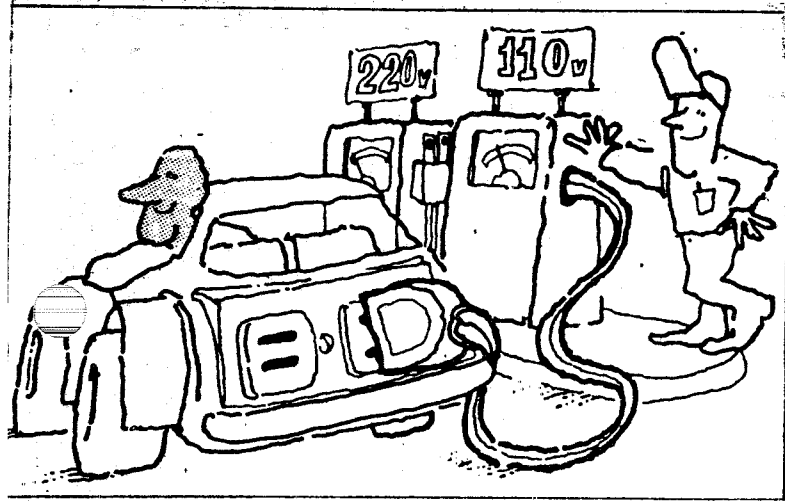


FVEAA NEWSLETTER  
August 1984

MEETING NOTICE

The Fox Valley Electric Auto Association will meet on the third Friday of August, the 19th, in the lower level of the Mid-America Federal Savings Building, located at 250 E. Roosevelt Rd, Wheaton, IL. At the August meeting we will have a discussion on the selection of a vehicle suited for conversion to battery power. This will be the first in a series of discussions covering all phases of the construction of an electric vehicle. Any who have show-and-tell demonstrations such as hardware they have built or circuits they have designed please bring them. Also bring your cars for others to see. Good weather will soon be coming to an end.

CHICAGO SUN-TIMES, Monday, July 23, 1984



“  
As many as 9 million electric cars may be operating by the year 2000. They can only go 50 or 60 miles before their batteries need recharging. *at this time*”

**ELECTRIC CAR SERVICE STATION:** There are only about 2,000 electric vehicles in use in the United States. But the Energy Department has estimated that as

many as 9 million may be operating by the year 2000. Electric cars are inexpensive to operate—as little as 6 cents a mile—but they can only go 50 or 60 miles before their batteries need recharging. That's where the service station comes in.



*fox valley electric auto association inc.*  
624 Pershing St. Wheaton, IL.  
60187

# Fund shortage hampers company

By **CHUCK DOHERTY**  
Daily News Staff Writer

Electric Motor Cars of Richardson is hampered by lack of funds but is moving toward development of a car powered by a magnesium-based battery — an achievement which could increase the range of an electric car 10 times.

George Thiess and Jack Hooker are the owners of the 4-year-old company, which primarily leases cars powered by golf-cart batteries to businesses and individuals. Those cars have a range of about 40 miles.

The company has funded most of the project on its own. Because of that and a need to make money, progress on the project has been ongoing but slow, Thiess said.

Also slowing the project has been a periodic shortage of parts.

"Research is inherently time-consuming because of that," Thiess said.

Thiess has developed a workable magnesium-based battery, but planned completion of a Mercedes Benz with a larger version of the battery will not take place until after the beginning of next year, according to Thiess.

The company recently purchased a Mercedes, and adjustments have been made in the car's suspension to accommodate the 16, 6-volt batteries, which will add 700 to 800 pounds



Daily News Photo

**George Thiess and Jack Hooker examine batteries at their Electric Motor Cars firm in Richardson as they attempt to develop a method of extending the distance electric cars can travel without recharging batteries.**

to the car's weight.

Thiess said he has been asked why the company purchased an expensive Mercedes for the project if funds are so short.

"If you start with a good car, ... you'll end up with a good electric car," he said.

Besides that, he said, the price of the Mercedes is a small fraction of the total cost of the project.

An electric car compares very favorably with a gas-powered car, he

said, in terms of fuel, maintenance and purchase price.

"If we turned out 10 (converted) Mercedes a month, we could sell them for the same price as a regular Mercedes and still make a profit," he said.

According to Thiess, there are millions of electric-powered vehicles in the United States, most of them golf carts, forklift trucks and airport-support vehicles. Fewer than 1,000 electric-powered vehicles travel on the roads, he said, but the U.S. Postal service is currently experimenting with electric-powered mail trucks.

By comparison, he added, Britain has more than 40,000 electric vehicles on the road. The reason for the greater number is the high price of gasoline coupled with a realization

that electric vehicles are the transportation of the future, he said.

The United States has a "chicken-and-egg" situation with electric cars, Thiess said. In other words, without adequate use, technology advances will be a long time coming; and without technology advances, people will not use the vehicles.

"There is a psychology that when you say that an electric car will only go a certain number of miles a day, people will not use them," he said. "If people would use them, they would become more feasible."

Because of the many advantages he sees in electric cars, Thiess believes they will someday replace gas-powered cars. "Ultimately, the only final possibility will be electric cars," he said.

4

# I.

## THE WORLD NEEDS ELECTRICALLY POWERED VEHICLES (And the sooner, the better)

### WHY, AN ELECTRIC CAR?

Gasoline powered vehicles have been an integral part of our life-style for nearly a century. Tested under every conceivable conditions, upon countless millions of miles; has uncovered whatever shortcomings were present. Mechanical minds, the universe over, contributed their ideas; and with technological progress through the years, the end product became a life necessity. Yet, we hear predictions of innovations, yet to come, that fairly blow the mind.

As acceptance of this mode of travel spread throughout the world's populace; the need for its petrol expanded tremendously. The search for new sources of Crude Oil intensified; spreading explorations to distant, remote areas. Refinement processes escalated, too. Chemists were added as research began concentrating upon the residuals derived from gasoline refinement. With the new discoveries, a whole world of new products is appearing. Their demand is already challenging the energy product for priority in the marketplace. Combined, on a world-wide level; the daily siphoned quota of oil being removed from this planet's total sources, must certainly hasten the day when NO More will be available.

There is no denying that Crude Oil (fossil fuels) has proven itself to be one, if not THE, MOST PRECIOUS resource this planet offers mankind. Considering the vast amount already drawn; it is truly amazing that much oil is still available. But, since our volume of demand, daily, is beyond our wildest conceptions, would you allow me to briefly touch on some factors that affect my concern?

To begin, we must project our numerical estimates upon a global level. Let's start by counting vehicles transversing the land mass: Those personally owned; (?) Public passenger transport; don't forget to add rail travel, too (?); Freight carriers, both rail and commercial trucking (?); The business deliveries and service vehicles (?). Remember; this is a world-wide estimate.

Now, with those figures totaled, let's take to the air: Many nations support freight and passenger airlines with flights that inter-connect to key cities all over the globe. Many flights compete and overlap with others. How many barrels of oil does all this activity demand? Then there are political and military flights, not to be ignored. And there are helicopter patrols and private planes in use, too. Now, your total figures should be beyond most computers!

At sea: There is a tremendous number of sea-going vessels of every size and description using diesel oil. Let's not ignore the extensive fleets of battle wagons most nations deploy. (land-locked nations as Switzerland can be excluded) You should have a mind boggling figure by now! ! !

Let us consider Heating Oils: - Much of the world is touched by inclement weather; some areas moreso than others. Private homes must be heated. How many did you say? Every type of business seeking to attract customers feels they must maintain a comfortable climate within the store (?); hotels; motels; and apartment houses use heat extensively (?); And: Office buildings and shopping complexes too (?). Many Utility companies require oil to operate electric generators for emergency and supplementary service; so we are told.

M. Solen  
9/30/83

Thanks for listening.

*Morris Solen*  
Morris Solen - Northbay chap.  
75 Fremont Dr.  
Sonoma, Ca. 95476

## II.

CON'T:

Are you still with me? ? ? Now, Let's peek into the Residual Products Field.: - I don't believe there is any way for even a remote estimate of the scope of Industrial Chemicals derived from Crude Oil. We can only touch on some of the more obvious products that come to mind. Medicine (would you believe Aspirin for one?); pesticides; fertilizers; paints; caulking compounds; tires; many forms of moldings and seals; adhesives; synthetic fibers (a tremendous array); plastics; lubricants; polishes; waxes; and asphalts: (largely for Roofing and Road Surfacing) That's for starters: - There's a wide field of plastics used in housing construction and yet a wider use as appliance materials and other sundry objects.

ALL OF THESE DERIVED FROM OIL! !!

Fantastic, as it may be; have you any notion of your TOTAL? It's way beyond my comprehension! \* \* \* But this is all a DAILY BASE FIGURE! If we can; let's MULTIPLY this by 365 days. And Multiply it again by: choose your number of years - 20? 50? 100? Haven't we ALREADY DRAINED A SUBTERRANIAN OCEAN?

We are indeed fortunate that our planet IS NOT, in total, one solid mass of OIL. For IF IT WERE, we would be able to foresee that eventually it would be reduced to a mere wisp of smoke and a cloud of gases. Since it is NOT so, as there is much of the planet that isn't Oil; we automatically become the TRUSTEES of this ever increasingly precious resource in our tenured life-time. Certainly, future generations will hold us accountable. How dare we expend it so extravagantly; how dare we shirk our responsibilities so casually?

With the need to move about freely, and independently, so much a part of life itself; the following questions demand our sober, thoughtful consideration: - -

(1.) Must we wait until the last drop of oil is squeezed from this ball of mud before we seriously consider developing alternate energy forms so that we may extend our OIL RESERVES? Whatever arguments to the contrary, the foregoing appraisals leaves no doubt that there must be a limit of global oil sources.

(2.) Can we truly expect today's well entrenched energy purveyors to lead us away from this imminent morass? Possibly, in the energy field; but will fall far short finding substitutes for many of the residual chemicals.

(3.) Are we being wise to reject all efforts of Electric Vehicle Development that falls short, in comparison, to our present means of travel? Shouldn't we recognize the advent of a new era; one that closely parallels the introduction of the Horseless Carriage which, in time, has grown to be the fine product before us today?

This Old Man has harboured the foregoing conclusions for one long time; but it wasn't until I set this all on paper, that I truly grasped the enormity of the context. The time has come that we all become aware and face up to its reality!

M. Solen 9/30/83

bank—however designed and staffed—would end up dispensing funds to only politically powerful companies. John M. Albertine, head of the American Business Conference, a lobbying group of medium-size businesses, thinks that many companies would just get the “crumbs” from funds that go to big industries. “Those who don’t have political clout will be largely ignored,” he says. Evidence exists to support this view. In 1983, 10 exporters received 80% of the Export-Import Bank’s direct loans.

Whether real or imagined, these objections are pushing some politicians and economists to suggest other, more modest, ways that an industrial policy could help keep smaller, old-line businesses alive. The most popular idea is state-funded investment banks—mini-RFCs. Already 13 states have started such institutions, says Larry Ledeber, an economist with the Urban Institute. Some of them invest in a variety of industries while others concentrate on high tech.

“It’s easier in the smaller microcosm of a state to bring the private sector into a coherent partnership with state and local government,” says Belden H. Daniels, a Cambridge (Mass.)-based consultant in economic development. He cites a Massachusetts partnership between the state and the insurance industry. In return for favorable tax treatment, a pool funded by the insurance companies makes higher-risk loans. A 1978 loan of \$5 million, says Daniels, helped keep Wang Laboratories Inc. on its feet when it was a struggling company with less than \$150 million in sales.

**A FACTORY SERVICE.** Another approach for channeling capital to smaller businesses is to create a secondary market for industrial loans, a proposal supported by Representative John J. LaFalce (D-N. Y.) and Senator Edward M. Kennedy (D-Mass.). The plan would create a government-backed institution that would insure, package, and resell industrial loans, playing a role similar to that of the Government National Mortgage Assn. in housing finance. This would enable companies to obtain financing at lower interest rates than they can get on their own.

Capital is not the sole problem for small companies. Often companies need to modernize, which takes knowledge of new technology. LaFalce and Kennedy propose a “factory extension service” that would link universities and businesses. It would be modeled after the Agriculture Dept.’s Extension Service, which informs farmers about new products and techniques.

These proposals may help smaller business. But if the current economic expansion falters, the push for supplying capital to smaller companies through a national RFC may get wider support. ■

## Technology

# GEARLESS TRANSMISSIONS SHIFT OUT OF ‘PARK’

AFTER YEARS OF JERKY STARTS, THE FUEL-EFFICIENT SYSTEM IS FINALLY GETTING ROLLING IN EUROPE AND JAPAN

In mid-January, Fuji Heavy Industries Ltd., builder of Japan’s Subaru cars, became the fourth auto maker in recent weeks to throw its support behind the latest technology in automatic transmissions: “shifting” without gears. Fuji will join General Motors, Ford, and Fiat in replacing the usual toothed transmission gears with a belt-and-pulley system that delivers at least as much fuel efficiency as a five-speed manual shift, the stingiest transmission now available. Their first commercial gearless units will hit the streets in Europe and Japan this summer in Ford’s Fiesta, Fiat’s Uno, and Subaru’s Justy. A U. S. debut will come later, perhaps in 1986 or 1987.

While Fuji is the smallest auto producer among the four world leaders, it could play the most pivotal role. Selling the gearless idea to European drivers will be a difficult challenge, despite the claims of superior fuel economy. Automatic transmissions have never gained much popularity in Europe, because of their gas-guzzling tendency and the area’s historically high gasoline prices. Today, 90% of the 10 million cars that Europeans buy each year come with manual gearboxes, and many European drivers insist that they actually prefer the “feel” of a stick shift.

Japan is a more likely springboard for the belt-and-pulley system, because 40% of the cars purchased there come with automatic transmissions, a one-third gain in the past two years alone. Japanese drivers, increasingly fed up with constant shifting in dense, stop-and-go urban traffic, should be much more prone to give the new transmission a try. Following Fuji’s announcement, Japan’s other auto makers were even more coy than customary about their plans, but an official at Nissan Motor Co. confides that “all Japanese car companies are interested in this technology.”

**SMALLER AND LIGHTER.** “Existing Japanese automatic drives will be the first to disappear,” predicts E. F. M. Hendriks, head of research and development at Van Doorne Transmissie, a tiny Dutch company that has spent some \$50 million pioneering the new system, known as a continuously variable transmission, or CVT. The four auto makers that plan to offer the new transmission are all using Van Doorne technology. Hendriks be-

lieves that CVTs will eventually replace automatics everywhere, and even some stick shifts. Last October, Henry Ford II, finance committee chairman of Ford Motor Co., waxed almost as enthusiastic when he told a Ford dealer meeting in Amsterdam that all Ford cars worldwide would have CVTs as optional equipment “in the not-too-distant future.”

Compared with conventional automatic transmissions, Van Doorne’s CVT is smaller, lighter, and much cheaper to manufacture. And it promises to boost mileage by up to 20%, possibly more with advanced microcomputer controls. Its secret: It can “dial in” a nearly infinite number of ratios between the engine’s crankshaft and the car’s wheels, not just the three, four, or five fixed ratios of ordinary transmissions.

**MOST EFFICIENT SPEED.** The CVT does this by adjusting two split pulleys in concert. For example, to shift into a higher gear, the pulley linked to the engine squeezes together, pushing the belt up its V-shaped groove to form a bigger loop, corresponding to a larger gear. Simultaneously, the drive-shaft pulley spreads apart, dropping the belt lower in its V-groove (drawing). Continuously adjusting the pulleys means that the engine always runs at its most efficient speed. The effect is comparable to adjusting a light bulb’s brightness with a rheostat dimmer, not a three-way switch.

The new gearless transmission caps a 25-year R&D effort at Van Doorne to perfect its technology—and then to persuade the notoriously conservative automotive industry that the system works. The first CVT was offered in the DAF, Holland’s smaller and cheaper version of the postwar Volkswagen Beetle. But this transmission soon became the butt of ridicule. It was an ungainly device, bigger than the DAF’s tiny engine and incapable of handling more than 55 hp, and its rubber belts wore out rapidly. Derided as a car that “runs on rubber bands,” the DAF disappeared in 1973, when its parent company was bought out by Volvo Car, a Dutch affiliate of Sweden’s Volvo.

To overcome the problems associated with the DAF, Van Doorne developed a flexible steel belt with hundreds of stainless steel plates strung together on steel bands, rather like a necklace. This metal

belt has a projected life of 100,000 mi. and is strong enough to handle the power from 450-hp engines. In fact, CVTs for trucks and buses are being developed.

**SPORTING RACE.** "Van Doorne has an absolute world monopoly in this field," declares a Fiat executive. "If anyone wants to make a CVT, they have to use Van Doorne's metal belts and pulleys." An engineer at West Germany's Bavarian Motor Works (BMW) says, "The Van Doorne transmission is the direction we are taking." He adds, though, that efficiency with powerful engines and rear-wheel drives needs to be enhanced, "and that may be a few years off." A few companies are not buying Fiat's line that Van Doorne's is the only technology; the Italian car maker, after all, acquired a 24% stake in Van Doorne for \$7 million in 1979 and has since invested close to \$60 million in R&D for the transmission—more than Van Doorne has spent. Nissan is developing its own version, as is

ments of 1,600 cc and up—large by European standards. Its first customer will be Adam Opel, GM's West German subsidiary. Ford, meanwhile, is spending \$55 million to retool its transmission plant in Bordeaux, France, to make CVTs for cars with engines in the 1,100-to-1,600-cc range. These include its Fiesta and Escort models and Fiat's Uno, Ritmo (Strada), and Lancia Prisma. And for minicars, Fiat hopes to buy a small CVT from Japan, such as the one that Fuji will put in its 1,000-cc Justy.

Until Ford and GM can start cranking out gearless transmissions, the units will be supplied by a Volvo plant in Sint Truiden, Belgium. It is already producing 100 CVTs per day as a subcontractor to Van Doorne, with the Dutch company supplying the belts and pulleys.

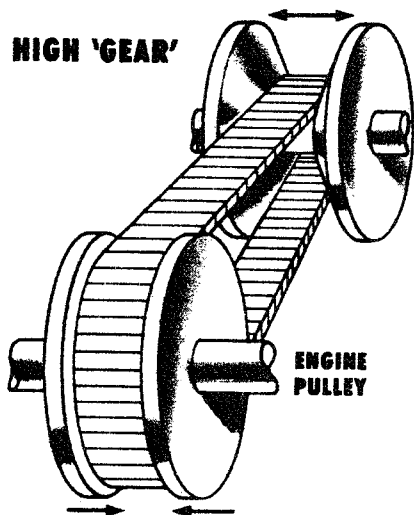
Richard Hamstra-Pik, Van Doorne's managing director, says his company intends to retain all manufacturing rights to its patented metal belt. Since GM,

CVTs. Actually, Borg-Warner delivered only 150 prototypes to Fiat.

With Borg-Warner on the sidelines, Fiat and Van Doorne scrapped production plans for the large, all-purpose CVT that had been Borg-Warner's primary goal. Instead, they switched to a midsize CVT for front-wheel-drive cars with 1,100-to-1,600-cc engines. That lured Ford into the project, since such cars represent 40% of the European and Japanese markets. The CVT is a natural for this application, notes Van Doorne's Hamstra-Pik, because when conventional automatics are upgraded to improve fuel economy by adding an automatic overdrive, they become too big and too heavy for most front-wheel-drive cars. This approach works well, however, for the rear-drive cars that predominate in the U.S.

The Fiat-Ford-Van Doorne team has also developed a new coupling to disengage the CVT when a car stops. Previously, it had been a centrifugal clutch,

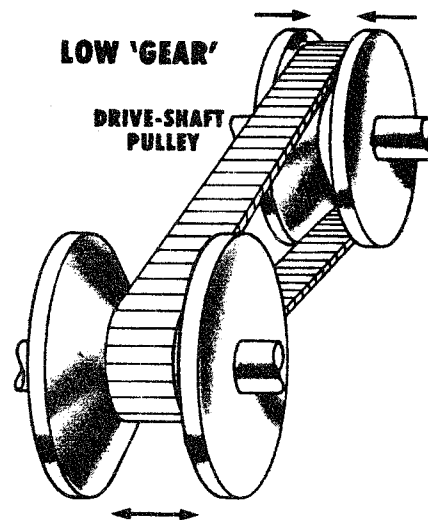
**HIGH 'GEAR'**



## HOW THE CVT SHIFTS 'GEARS'

*To shift into low gear, engine pulley spreads apart, dropping metal belt lower in its V-shaped groove. At the same time, drive-shaft pulley closes, forcing belt to ride higher in its V-groove. To go into high gear, the procedure is reversed.*

**LOW 'GEAR'**



Ford, and Fuji will be buying belts from Van Doorne, the Dutch company's production plans should be a good indication of the carmakers' preliminary outlook on CVTs. Boasts Hamstra-Pik: "We expect to be making a million belts annually within five years."

**SLOW DEVELOPMENT.** Van Doorne anticipates that its cash flow will finally turn positive in 1985. The company might have hit breakeven earlier, had it not been for the setback suffered when Borg-Warner Corp., which also bought a 24% stake in Van Doorne at the same time as Fiat, decided in 1982 to pull out of the automatic-transmission business. Richard C. Curran, president of Borg-Warner's Transmission Group, says that decision was made because the European market for automatics was slower in developing than had been expected. "Along with that," he adds, "many of the vehicle builders decided to make their own transmissions, so the volumes just weren't worth our staying with it."

Only two years before Borg-Warner backed off, John S. Ivey, then director of product planning for transportation equipment, had gleefully predicted that the company would be churning out CVTs that would "displace everything else," starting in 1983. The Chicago company planned to spend roughly \$50 million to tool up a plant in Wales to build

British Leyland, and Renault and Volkswagen have a joint program under way.

Detroit's attitude toward the Van Doorne CVT, meanwhile, has gradually shifted from cool to hot at both General Motors Corp. and Ford. Early reservations eased following extensive field tests of CVT-equipped Fiats sold to people who agreed to periodic monitoring and after a major improvement that smoothly transfers power to the wheels. As a result, a race is on to see which European subsidiary can get a CVT into production first. Robert A. Lutz, Ford's executive vice-president for international operations, is confident that his company's 1986 target will beat GM. The race is a sporting one for now, because the competitors are going after different segments of the European market.

GM is investing \$180 million in its Hydramatic Div. plant in Strasbourg, France, where it will build CVTs engineered for cars with engine displace-

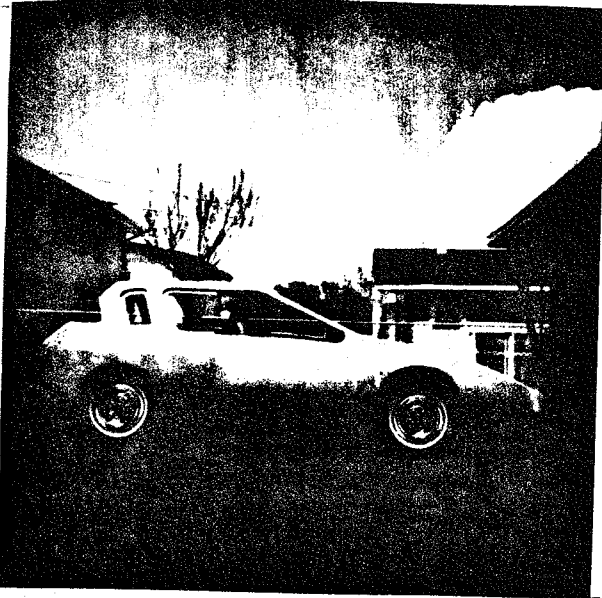
which meant the engine had to rev up a bit before it would engage—and then it did so with a lurch. Most drivers of Fiat's test cars complained of this erratic startup. A so-called multiplate clutch, which engages smoothly and promptly, solved the problem. Fuji tackled it by licensing an electromagnetic clutch from Mitsubishi Electric Corp. "If you rode in a car with the [CVT] transmission today," says Borg-Warner's Curran, "you'd sense quite a bit of difference from what was there two years ago."

Ironically, just when the CVT seems ready for a payoff, the Van Doorne family was forced to sell its remaining 39.5% share last year to raise capital for production tooling. To ensure that the company and its technology stay in Dutch hands, the government, which owns a 12.5% share and has lent Van Doorne \$8 million, arranged for Volvo Car, 70%-owned by the Dutch government, to buy out the family for about \$8 million. ■



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FOR SALE '75 Ford Pinto - two-door - Engine and the exhaust and fuel systems have been removed. Would like to get \$500. By Richard Cole - 682-9317 or 665-8045

TOWING If you have any towing needs or problems, call Dana Mock (312) 759-8033

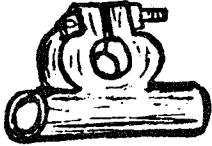
FOR SALE I have a 1975 Citi-Car SU-48 with 5148 miles. The batteries and electric contact switches were replaced last year, so I believe it has a lot of use left in it. Plastic side windows are opaque from age and the body has one crack in the rear fender. Asking price is \$2500. Ken Dunn 5476 S. Woodlawn, Chicago 60615 Phone (312) 241-6616

FOR SALE "I have a 1973 Subaru for sale. It has been converted to electric and data on it is as follows: 1973 GL1400 Subaru Coupe, 86,258 miles. Converted, using a 2LM77 GE motor/generator - Eight Gould 220 6 volt batteries. On board charger. Voltage switching speed control thru high amperage solenoid relays. Control and charger are home-made. Body is in good condition. Interior is in good condition except for one seat cushion. Six wheels and five tires. Spare clutch plate. Complete circuit diagrams, drawings of mechanical conversion parts, and a Subaru Manual. Tow-bar included. I am asking \$1500. Someone capable of arranging a solid state control for the vehicle could greatly extend its capability". Paul L. Hatleberg - 2027 Meadow Dr. Beloit, WI 53511 Phone (608) 362-6752

ITEMS AVAILABLE AT THE CLUB

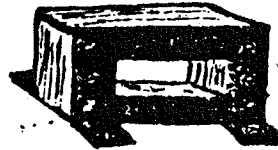
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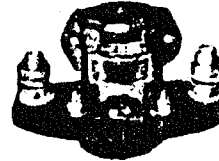
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