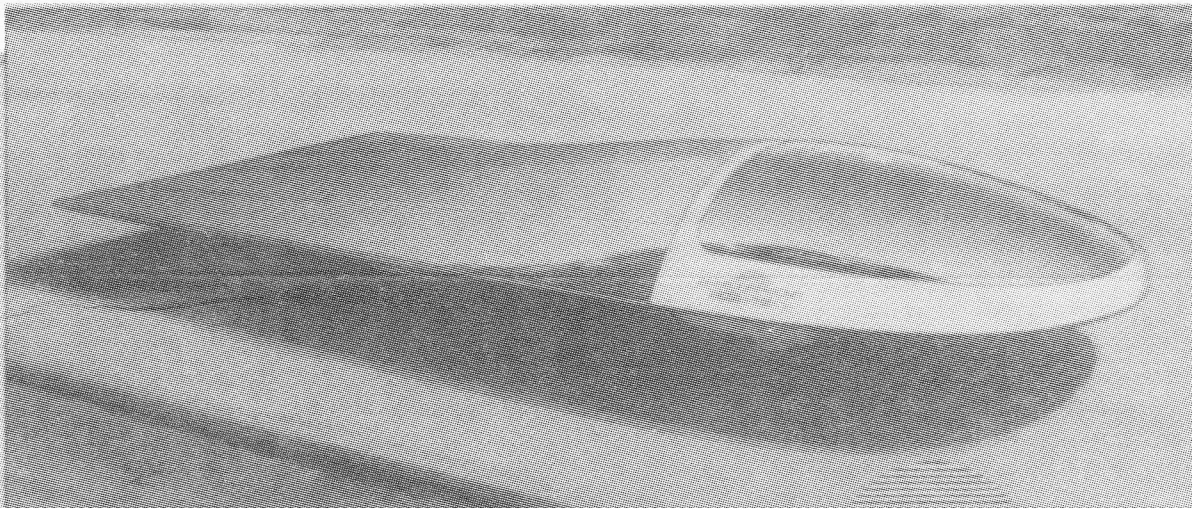


NO LOSERS IN SOLAR RACE

EVERYONE WHO PARTICIPATED IS A WINNER! EAA SALUTES YOU FOR
YOUR DEDICATION IN MAKING THIS EVENT HAPPEN-THANKS!
AND THE WINNER IS BY A COUNTRY MILE
(600 IN FACT)



The design of GM's solar-powered race car, Sunracer, was revealed in this rendering created by artists at GM's Design Staff Advanced Concept Center. The GM-built vehicle is scheduled to race 1,950 miles across Australia using solar power. The World Solar Challenge begins Nov. 1 and will be a test of technical ingenuity, car making skills and human endurance.

GM SUNRACER

\$7,000 per KW, some power bill, if you use Polycrystalline Silicon Solar Cells. However GM decided to go for it with the high-output more efficient (20%) gallium-arsenide cells, 7,200 cells for approx. \$700,000. These cells backed up by Silver-Zink batteries driving a custom built brushless DC Magnequench motor allowed them to average better than 40 MPH for the 1950 mile trip. The 19.7' long by 6.6' wide and 3.3' high Vehicle is an Aluminum tube frame with composite shell, weighed in at only 360 pounds.

WE CONGRATULATE GM ON THIS OUTSTANDING ACCOMPLISHMENT

Season's Greetings

NO LOSERS IN SOLAR RACE

The World Solar Challenge, a race among Sun-powered - photo-voltaic - electric cars across almost 2000 miles (3200 Km.) of Australia's Desert, from Darwin in the North to Adelaide in South Australia, is a benchmark event..

To those who favor Electric Cars, it is the event of the year. To those who have to devise a strategy to overcome the pollution of our air, the successful completion of that race is the Silver Lining behind the Smog Cloud!

The Solar-powered car is no longer a distant dream of those who walk with their heads in the clouds. It's for real! It WORKS!"

Those fortunate folks who have access to plenty of sunshine are possible and likely beneficiaries - in the fullness of time. What can we do to bring that day closer?

If the elected officials and public servants, who are concerned with clean air and the question of meeting Federal Standards for clean air, - already past due, - are listening, ... this is the drum beat by which they can march to Kill the Giant!

Let them listen to the voice in the Desert.
That voice is the clarion call to action:

Enact and regulate the photovoltaic cell to such mass use that it will become inexpensive, - & cheap, readily available, so that we can use it in our cars and homes, - wherever the sun shines, and we need electric power, without burning fossils. That WILL CLEAN THE AIR"

We who live in the South Western United States and have seen what a million tons of burned oil can do to our air - hope that the message comes through LOUD AND CLEAR"

Every Photovoltaic Car driven across Australia, the full length of the Stuart Highway is a winner in the race to liberate us from dependence on oil. The large Auto Manufacturers deserve our thanks for the long view they have taken of the future of their industry, by participating in the race. The two High School-College Teams, who participated, also deserve our applause. The twelve students in Sonderborg, Denmark, who selected a solar powered car as a graduation project in time for this race, volunteered their time and the work they did in designing and building the car. Parts and material were donated.

The passion, skill and committment that have been invested along with money in this event are encouraging. The victory of crossing the desert by solar power, faster than a camel, makes this the event of the year for us Electric Vehicle people. The oil people may well ask themselves, if this was their Waterloo.

COMPLETE SUNNYVALE RALLY RESULTS

RESULTS OF THE 1987 ELECTRIC AUTO ASSOC RALLY - STANDINGS BY CLASS & LAPS

SANTA CLARA - 4.0 MILE COURSE

(GROSS WEIGHT INCLUDES 300 LBS FOR DRIVER AND PASS.)

NO. EFFIC LAPS	ENTRY NO.	OWNER NAME	CAR TYPE	GROSS WEIGHT	CLASS	AREA SQ-FT	NO. BATTS	AMPHR RATING	MILES FACTOR
ANTIQUE CLASS									
CUSTOM CLASS									
9	0.63839	15	BOB STEINFELD	RED HOMEBLT '81	1850	CUSTOM	20	217	57.8010
6	0.58218	5	DON GILLIS	WHITE BRADLEY '1	3000	CUSTOM	22.4	105	42.2549
4	0.25950	13	CLARENCE ELLERS	GREEN HOME BLT	3000	CUSTOM	15	140	63.1979
3	0.27850	10	SAM HAYEK	BLACK VW '63	2300	CUSTOM	21	105	44.1637
STOCK CLASS									
20	1.24853	1	CHUCK OLSON	SAAB 1980	3000	STOCK	20	140	65.6769
20	1.25961	11	LLOYD WENZEL	HONDA 198?	2800	STOCK	21	244	65.0995
20	1.81516	16	TONY de BELLIS	BLUE/WHITE JET	3840	STOCK	22.3	105	45.1750
18	1.67997	7	BILL WILLIAMS	BLUE DATSUN '78	2322	STOCK	21	105	43.9291
15	1.50969	17	JOHN NEWELL	BRN FORD '81	3140	STOCK	23	105	40.7366
13	1.25524	4	JOHN BENNETT	BEIGE '80 DATSU	3400	STOCK	25	105	42.4618
12	1.31548	2	LEE HEMSTREET	1980 VW	2350	STOCK	21	105	37.4007
11	1.48436	8	JOHN WASYLINA	RED RENAULT '83	2530	STOCK	20	105	30.3834
11	0.82792	14	SCOTT CORNELL	BLUE RABBIT '75	2950	STOCK	21	140	54.4737
10	0.50267	12	BETTY ELLERS	WHITE JET '80	2500	STOCK	20	140	81.5635
9	7.57171	6	I. TILLIN	RED HONDA '73	1	STOCK	1	105	487.340
HYBRID CLASS									
2/3 WHEEL CLASS									
10	1.28066	9	ANGUS MACDONALD	LONG BEACH ELEC	600	2/3 WHEEL	10	217	32.0147
8	1.66398	3	ROY PAULSON	HOM MADE	150	2/3 WHEEL	12	105	19.7117
COMMERCIAL CLASS									

MOST EFFICIENT VEHICLE WAS No. 16, TONY de BELLIS, at a rating of 1.815.

ACID RAIN - ACID SOIL - ACID WATER?

Acid Front Penetrating More Deeply into the Subsoil Groundwater Is Threatened by Over-Acidification

(grs) It is gradually becoming obvious how dangerous acid precipitation is, a problem which has now spread all over the world. As a result of exposure to many acidic substances, the pH value of most soils has dropped significantly below the ecological optimum of 5 to 6.5 (the pH value reflects the degree of acidity of a substance). The soils are now beginning to produce acids themselves, and the groundwater is becoming jeopardized.

The soil, the basis of all life, is not a simple system consisting of just humus, earthworms, and gravel. Rather, it is a seething natural laboratory, in which reactions are going on constantly, the interconnections of which are as tortuous as the cerebral convolutions of the human brain. And there are many different kinds of soils, all of which are closed ecosystems.

Man has interfered with these chemically "dense" ecosystems. He began to use biomass by cultivating the soil. If biomass is taken from the soil in the form of harvested fruit or timber the soil will become over-acidic, because this organic matter ordinarily contains an excess of alkaline material. Deforestation and degeneration into steppe have resulted from this process during the past 1,000 years. In the Federal Republic of Germany, the Lüneburger Heide is an impressive example of this.

However, while the subsoil and the groundwater have not been affected by this process of over-acidification of the soil for centuries, this is no longer the case in the age of air pollution. Industrialization marked the beginning of the change in the circle of chemical substances. Continuous exposure of the soil to acid precipitation robbed the soil of its alkaline compounds. Moreover, the soil changes the composition of the ions in precipitation. Precipitation, which is acidic to begin with, is turned into an even stronger acid in the soil. This means that the soil is now open to all substances to which it is exposed, because it can no longer filter out the substances which penetrate from above. This danger of over-acidification is eliminated as long as there are carbonates and silicates in the soil neutralizing the acidic solutions. But once they have been "used up" the pH value drops sharply. Below a pH value of five the silicate grids of the clay minerals release metal

ions such as aluminium and manganese, below a value of 3.8 they even release iron. Thus, compounds which previously preserved the soil are transformed into new compounds, which are now poisonous. Not only is organic matter changed, but also the entire balance of the soil's chemistry.

Between 1969 and 1983 Professor *Paul Benecke* of the Institut für Bodenkunde und Waldernährung (Department for Soil Research and Forestry) at the *Universität Göttingen* conducted research in a spruce and in a beech forest in Solling near Göttingen. He found that throughout these 14 years the sulfur sediments remained roughly the same, namely an annual average of 51 kilograms per hectare in the beech forest and 87 kilograms per hectare in the spruce forest. Until 1975 the soil retained these amounts of the substance, and in the following two years the soil released as many sulfate as it took in. But in 1977 the soil started to release more sulfate ions than it was exposed to. In 1981 it released as many as 240 kilograms per hectare in the spruce forest, which is three times more than the soil had received. With respect to aluminum the "output" has also been much higher than the "input" since 1977. The hazardous substances which have thus been accumulated have now penetrated the soil, formerly a big receptacle, and are seeping into the subsoil.

Analyses of drillings in the Harz Mountains have shown that down to a depth of three meters exchangeable calcium and magnesium have almost fully been replaced already by aluminum and manganese. Thus, the acid front has advanced deeply into the subsoil. This is a ticking time bomb. It is likely that the acid substances will sometime suddenly break through the groundwater level and carry large amounts of aluminum and other substances into the other watersystems.

But this is not the only warning. The gradual over-acidification of the subsoil can also be seen from the fact that calcium and magnesium are increasingly being washed into the groundwater. The high concentration of iron in the water is alarming. The soil is so acidic that even heavy metal ions like iron can no longer be retained. The waters are acutely endangered by all this, and the effects of this acidification would be a catastrophe not only from the ecological point of view: the water economy would be faced with bankruptcy.

Donné Norbert Beyer

Contact: Professor Dr. Paul Benecke, Universität Göttingen, Institut für Bodenkunde und Waldernährung, Busgenweg 2, D-5300 Göttingen-Weende

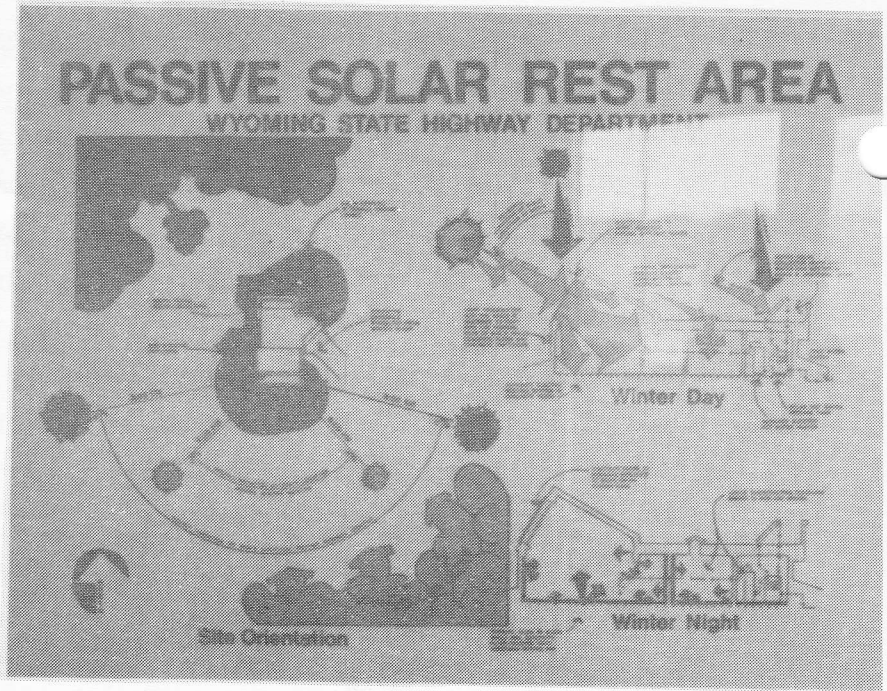
Taming Dioxin

Dioxin emissions in particular have been of concern to citizens' groups opposing the construction of waste-burning facilities, despite the EPA's conclusion that these emissions do not constitute a health hazard. In an attempt to understand how dioxin emissions are related to combustion conditions, and so help incinerator operators to minimize them, ASME's Dioxin Committee has developed a research protocol.

The research study was carried out by the Midwest Research Institute for the New York State Energy Research and Development Authority at the Vicon Incineration Facility in Pittsfield, Massachusetts. It considered the relationship between dioxin levels at several sites within the incinerator system and such combustion variables as temperature, oxygen level, and carbon monoxide production.

The study report, issued in August, concluded that there is, indeed, a direct relationship between dioxin and carbon monoxide levels. Thus, carbon monoxide can be used as an indirect measure of dioxin produced during combustion. Other experiments found an inverse relationship between dioxin and operating temperature. Although Barry Commoner has suggested that polyvinylchloride in trash is a source of dioxin, the Vicon study found no such relationship. Nor did it find the water content of trash to be a significant influence.

Because operating conditions are so important in controlling emissions from municipal waste incinerators, ASME's Council on Codes and Standards has established a committee to standardize and accredit operator training and certification programs. Velzy told the House subcommittee that this program "could be used as a means to satisfy regulatory requirements."—David I. Lewin



WORLD'S FIRST SOLAR OUT-HOUSE

Most powerful magnet of all found

Scientists analyzing a new superconducting material have discovered that it can be made into magnets far more powerful than any now in existence, according to unpublished data from a half-dozen laboratories in the United States and China. The material, a hard, dark ceramic discovered less than three months ago, has already astounded scientists with its ability to carry electric current with no loss of energy at record high temperatures. Researchers who are investigating the electrical properties of the material now find that it is also capable of sustaining unexpectedly large magnetic fields.

From wire reports

/ SEPTEMBER 1987 / MECHANICAL ENGINEERING

EVA/SO.-CAL. RALLY RESULTS

Below is a recap of the Rally results. The official stats and presentation of the various awards will take place at our December 19th meeting.

PLACE	NAME	CLASS	TYPE	LAPS	TOTAL MILES
1st	Paul Akman	2-wheel	Homemade Moped	22	57.2
1st	Ed Combs	3-wheel	Rascal Wheelchair	1	2.6
2nd	Ken Krutz	3-wheel	Custom	--	(a)
1st	Ken Koch	4-wheel	Mazda RX-2	45	117.0
2nd	Cal Orr	4-wheel	Renault Dauphine	33	85.8
3rd	Joe Coderre	4-wheel	Sterling VW	31	85.6 (b)
4th	Leo Schatzl	4-wheel	Honda Civic	20	66.0 (b)
5th	Chuck Smith & Ernie Eperjesi	4-wheel	Griffon Van (DWP)	7	39.0 (b)
6th	Glenn Ducat	4-wheel	Griffon Van (SCE)	5	33.0 (b)
7th	Ria Schatzl	4-wheel	Electrobug Custom	11	28.6
8th	Jack Ruebsamen	4-wheel	Mazda R-100	--	(a)

(a) - Participation award. No official mileage listed.

(b) - Includes mileage allowance for driving to and from Rally.

EV Marketplace

WANTED

Bradley, Aztec, Urba Electric or other fiberglass Electric Auto. Is there anyone near Boston with one of these cars for sale???

CALL: or Write: John Iozza, 24 Birch St. Everett, MA 02149, (617) 389-8938 Days or (617) 387-9325 7-9PM.

'69 VW Hatchback Electric Vehicle, ready to run. Mounted generator/starter motor, on board charger, all safty relays. Needs controller and batteries \$600. CALL: Ross after 5PM. (916) 481-8577, Sacramento.

FOR SALE

Four Jet Electra Vans, ready to drive less batteries \$1995, will deal for all. 20HP General Electric motor \$350, Electronic Controller \$350, 102 Volt Charger \$350. FOB Seattle. CALL: Tony (206) 367-8084 eves. or (206) 784-9492 days, write M. Tony Feralio 11540 Greenwood Ave. N. #4, Seattle, WA 98133.

ELECTRIC AUTO LIQUIDATION

All items in factory new condition and are priced at 50-60% of quantity wholesale cost 1980. Quantity prices available. GE 99v. 23hp series motors, \$600. 96/12V, 20-40amp transformers (110V Pri.) \$110. 48/12V transformers (110V Pri.) \$70. Prestolite 48V, 15hp series motors \$500. Contactors, H/B 24V coils, 75-150 amp. SPST & DPST \$45. Contactors, H/B 24V coils 300-600 amp SPST \$65. ALL FOB MASS. METERS (600 AMP, 50+100V). Motor adaptors for Fiat 128/X1-9/Strada & Renault Le Car/GL, cable, hardware, SCR components. CALL: (707) 468-1603, Write Stevenson, 1201 Parducci Rd. Ukiah, CA 95482

FOR SALE

ELECTRA VAN 600, 1979 model, new condition, new tires. Batteries need replacing but vehicle in perfect running condition. \$2000. CALL: Ivan Marts, (408) 946-5852.

RUSSCO

Coming early 1988 the new high torque Russco motor, manufactured by General Electric, Modified by Russco. Twice the torque of the famed Prestolite. Available Russco's programable field controller and the new high output H O 400 controller, instant regenerative braking & dynamatic braking, of course.

RUSSCO THE INNOVATOR

PROJECT "X"

TO CONVERT A DODGE CARAVAN TO A STATE OF THE ART HYBRID WHICH WILL BE THE MOST PRACTICAL AND ECONOMICAL FAMILY VEHICLE EVER CONCIIEVED 100+MPG.

WE NEED YOUR HELP!

Send checks to project X, Lee Hemstreet 787 Florales Dr. Palo Alto, CA 94306.

SURVEYS SHOW THE SMALL VAN TO BE THE MOST MARKETABLE VEHICLE AROUND THE WORLD!

SANTA CLARA CHAPTER

JAN. 16 th. ELECTION OF OFFICERS & PLANS FOR 1988. LET'S HAVE A GOOD TURNOUT, THANKS

CLARENCE

NOW!!! ANYBODY IN THE WORLD CAN WIN A GOLD MEDAL AT THE EAA INTER- NATIONAL RALLY:

SUNNYVALE RALLY ENTRANTS WILL BE ELIGIBLE TO ENTER WITH WRITE
IN CANDIDATES, WITH OUT DOCUMENTATION SINCE CARS WILL BE
INSPECTED ON SITE AND AWARD WILL BE PRESENTED AT OUR BRUNCH.

- 1-Write it up
- 2-Have it documented by two disinterested parties
- 3-Must be INSTALLED and OPERATING in an EV

Send to Bill Palmer
44 Dior Terr.
Los Altos, Ca. 94022

KEITH CROCK TECHNICAL AWARD

This award will be presented to the EV'er who has been innovative
by making his EV have features which improve efficiencies or perform-
ance (mechanical).

It will also cover an unusual electrical control system or an elec-
trical or electronic monitoring system to measure performance of the
car such as KWH, or for the battery pack (electrical or electronic).

To enter in the Program you must fill out this form with your Regis-
tration and submit them together. (Rally Entrants Only)

Also, to participate, the feature must be installed and working in
your EV.

NAME _____ CAR ID _____

Feature(s)

INCLUDE ANY SUPPORT SHEETS YOU WISH, DRAWINGS, PHOTOS, ETC

Call: Clarence (408) 248-2588

WANTED

600 JET ELECTRO VANS

Any condition-must have good transmission.

K.D. Bancroft
4301 Kingfisher
Houston, TX 77035
CALL: (713) 729-8668

FOR SALE

Trade-In electric vehicle components. GE EV1 SCR Controller, \$55.00. Pulseomatic SCR Controller, \$45.00. Skokan Controller, \$65.00. PMC black controller, \$350.00. VW to aircraft Wasylna adapter, \$115. GE 2CM73, \$95.00. GE 2CM76, \$175. GE 2CM88, \$215.00. Six volt batteries, \$1.00 each. ALL SALES FINAL!

Russco Engineering, Used Auto Parts Division; PO Box 1175, Healdsburg, CA 95448. CALL: (707) 542-4151.

FOR SALE

1980 JET INDUSTRIES SUBARU 600 ELECTRA VAN. Only 5000 miles. Needs batteries, motor and controller to function. ONLY \$195.00. Or part out, doors, glass, front and rear suspension, transaxles, tires and wheels, \$25-\$50 each.

Russco Engineering, Used Auto Parts Division, PO Box 1175, Healdsburg, CA 95448. CALL: (707) 542-4151.

ELECTRIC AUTO LIQUIDATION

All items in factory new condition and are priced at 50-60% of quantity wholesale cost 1980. Quantity prices available. GE 99v. 23hp series motors, \$600. 96/12V, 20-40amp transformers (110V Pri.) \$110. 48/12V transformers (110V Pri.) \$70. Prestolite 48V, 15hp series motors \$500. Contactors, H/B 24V coils, 75-150 amp. SPST & DPST \$45. Contactors, H/B 24V coils 300-600 amp SPST \$65. ALL FOB MASS. METERS (600 AMP, 50+100V). Motor adaptors for Fiat 128/X1-9/Strada & Renault Le Car/GL, cable, hardware, SCR components. CALL: (707) 468-1603, Write Stevenson, 1201 Parducci Rd. Ukiah, CA 95482

FOR SALE

1981 BRADLEY GT-II ELECTRIC, ON 1968 VW BUG CHASSIS, 50% COMPLETE. UNABLE TO COMPLETE MYSELF. ALL DOCUMENTATION INCLUDED. ELECTRIC PACKAGE IS INSTALLED AND OPERATIONAL. ASKING \$2,500. CALL: STEVE HAMMETT, (714) 633-1831 or (714) 633-4240.

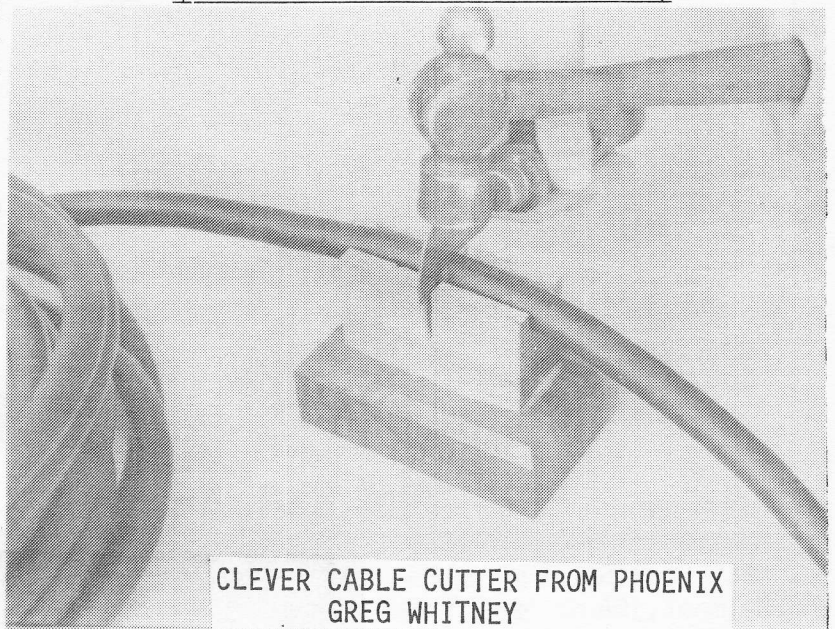
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Free Magazine

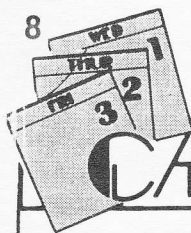
All members should be receiving the May/June issue of *Invention & Technology*, the magazine that is sponsored by General Motors and sent free of charge to ASME members. The quarterly magazine is devoted to the history of engineering.

Any member who does not receive the issue or who wishes to report an address change, should contact the publisher directly: *American Heritage, Subscription Department, 60 Fifth Ave., New York, NY 10011.*



CLEVER CABLE CUTTER FROM PHOENIX
GREG WHITNEY

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, Full Pg. \$50.00, Full Pg. 2 sides \$80.00, WANTED - TRADE - FOR SALE, etc. Mail to EAA 1249 Lane St. Belmont, CA 94002



CALENDAR

DEC. 6: Peninsula Chapter Christmas Party.
12 Noon, #8 San Juan Ave. Daly City. CALL:
Mae (415) 992-5453 or Lydia (415) 591-6698.

DEC. 12: East Bay Chapter, PG&E Service
Center 4801 Oakport St. Oakland. Speaker
from PG&E on testing Solar Cells. CALL:
Scott (415) 798-0909.

DEC. 15-17: Winter National Design
Engineering Show. Anaheim Convention
Center, Anaheim, CA. CALL:(203) 964-0000

DEC. 16: Vancouver, B.C. VEVA. B.C. Hydro
R&D Conference Room. 12388 88th Ave Surry,
B.C. Joint meeting with Seattle. COOKIES &
CAKES WELCOME! CALL: Axel (604) 987-6188.

DEC. 19: THE DEVC HOLIDAY PARTY, 3:30 PM.
2940 13th Street Boulder, CO CALL: George
(303) 442-6566.

Season's Greetings

EAA Chapters

ARIZONA: PHOENIX
Roger Smith 602-969-9667
P.O. Box 16800 #273
Mesa, AZ 85202

CALIFORNIA:
Burbank
Irv Weiss 818 841-5994
2034 N. Brighton #C
Burbank, CA 91504

East Bay
Scott Cornell 415 798-0909
60 Alan Dr.
Pleasant Hill, CA 94523

North Bay
Gordon Schaeffer 415 456-9653
211 Bellan Blvd.
San Rafael, CA 94901

Peninsula
Mae Bensen 415 992-5453
8 San Juan Ave.
Daly City, CA 94015

Sacramento
Carl Metcalf 916 486-0321
3654 Bausell St.
Sacramento, CA 95821

San Jose
Don Gillis 408 225-5446
5820 Hern St. #3410
San Jose, CA 95123

Santa Clara
Lee Henstreet
787 Florales Dr.
Palo Alto, CA 94306

OREGON: Willanette
Leslie Brundidge 503 390-3871
4040 Gary St. NE
Salem, OR 97303

TEXAS: Houston
Ken Bancroft 713 729-8668
4301 Kingfisher
Houston, TX 77035

WASHINGTON: Seattle
Bryan Lowe 206 632-4496
5011 9th NE
Seattle, WA 98105

WISCONSIN: Milwaukee
Dave Pares 414 481-9655
3251 S. Illinois
Milwaukee, WI 53207

NEW JERSEY: Hackensack
Kasimir Wysocki 201 342-3684
293 Hudson St.
Hackensack, NJ 07601

Vancouver, B.C.
VEVA 604 987-6188
543 Powell St.
Vancouver, B.C. V6A 1G8

NON-AFFILIATED GROUPS

CANADA
Ottawa, Ontario
Fred Green
Box 4044 Sta. "E" K1S 5B1
Ottawa, Ontario, Canada

NEW MEXICO: Albuquerque
Mike Lechner 505 848-2331
PNM Alarado Square
Albuquerque, NM 87158

Southern Cal-EVA of SC
Ken Koch 714 639-9799
12531 Breezy Wy.
Orange, CA 92669

DENVER CO DEVC
Genny Clark 303 451-5051

Fox Valley IL 312 879-0207
John Stockberger
25 643 Nelson Lake Rd.
Batavia, IL 60510

Eastern 215 696-5615
P.O. Box 717
Valley Forge, PA

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.
PHONE (415)591-6698

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Electric
Auto



NEWS

Association

DECEMBER 1987

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State of art HYBRID



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