplace among gasoline cars but almost unheard-of among electrics). The catalog claimed that Fritchle had built this body type successfully for eight years thus far. Fritchle also offered a covered commercial van.

Oliver P. Fritchle, company founder, perfected an improved type of storage battery in the early 1900s, and by 1905 was building and selling electric cars in the Denver area. In 1908, Fritchle amazed the auto world by

making a long-distance run from Lincoln, Neb., to New York in one of his vehicles. He was able to average 100 miles on each charge of the batteries, in spite of the tortuously primitive roads and axle-deep mud in many places. This gave rise to a trade slogan: "The 100-Mile Electric." Most electric cars needed recharging after about 50 miles.

In 1916, a gas-electric model was added to the line, but few were sold. Fritchle returned to the production of electrics until he decided to close down.

The illustrated car was powered by 32 battery cells of 150-ampere-hour capacity, which produced 64 volts. Replacement of the set of batteries cost \$250.

A Fritchle drum-type controller provided five speeds forward and three in reverse, with a horizontal lever "mounted upon and concentric with the steering post."

Standard colors were Brewster green and French gray, but other colors were available (buyer's choice) at no extra cost. Leather upholstery was standard in the four-passenger Roadster — available in colors to harmonize with the paint.

One Fritchle electric Brougham is reported to be in the hands of a collector in Southern California. And perhaps a couple of others have also survived, scarce as they may be.

AS SEEN BY THE CLIPS ON THE FRONT OF THIS NEWSLETTER THE QUALITY OF THE AIR WE BREATHE IS FAST BECOMING LETHAL!! ALL THESE CLIPS APPEARED JUST IN THE LAST FEW MONTHS.

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NOTICE

ELECTRIC POWER RESEARCH INSTITUTE (EPRI) VHS Video Tape is available on request. ELECTRIC VEHICLE RESEARCH is very good and up to date info on EPRI's EV activities. CALL: John (415) 591-6698 or write EAA Hdq

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WHOSE JOB IS IT?

This is a story about four people named Everybody, Somebody, Anybody, and Nobody.

There was an important job to be done, and Everybody was sure Somebody would do it. Anybody could have done it, but Nobody did it. Somebody got angry about that, because it was Everybody's job. Everybody thought Anybody could do it, but Nobody realized that Everybody wouldn't do it. It ended up that Everybody blamed Somebody when Nobody did what Anybody could have done.

ADS must be received with payment by the 10th of the month, for the following month's issue. AD rate is min. 1 to 5 lines \$5.00, 1/4 Pg. \$15.00, 1/2 Pg. \$25.00, full Pg. \$50.00, full Pg. 2 sides \$100.00. For Sale, Wanted, Trade, etc. Mail to EAA 1249 Lane St. Belmont, CA 94002.



May 3: THE CANON ELECTRATHON, Electric vehicle endurance competition VFL Park Melbourne. CALL: (03) 570-5261.

May 3-4: ASSOCIATION OF CAL. CAR CLUBS INC., Sacramento. CALL: (818) 347-5577.

May 11-15: ISATA AUTO TECHNOLOGY, Florence, Italy.

May 16: NOTE!! No Santa Clara Chapter meeting, we will be at Stanford Show come join us!!

May 16: STANFORD SOLAR CAR PROJECT RALLY, SOLAR & EV COMPONENT FAIR, SEE PG. 2.

May 20: VANCOUVER, CALL: George McCrae (604) 663-3347 may have new meeting place.

May 24-27: UITP, LAUSANNE, SWITZERLAND.

DENVER - Aug INTERNATIONAL

A CHANCE TO PROVE EAA IS REALLY AN
INTERNATIONAL ORGANIZATION,

EAA Chapters

Call the contact person for meeting times and places.

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For information on forming a chapter in your area write Electric Auto Association, 1249 Lane St. Belmont, CA 94002. For a sample copy of the newsletter send SAE #10 envelope.
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EDITORS: - Walter Laski - John Newell - Bill Palmer - Paul Brasch - COMPILED AND PUBLISHED by Clarence Eilers. SEND IN YOUR PERSONAL AND CHAPTER NEWS AND COMING EVENTS. ARTICLES-Comments etc. all correspondence to address below

**Electric
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