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F. V. E. A. A. NEWSLETTER

OCTOBER 1989

MEETING NOTICE

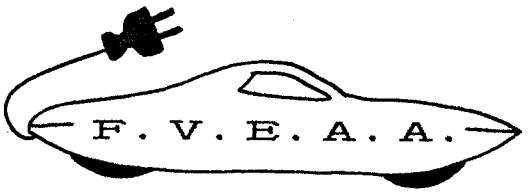
The next FVEAA meeting will be **OCTOBER 20th** at Cragin Federal Savings & Loan 333 W. Wesley st. Wheaton, Il Time - 7:30 P.M. sharp. Guests are welcome and need not be members to attend the meeting.

DEADLINE for newsletter *STUFF* - in my hands the friday before the next meeting. Editor

THE PREZSEZ

The discussion of the FVEAA objectives for the coming year, scheduled for our October meeting, needs to be based on the members opinions concerning the future of electric cars. We have a lot of construction and operating experience with our converted cars that can be used in forming a consensus. This Newsletter includes an essay containing my observations on electric car parameters and future possibilities that can form a basis for the discussion.

Bill



FOX VALLEY ELECTRIC AUTO ASSOCIATION
6542 Fairmount Downers Grove Il 60516

FIRST CLASS

ADDRESS CORRECTION REQUESTED

MINUTES OF THE FOC VALLEY ELECTRIC AUTO ASSOCIATION
SEPTEMBER 15, 1989

The meeting was called to order by Pres. W. Shafer at 7:36 P.M. Pres. Shafer indicated to us that this was our ANNUAL MEETING and that there would be an election of officers at the November meeting. He also VOLUNTEERED to be a ONE-MAN Nominating committee and will present his slate of officers at the October meeting for consideration by the membership.

Treasurer V. Vana gave his usual finely detailed report on our assets (I won't go into the detail at this point)...Checking NOW account $ 1,002.56, Savings account $864.15 for a grand total of $1,866.71.

Pres. Shafer reported on th Mid-Con happening...very interesting..Henry Setton and John Stockberger also represented our group. John Stockberger applauded our Pres. Shafer on a superb presentation. Ken Woods said that Henry Setton did a super job as chairman.

A general discussion was held to try to line up shopping centers for displaying our cars. Ken Woods to check with Fox Valley shopping center...All members are requested to check their local area centers and report back at the next meeting.

Vana reported that we received the manuals on Electric Vehicles from Clarence Ehlers on a COMPLIMENTARY BASIS (he sent our check back to us) John Emde sent a special thank you letter on behalf of the Assoc.

Les Stone brought some pictures of his electric bike and some spec sheets and a pulley wheel part. He only has put on some 8000 miles on it so far. The maximum speed is 20 mph...range 20 miles..charges it over night.

Ken Woods put on a slide show of the Wooddale parade, 150th Anniversary of DuPage County, and showed our participants and their vehicles..in alphabetical order...Dale Corel and his Citi car..with Gel cells yet....John Emde and his super SUBURU.....Bill Shafer and his world renowned DAF..and of course John Stockberger and his Gull Winged HI-Flying Bradley.

John Emde gave Pres. Shafer a bulletin froma group in New Mexico Electric Vehicle Users Group..They are being disbanded because they cannot get programs and activities and member's interest. John also reported that we are starting to get bulletins from other groups with the hopes of NETWORKING. looks good.

John Emde indicated that he is taking a Cable TV course on "How to be a TV Producer" and he reported that he has been CERTIFIED to use Video equipment at the studio with the hopes of producing a TV show in the future...maybe interviewing one or two of our members and showing their vehicles.

A general discussion was then held on the direction that the club is going at what direction we should take in the future. Pres. Shafer to publish some of his ideas in the October bulletin.

The meeting was adjourned at 9:30 P.M. by voice vote.

Respectfully submitted.

Paul P. Harris, Secretary

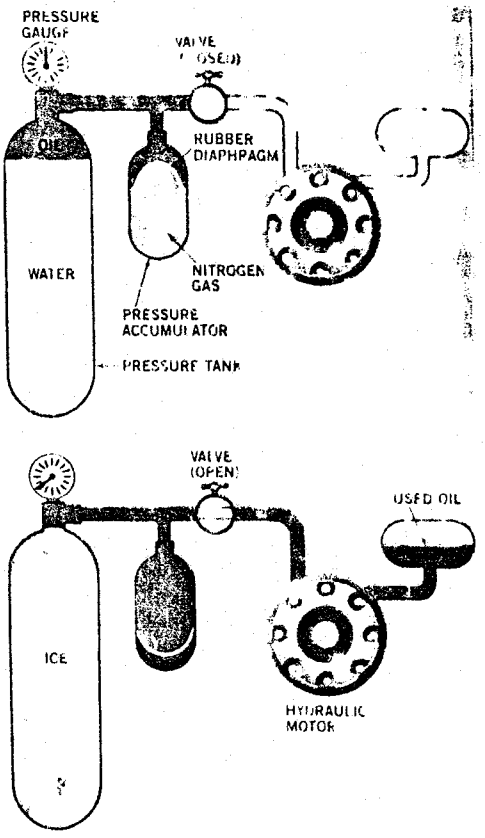
Ice power

Icy Rider uses a 27-liter oxygen cylinder as a pressure tank. With a stronger tank, the inventor hopes its driving range will increase to several miles.

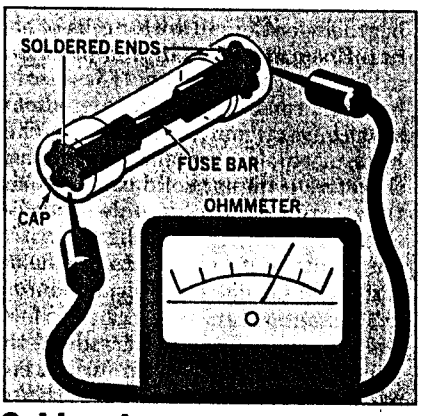
As freezing water expands, its force can fracture huge rocks and burst steel pipes. To tap this ice power Bo Nordell, a researcher at the Lulea University of Technology in northern Sweden, built a small cartlike vehicle he calls Icy Rider.

Nordell uses a water-filled pressure tank to transfer energy to an accumulator, a small cylinder filled with nitrogen gas. As the water freezes, the accumulator stores the pressurized fluid that powers a hydraulic motor (see drawing). "Leave the cart outside overnight in our Swedish winter, and in the morning I can drive it at fifty miles per hour for a few hundred yards," he told me.

The on-board pressure tank could be left at a base station, charging the storage accumulator between runs. This would halve the present vehicle weight to 130 pounds. Nordell's ice power not only taps a new form of renewable energy, but is silent and nonpolluting.—*David Scott*



Pressure tank is filled with nine-tenths water and one-tenth oil (top). Freezing water expands (right), feeding oil into the accumulator, compressing the nitrogen gas. Valve releases pressurized fluid to drive the hydraulic motor.



Solder stopper

An electrical fuse may appear to be in good condition but occasionally fail when the soldered joint that connects the fuse bar to the end caps has become separated or burned out and no longer makes contact. This type of failure is hidden from view and can be tested by checking the fuse for continuity with an ohmmeter.

Grease Job

CAR CARE TIP

Harken back to your school days and answer this multiple choice question:

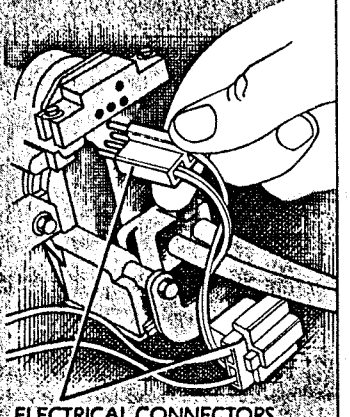
You pull off an electrical connector from a thingamajig and find it coated with grease. You pull off another you-know-what and find it dry of any grease. After cleaning both with electrical contact cleaner, what do you do when it's time to reinstall them?

(A) Use electrical contact grease on both of them.
(B) Leave them both dry.
(C) Grease the greasy one and leave the dry one dry.

The answer is (C). Only use dielectric grease where the manufacturer used it.

Apply grease to the male half before reinstalling them. Leave dry connectors dry after cleaning them.

What's electrically dielectric grease? It's a special grease with high electrical resistance, high resistance to water, and high temperature stability. It's used to prevent corrosion in places where water is a problem. Electrical contact cleaner is usually freon based. *Don't* use carb cleaner or brake cleaner, or you might melt the connector.



ELECTRICAL CONNECTORS

FACTORS THAT WILL AFFECT ELECTRIC CAR DEVELOPMENT IN THE NEXT DECADE

William H. Shafer, President
FOX VALLEY ELECTRIC AUTO ASSOCIATION
14 October, 1989

The last decade of the 20th Century is likely to favor the general acceptance of electric cars for personal transportation. This essay will list the factors supporting this hypothesis and consider the realistic technical considerations that are likely to influence the direction of electric car developments.

The decline in worldwide petroleum stocks will be the most important factor favoring electric car future acceptance. The decline will have the greatest effect in the United States since it is the world's biggest consumer of petroleum energy. Domestic reserves have already been significantly depleted. This means increasing reliance on foreign oil imports, bigger balance of trade deficits, and higher gas pump prices.

Higher gasoline retail price will favor electric car developments. Electric power production does not require petroleum fuels. Electricity can also be produced from coal, nuclear, hydro, or even photovoltaic energy sources. Higher petroleum fuel costs are likely to diminish the portion of electric power production dependent on oil. As gasoline prices steadily increase, the economics of electric power for personal transportation will become more competetive.

Environmental improvement is likely to be the second most-important factor in electric car future acceptance. There are signs that the Congress, reflecting public opinion, is about to institute measures that will limit automobile exhaust emissions and increase gasoline mileage performance. These measures will be applied to the urban areas of the US where pollution problems are most severe. Electric cars do not individually contribute to emissions and the electric power sources can be made environmentally acceptable. Concern about global warming is likely to favor nuclear, hydro, and photovoltaic electric power sources over coal-based generation.

Diminishing petroleum resources as well as environmental concerns will encourage development and utilization of alternative fuels in the coming decade. Principal alternative fuels for personal transportation are likely to be methanol, ethanol, and natural gas. These will be electric car competitors. Methanol can be produced from either natural gas or coal. Widespread availability of this fuel will require a significant capital investment in production facilities. Ethanol is produced from grain fermentation and is an indirect use of solar power. It already is used as a component of some present gasoline. Increased ethanol production will also require significant investments. Natural gas can be compressed and directly used as a vehicular fuel. Neither methanol nor natural gas addresses the problem of global warming produced by combustion of fossil fuels.

Realistic prospects for electric cars in the next decade depend on technical factors. The most important of these is the battery. The energy storage capability of available batteries places a severe limitation on the single-charge range of an electric car. Today's lead-acid battery, although much improved over those produced even a decade ago, is still limited to storing about 1 kWh in each 50 pounds of battery (20 watthours/pound or about 70 Btu/pound) Contrast this with gasoline which stores about 16,000 Btu/pound.

Other batteries have been investigated. These include nickel-iron, sodium-sulfur, aluminium-air, and lithium-sulfur. Of these, only the nickel-iron is close to being commercially available in the next decade. The rest are still in the laboratory stage and about 10 years is required after completion of laboratory development to commercial availablily. Nickel-iron has the twin drawbacks of requiring an expensive material (nickel) that is difficult to fabricate and a low (About 50%) charge turnaround efficiency.

Today's lead-acid battery, with possible marginal improvements, is the likely energy-storage medium for electric cars in the next decade. FVEAA experience with converted cars indicates an average energy consumption of about 0.5 kWh/mile and a single-charge range of 20-40 miles, depending on the number of batteries, drive system efficiency, and driving patterns. State-of-the-art electric cars have been designed and built that have achieved an energy consumption of 0.2 kWh/mile and single charge ranges exceeding 100 miles.

FVEAA experience indicates limited-range electric cars can be useful, but are unlikely to gain general consumer acceptance. Even the best cars produced with their demonstrated performance have not become acceptable because of cost considerations. The oil supply and environmental factors discussed previously will change, but not eliminate objections to electric cars using only lead-acid batteries.

The petro-electric (hybrid) combination of electric drive supplemented with a small engine-generator has been investigated by the FVEAA as a way to improve electric car performance and increase its utility. The rationale for this combination is based on car use patterns in urban areas, on the ability of the battery to provide high power for short times during acceleration, and the need for amenities that include car heating in the winter and air conditioning in hot climates and summer.

Most automobile trips involve distances that are within the capability of electric cars with lead-acid batteries. A 30-mile range is adequate for a 15-mile shopping trip or daily run to and from a commuter train station. A survey of car use conducted for DOT indicate that 30% of all car use is for trips less than 20 miles, but most car owners are unwilling to take the gamble than an electric car would make it. The hybrid can be used to extend the range and overcome this reluctance.

The power profile for urban driving shows that peak power is required to achieve acceptable performance during acceleration. Peak power requirements are 3-5 times the power required to cruise at 45 MPH. The short-time overload capability of the electric motor, controller, and battery can be utilized to provide this peak power for an electric car. A hybrid combination provides a means to effectively levelize the peak power over an entire trip and thus provide a more-efficient fuel utilization than is possible with a conventional engine vehicle with equivalent performance.

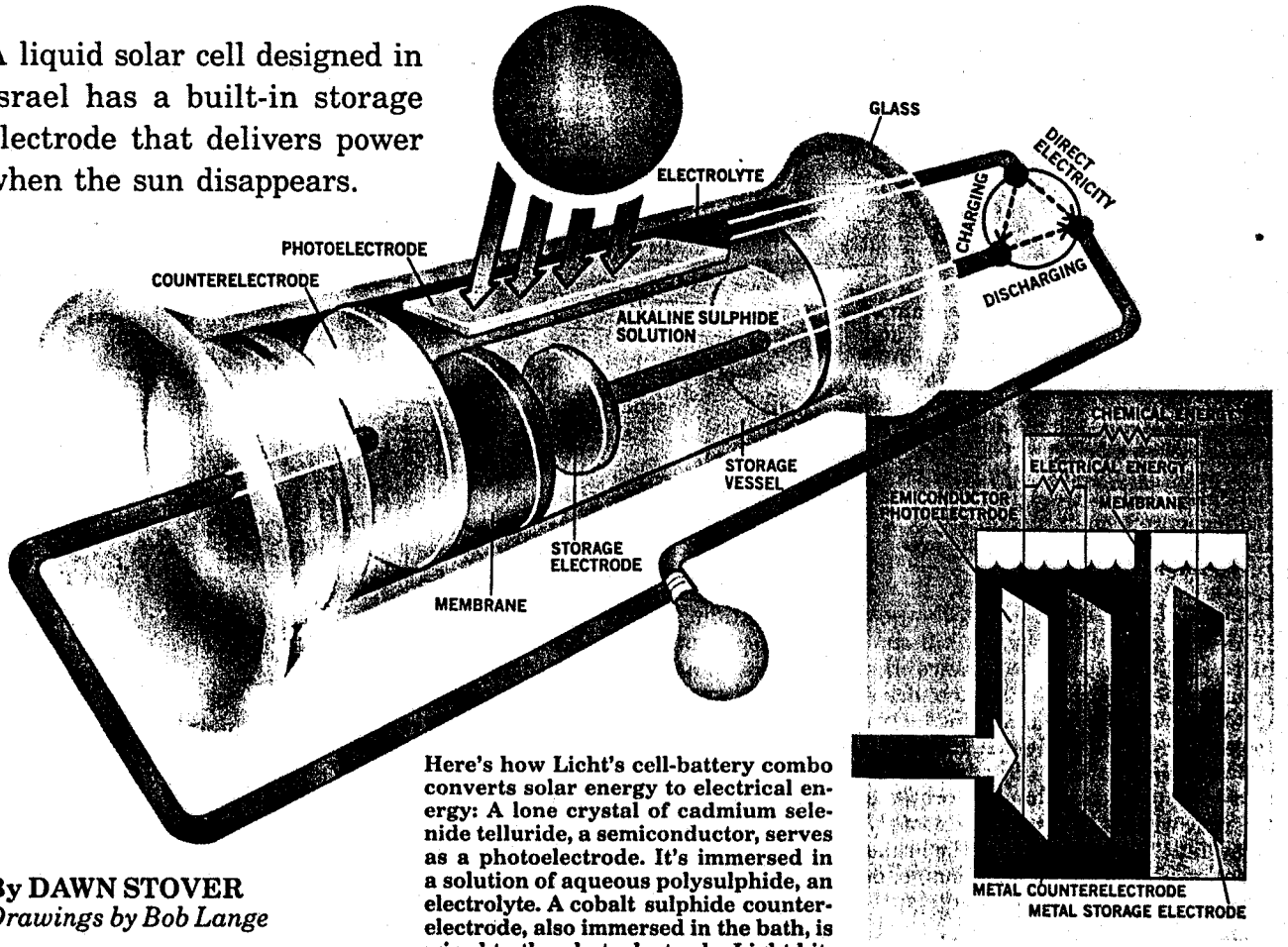
The electric car of the next decade must provide some of the amenities that today's cars possess. Heating and air conditioning are two essential factors. Since heating or cooling a car uses about as much energy as moving the vehicle, the comfort-conditioning cannot be provided by the propulsion lead-acid battery. A fuel-fired heater can be added to provide heat. An engine-driven air conditioner could be utilized. Addition of these two components would unacceptably increase the already-high cost of an electric car. A better way to provide these features is from the hybrid engine-generator. The engine can provide the heating. The engine sized to also belt-drive an air-conditioning compressor, or an ac inverter providing power to a room air conditioner type cooling system are possibilities.

What part does the FVEAA wish to play in electric car development during the next decade? Does the membership wish to continue to use and exhibit the cars they have built and continue to inform the public about these electric cars. Does the membership wish to continue to encourage new members to build similar vehicles? Does the membership wish to undertake an upgrading of their cars to improve performance? Does the membership wish to take on the demanding task of designing, constructing, and testing of a petro-electric car to demonstrate its capability? Should we initiate design and construction of a lightweight electric car? Should new projects be an individual responsibility with assistance from members or should it be a group undertaking? What priority should be assigned to these options? What resources will be needed for each of these choices? How should the FVEAA seek to acquire these resources?

The FVEAA needs to arrive at a consensus and determine its future direction. We will make a start at the October meeting.

Solar cell that works nights

A liquid solar cell designed in Israel has a built-in storage electrode that delivers power when the sun disappears.



Here's how Licht's cell-battery combo converts solar energy to electrical energy: A lone crystal of cadmium selenide telluride, a semiconductor, serves as a photoelectrode. It's immersed in a solution of aqueous polysulphide, an electrolyte. A cobalt sulphide counterelectrode, also immersed in the bath, is wired to the photoelectrode. Light hitting the photoelectrode excites electrons, which then jump from the electrolyte. They travel from the photoelectrode to the counterelectrode, powering an electrical device placed along the wire connecting the two electrodes. Upon reaching the counterelectrode, the electrons return to the electrolyte, completing the circuit.

In Licht's device solar energy also drives a chemical reaction to stockpile chemical energy. While the sun is shining some electrons are diverted from the main circuit down a second wire to a tin-sulphide storage electrode. There the electrons split the tin sulphide molecules, leaving tin on the electrode and releasing sulphide into an alkaline sulphide solution. When the light becomes too dim and electrons stop arriving at the storage electrode, the tin and sulphide recombine, releasing electrons that rejoin the main circuit and deliver power.

By DAWN STOVER
Drawings by Bob Lange

"One of the biggest problems with solar energy is its intermittent nature," says Dr. Stuart Licht, a chemistry professor at Clark University in Worcester, Mass. "It's not useful to a normal household."

While at the Weizmann Institute of Science in Rehovot, Israel, Licht and a group of researchers came up with a solution: a device that captures *and stores* solar energy. It discharges electricity in the dark.

Shortly after liquid solar cells containing conductive chemical baths were invented in the late 1970s, the Weizmann team suggested these cells could incorporate storage batteries. "We already had an electrochemical system," says Licht. "And a battery is also an electrochemical system."

Other solar researchers, trained in solid-state physics, hadn't figured out how to prevent light-induced rusting. "I approached the problem purely as a chemist," Licht says. Instead of looking for protective coatings, he sought chemically compatible materials that would react in constructive ways—circumventing more destructive pathways.

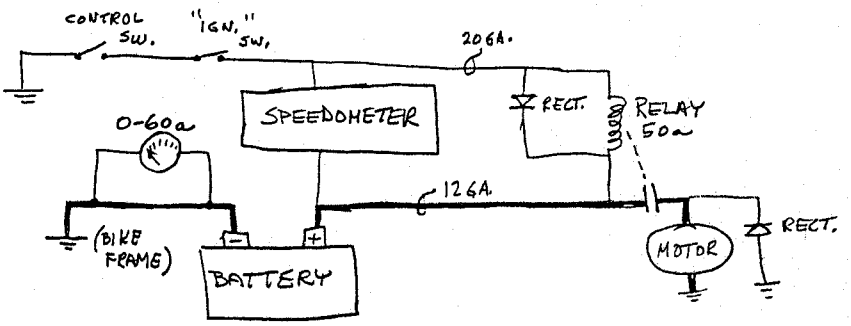
The cell-battery system's overall efficiency is 11.3 percent, slightly better than a photovoltaic cell combined with an external battery.

Licht is now experimenting with inexpensive thin-film photoelectrodes. If its efficiency can be improved, a thin-film system could provide round-the-clock energy for remote areas. PS

LES STONE'S ELECTRIC BIKE

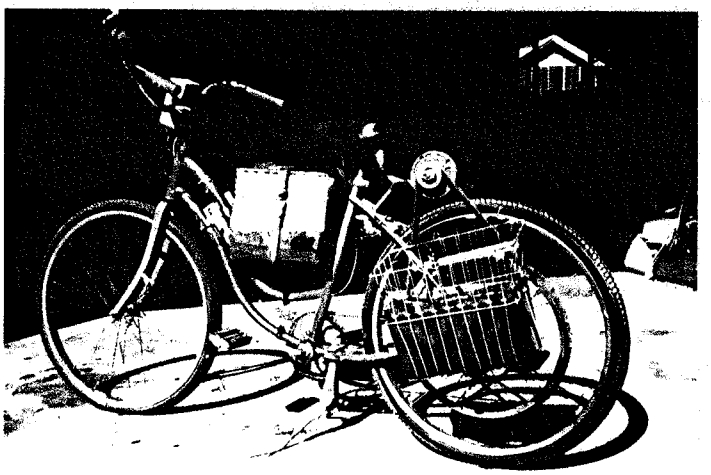
26"x 1.75" wheel
1/2 HP Motor, Pemanent Magnet, 1800 rpm, 12volt 42amp (Applied Motors)
2 1/2" dia. motor pulley
15" wheel pulley
12volt Deep Cycle Battery, Sears Die Hard
Battery Life 1800 miles
Range - 25miles per charge
Max. Speed - 20mph
Total Mileage To Date - 5300
Energy Cost - .15¢ per mile
"Dash" contains 0-60 amp meter and a Solid State Speedometer

Note; No meter shunt is used, the meter is connected between two points on the main cable. The distance between these points is calculated to give the same resistance as would the meter shunt.



COSTS

Bike	$10	garage sale
Motor	40	used
Pulley (small)	3	
Pulley (large)	3	Dick Ness
Relay	3	Groban Supply
Battery	58	Sears
Meter	7	on hand
Speedometer	20	home made
Misc.	20	
	$157	



Chrysler revs up battery-powered Caravan

By Jim Mateja
Auto Writer

DETROIT—Just in case federal mileage and emissions laws get stricter in the future, Chrysler Corp. has a battery-powered Dodge Caravan undergoing testing.

"We can't ignore an electric-powered vehicle," said Francois Castaing, vice president for vehicle engineering at Chrysler. The hangup, as it was when General Motors Corp. had electric vehicles in mind in the mid-'70s, is developing a battery that will allow several miles between stops for overnight recharging.

"The key is finding a battery with decent range," Castaing said. "The range now is about 60 miles before stopping to plug in. If we can produce a vehicle with 150 miles' range, we will crack the fleet market."

Castaing said Chrysler is working with Eaton Corp. to come up with a transmission for the electric van.

"One way to get more miles between recharging is with a more efficient transmission," he said.

"But the battery is the holdup and that must be resolved," he said.

Chicago Tribune, Sunday, October 8, 1989

NEXT MEETINGS

Fri. Nov 17th	Fri. Dec 15th
Cragin Federal	Cragin Federal
7:30 P.M.	7:30 P.M.

FOR SALE ---- ELECTRIC CAR

1973 4 Door SUBARU Deluxe Model Series 1400

The car is in remarkably good condition. It is orange. The tires are in good condition. It was converted to electric power in 1980. It has been in service ever since with standard maintenance of new brakes, and two sets of batteries. The current set of batteries, all thirteen, are new and have approx. 50 miles on them. It has always been garaged since it was converted and is in excellent running condition. The mileage is currently 39,583 miles. Of those 6,500 miles were under electric power. The car was converted by John Stockberger, Ken Meyers, Everett Harris, John Ahern, and Len Fisher at the Electric Auto Works in Batavia, IL. It is completely equipped with a custom built tow bar, spare tire and radio.

It was the pace car for the 1980 Americas Marathon (26.2 mile race) in Chicago. It is described in "The Complete Book of Electric Vehicles" by Sheldon Shachet, Page 178 of the 2nd edition. At present it is licensed and is insured by Allstate Insurance Co.

PROPULSION: There are 12 six volt batteries (Two series of six to supply 36 Volts at 400 ampers.) One 12-volt auxiliary battery provides power for lights, controls, etc. The Electric Drive Motor is a surplus aircraft generator that can achieve a maximum speed of 42 mph with a cruising speed of 30 mph. Range has been noted at approx. 50 miles.

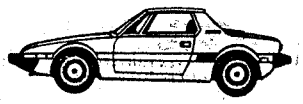
Controller: Custom designed Transistor Motor Controller, made by Electric Auto Crafters Batavia, Il, 36 volts at 400 amps.

It has a custom built on-board charger which charges the 36-volt and 12-volt batteries automatically. The car can be plugged in anywhere there is a 120 volt outlet.

Selling Price $1750, Henry Setton, Phone 485 0334

BUY IT.

FOR SALE



'74 FIAT X/1.9
Good cond. No rust thru
4 cyl. 4 speed runs ok
'75 FIAT X/1.9
Rusty - Bad engine half out
Extra Rebuilt engine
Good parts car.
$600 takes ALL

'82 Dodge Colt hatchback
4 cyl. 4 speed with 2 speed power/economy shift (8 speeds)
Air cond. Needs CV joint.
$150.00

John Emde 968-2692

FOR SALE

Electric car $1600 O.B.O.
1975 Honda Hatchback
New tires 54 Volt
On board charger
Needs new batteries
Good condition

Everett Harris

312/232-0344

SEND YOUR:

News, articles, events, want ads, photos to the : *NEWSLETTER ED*
Membership inquiries, applications & payments to the : *TREASURER*
Inquiries on club info, tech ??? & all other ??? to the : *PRES.*

ADVERTISING

Free to members
Commercial: On quote

NEWSLETTER EXCHANGE

The FVEAA newsletter is now being exchanged without charge to other clubs on a reciprocal basis. So far we're sending to New Mexico, Pennsylvania, California, Colorado, Canada and Illinois. These and hopefully many more will keep us informed of news and events in other areas.

DEADLINE for newsletter *STUFF* - in my hands the friday before the next meeting Editor