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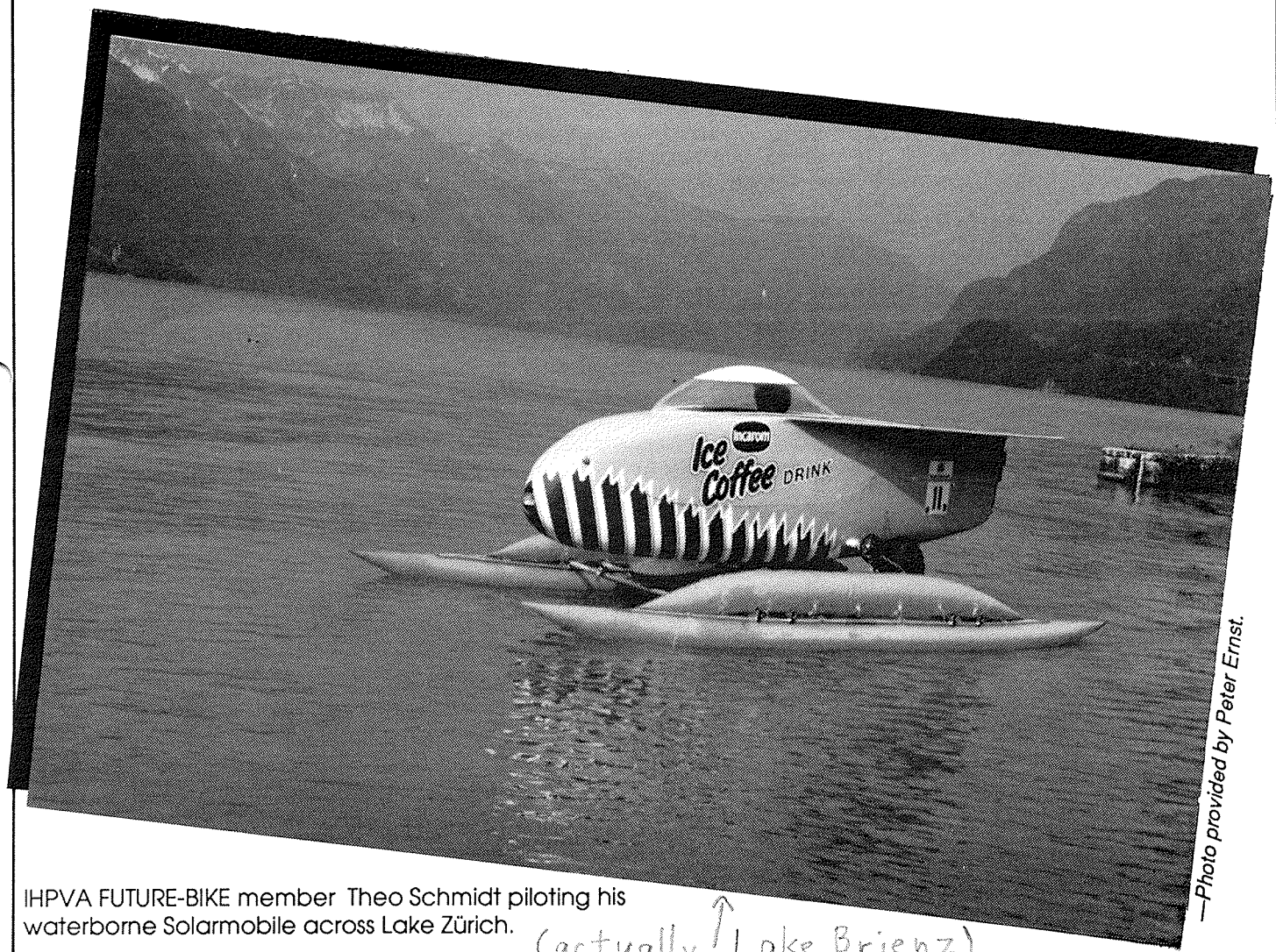
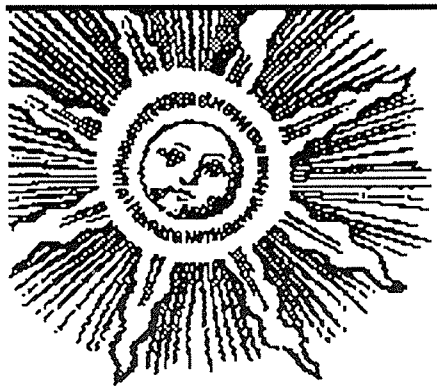


—Photo provided by Peter Ernst.

IHPVA FUTURE-BIKE member Theo Schmidt piloting his waterborne Solarmobile across Lake Zürich. (actually ↑ Lake Brienz)



Retrospective: Tour de Sol 1987

29 June - 4 July

by Peter Ernst, Biel, Switzerland

The trend of the always winning star teams has been broken. This year's 441 km (274 mile) solar trek across Switzerland, Austria and Liechtenstein took place under the sign of unexpected outsider victories—with well over 100 entries from 5 countries. The most favored teams encountered unexpected difficulties. For the top vehicles the going was dicey since speed limits and traffic laws had to be respected on roads kept busy by commercial and tourist travelers.

The first technical pit stop came after only 14 km (9 mi.) when James Worden's MIT Solectron was beset with motor trouble. Also, quite a number of French and German teams experimented with too many novelties at the expense of reliability. Average speeds in all categories again increased, however. Part of this was undoubtedly because of technical efficiency increase; part because of a week of super sunshine. [Add #118 Sunshine graphic here.] The fastest vehicles reached average speeds of regular automobiles and a few hotheads cashed penalty points for having flouted highway rules.

Again, the 1987 **Tour de Sol** rules distinguished and honored the following vehicle categories with separate prizes:

I Solar racing cars (photovoltaic power only)

II Solarmobiles with pedal plus photovoltaic power

IIIa Production-close prototypes (photovoltaic only)

IIIb Production-close prototypes (pedal plus photovoltaic)

IV Production-close prototypes devoid of solar cell panels (refueling at rest via fixed solar panel arrays)

The winning team *Solaris* (category I) of Axel Krause and Wilfried Schweri made history in the king category—and it could be a worthwhile case study for all future HPV project managers. Last year Axel failed miserably in the **Tour de Sol** because of his poor chassis work, while Wilfried's entry had poor electronics. This year they teamed up, pooling their know-how and resources, and built two identical vehicles. Their collaboration paid dividends ince both cars covered the distance in just over 8 hours total accumulated racing time.*

A similar situation prevailed in Category II where the winner in 1985 and 1986 saw their chances decreased by an outsider team starting for the first time. Again, this victory was a result of the teamwork of German students who debugged and tested the vehicle prior to launching it in a race.

In the following categories, an analysis of results showed that attained speeds decreased with added seats, weather protection, passenger comfort, etc. Thus, those vehicles close to mass production (having all the features spoiled automobile owners desire) were slow or did not finish for lack of energy range! The true lightweights with pedal assists came out on top.

To close the overview, in the "topless" category, we saw the smiling face of retired Swiss formula one Grand Prix driver, Marc Surer, take the honors on a stylish, single-seater, 3-wheeler produced by HPA pioneer Max Horlacher.

A final remark on achieved vehicle reliability: About 60% of the teams starting in Biel reached Arosa and were classified. The others either failed because of technical difficulties or lack of propulsive energy. This rather high dropout rate was in part excusable only because of the sharply accentuated "alpine" routing profile. A total of 3000 accumulated altitude meters (9843 ft) had to be climbed. The ultimate test came with the last leg rom Chur to Arosa—a distance of only 30 km (18.6 miles) required a climb of 1144 m (3753 ft)—and this was the undoing of quite a few solarmobiles which had hoped to reach the mark of "alpine excellency!"**

Indeed, solarmobile racing is at a crossroads. On the one hand several countries have followed suit and there are now a dozen of more or less international events on the calendar—not the least of which is taking off on 1 November 1987 in Darwin for a 3200 km (1990 mi.) trek across Australia. On the other hand, the trend points towards professionalism—favoring large and expensive craft with bellies full of heavy batteries in utter disregard of pedal power. Actually, future solar races should be started with empty batteries and optimized human power since we can count on the latter, but usually find ourselves living in less than ideal solar conditions.

Once more our efforts should be concentrated on optimal efficiency of components, lightweight construction with, say, a maximum of 20% deadweight taken up by batteries, not speed considering designs capable of winning on a time basis, but on an overall energy-balance basis.

In this dark age of bike bans in automobile infested cities we should not hesitate to call true progress by its rightful name. In solarmobile terms it must bring about the elimination of supporting crews following the race in heavy automobile convoys! It must include the expulsion and relegation of pure solar speed vehicles to closed-loop speedways. It must reserve road competitions for leisurely and practical road-certified solar HPVs, which by climatic definition should be capable of dealing with "gray" weekdays.

In such practical terms, the true winner of the **Tour de Sol 1987** was #10 *Incarom*, built by Theo Schmidt, whom we all know as a never tiring IHPVA/FUTURE BIKE activist who started in Category II. He was the only competitor having covered the **entire** distance of the race under his craft's power. Indeed, while all the others took the chartered ferry boat to cross Lake Zürich, Theo quitely took out his super lightweight floats and loaded/swam his solarmobile under its own power across the [water] "obstacle..."***

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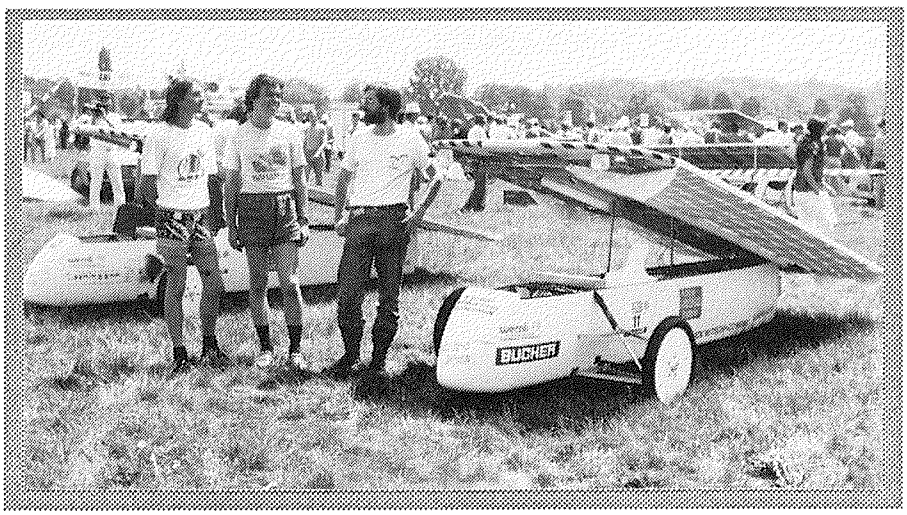
Tour de Sol, *from page 8*

So, in closing, I sincerely hope to see you all after the kangaroo jump across Ayers Rock with your own roadworthy, number-plated HP solar vehicle. When? Well, of course, on D-day minus one—since we should spend a leisurely pre-race day together getting to know each other under the then available sun, charging equitably all the reunited, empty batteries before pushing off jointly into a promising solar future.

* If IHPVA loners are to reach their wildest ambitions, they are well advised to break out of their isolated backyard routines in order to recruit more neighborhood members possessing complementary virtues!

** We are far from rush-hour commuter reliability which is essential for acceptance in daily use—and a lot of development work lays ahead still—if we are to make the giant step from feasibility to marketability.

*** See Theo Schmidt's account of the **Tour de Sol** on page 9 of this issue.



1987 Tour de Sol champs: from left to right, Stefan Brägger (driver of #11), Axel Krause (electronic ace and championship driver, and Wilfried Schweri (chassis builder). Winning vehicle, Solaris (#12) is in background. --Photo provided by Peter Ernst.

1987 Tour de Sol Winners

Overall, First:#12 *Solaris* by Axel Krause and Wilfried Schweri, v_0 = 54.1 km/h (33.6 mph).

Overall, Third#11 *Solaris* by Axel Krause and Wilfried Schweri, v_0 = 52.9 km/h (32.9 mph).

II, First: #89 Oscar V. Miller School, Kassel, Germany, v_0 = 43.3 km/h (26.9 mph).

IIIa, First: #55 Solar Team Zumikon of Michael Lanker, v_0 = 44.4 km/h (27.6 mph)

IIIb, First: #112 Disch Design Team of Rolf Disch, Germany v_0 = 45.3 km/h (28.2 mph).

IV, First: #52 Swiss Illustrated Team of Marc Surer, v_0 = 44.1 km/h (27.4 mph).

Ride-A-Recumbent Event

By Mike Eliashohn

How do you get 1000 people to ride recumbent bicycles? Go to where there are 1000 people gathered for a bicycle event!

That's what the Michigan Chapter of the IHPVA did on 3 July 1987 when it conducted a Ride-a-Recumbent event during the League of American Wheelmen National Rally in East Lansing, Michigan.

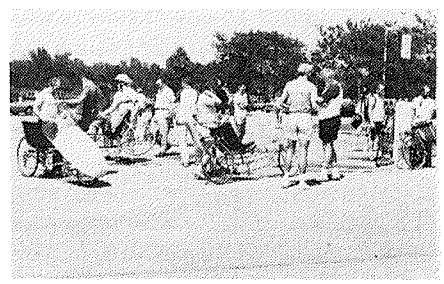
Since the League (LAW) holds its national rally on or close to the U.S.Fourth of July holiday each year, the Michigan Chapter decided to take advantage of the rally being close to home and give those attending the rally a chance to ride 2- and/or 3-wheel recumbents.

Although about 1000 cyclists attended the 5-day rally, hosted by the Tri-County Bicycle Association, perhaps 100 came to the Ride-a-Recumbent offering. an event held for about 2-1/2 hours in a parking lot at Michigan State University.

Tim Lubben, marketing director for Kann Manufacturing (*Linear* recumbents) felt the event was an excellent opportunity to expose that many people to the firm's products in such a short time.

In addition to the 2 *Linear* models, other production recumbents available were 2 new *Infinity* models, 2 older *Infinity* models (1 with the new *Breeze-Eeze* fairing), some *Tour Easys*, one tandem recumbent, and some home built recumbents.

We aren't sure how many "converts" to recumbents there were, but everyone was having a good time. IHPVA president Marti Daily also presented 2 slide shows about HPVs.



Scene at Ride-A-Recumbent event. —Photo by Mike Eliasohn.

Another View of the Tour de Sol

by Theo Schmidt, Frenkendorf, Switzerland

Our annual solar powered race, **Tour de Sol**, was quite spectacular this year. Although the focus is on commuting vehicles, the top racing vehicles always steal the show and the media attention, which however helps to get the environmental message across and to get some respect even from hard core auto enthusiasts. The 6-day race was quite tough with many hills—the last day gaining over 1000 meters in altitude. It is here on winding mountain roads where the leading vehicles regularly outperform even high performance gasoline cars, making a spectacular event, but posing safety problems and detracting from the aim to show that high performance, high speed vehicles are not necessary or good for moving people about.

With the practical vehicles most people are here, also, thinking "car" rather than "bike," with too much emphasis on power and acceleration and safety regulations written for automobiles rather than for light vehicles. A large prize of Fr. 20,000 was given to "the most practical" vehicle, a prize won by a small, 3-wheeled electric car with a few solar cells. Most vehicles were prevented from competing for this prize, given by a chain store, by the requirement to accelerate from 0 to 50 km/h in 15 seconds.

As the weather was good (lots of sun) the human assisted vehicles didn't get near the speeds of the leaders, except for one—a very sleek machine from Gesamthochschule Kassel in Germany, which had linear pedals and a very small frontal area as well as a powerful motor and easily won the class.

My own machine didn't do too well as I had some problems and was simply not getting enough solar energy to go fast. In spite of the very low rolling and aerodynamic resistance, the many gradients really used up the juice, of which I was able to recoup only a small fraction, and the vehicle was a bit overweight and too heavy to pedal decently up hills (used ~ 3.5 kwh for 400 km).

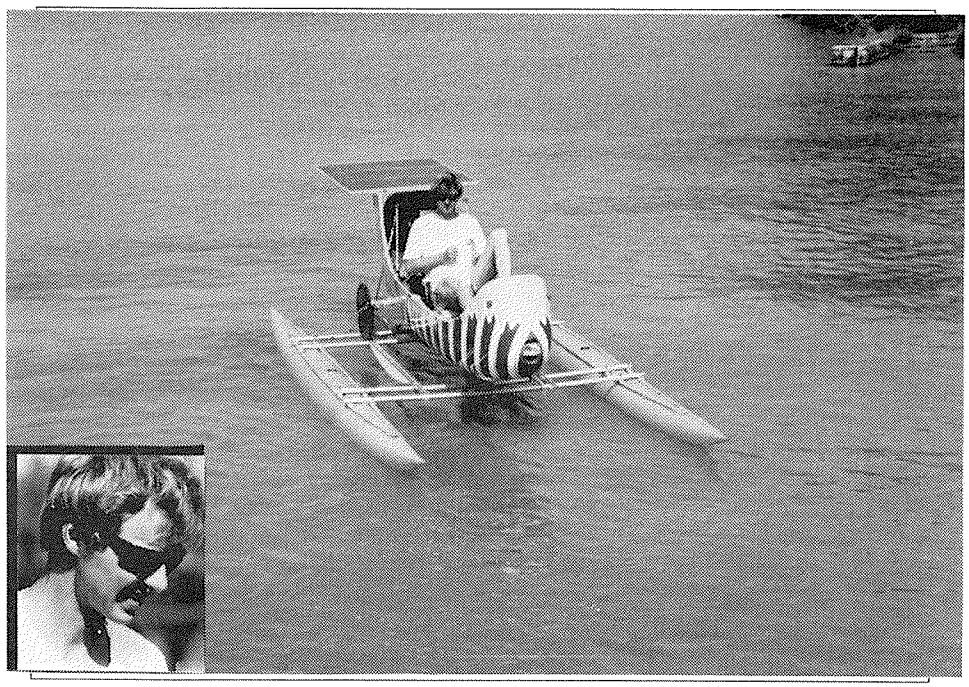


Photo showing Theo's craft, Incarom, "uncovered," on Lake Zürich. --Photo provided by Theo Schmidt. Inset: Photo of Theo Schmidt taken by David Gordon Wilson during IHPSC in Vancouver, 1986.

The course went across Lake Zürich on one day. This was organized using a car ferry, but I couldn't resist crossing under my own steam, using my floats and outboard propeller leg and leg muscles, saving electricity for later. The crossing time for the 3 km was about 30 minutes—excluding a repair en route. The boat parts could be taken aboard the solar powered vehicle on the road, but I didn't do this and nobody was interested in the concept.

This experience has prompted me to rethink my Channel crossing (London to Paris) with the semi-amphibious tricycle.* I will try to do the stunt under solar power, but only do the water part. This will make organization a lot easier and a solar crossing would probably be the first on water. Although the boat (which I am just completing) also has linear pedals, can most sensibly use some batteries and can sail using kites, I will try to do the crossing under pure (direct) solar power for record purposes. The 360 W panel will generate enough, even in cloudy weather, to keep going. The boat is completely portable (I must get it to Britain on a train) and I hope to be able to tow it behind a bike as well. The chances of a successful crossing are not that good as I need good weather and it is getting late in the year. Next year I must give back the panel.

It is a pity that solar boats are so expensive—making impossible their use for areas in the Third World countries where they would be most useful.

[Editor's note: This account was a letter from Theodor Schmidt to David Gordon Wilson, August 1987.]

*Note: Theo attempted to pedal from London to Paris last year, but was held up at the Channel by a 3-day storm, and gave up. He had inflatable floats on outriggers attached to his bike as well as a deployable propeller. [Information provided by David Gordon Wilson.]