The Journal of the Electric Boat Association
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Volume 20 Number 1 Spring 2007

Electric Boat NEWS

Broads Authority

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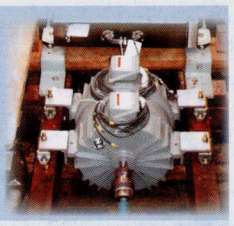

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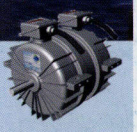

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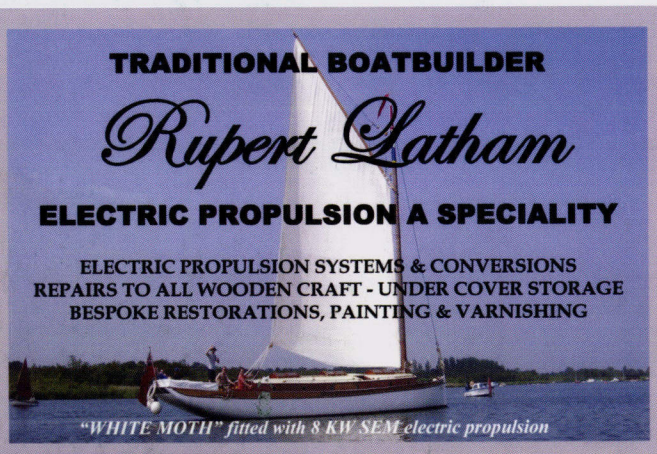
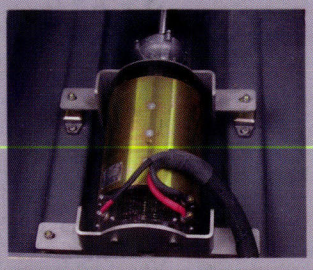
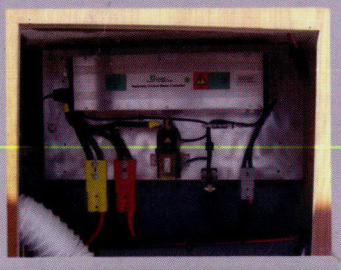


"WHITE MOTH" fitted with 8 KW SEM electric propulsion





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Canal challenge ***Page 2***

Speed challenge ***Page 7***

Design challenge ***Page 15***

EBA Calendar

May

12th – 13th	EBA Event	Cambridge/Wicken Fen Cruising Weekend
26th – 28th	EBA represented	IWA National Trailboat Festival Grantham Canal, Lincolnshire
30th – 2nd June	EBA represented	Royal Bath and West Show Shepton Mallet, Somerset

June

8th – 10th	EBA represented	Beale Park Thames Boat Show, Lower Basildon, Berkshire
30th	EBA Event	AGM Bourne End followed by a Thames Cruise

July

1st	EBA represented	Steam and Electric Boating Festival Sudbury, Suffolk
4th	EBA Event	President's Pimms Party, Henley on Thames
14th	EBA represented	River Festival, Evesham
21st – 22nd	EBA represented	Thames Traditional Boat Rally, Henley

August

25th – 27th	EBA represented	IWA Festival St. Ives, Cambridgeshire

September

8th	EBA represented	Green Boat Show, Salhouse Broad
8th – 9th	EBA Event	Norfolk Cruising Weekend
22nd – 23rd	EBA represented	Somerset River Festival Taunton

October

tba	EBA Event	Laying Up Supper

This is a provisional calendar and events and dates may change. For more details of the above, or notice of other events, contact the Secretary or check the EBA website.

Cover Picture: ***Sun21* crossing the Atlantic**
Photo: Alberto Mosteirin

Contents & Editorial

Contents

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Tel: 01491 681449 e-mail: mail@eboat.org.uk

Details of the other EBA Committee Members are on page 20.

Copy Deadlines:

Material to be considered for inclusion in the next edition of Electric Boat News should be sent to the Editor (preferably by email) by the following date:

Summer 1st June

Although it didn't get quite as much publicity as the one about road pricing, the Save our Waterways petition on the Prime Minister's website reached 7,205 signatures before it closed on 21st February. EBA members have joined other campaigners in further protests about the cuts in waterways funding and a large number of MPs of all political persuasions have become involved in the debate. Over the weekend of 3rd and 4th March, despite dreadful weather, many boating enthusiasts joined walkers, anglers, cyclists, horse riders and local businesses to demonstrate how many people use and value their local waterways. As the weather improves and the boating season gets underway there will be many more opportunities to continue the campaign.

It is disappointing that so far there hasn't been much publicity – in the UK at least – for the first crossing of the Atlantic by a solar boat. EBA President Malcolm Moss, who made the first solar powered crossing of the English Channel, was among the first to congratulate the team behind *Sun21* on behalf of the EBA. Their achievement has proved that solar power is a practical technology for the boating world and one which will become increasingly important in the future – as is demonstrated by the growing number of solar powered or solar assisted boats featured in EB News and on the EBA website.

Sylvia Rutter

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Solar Barge on a Shallow Canal

EBA member Chris Evans describes an impressive boat – and a challenging journey.

Bow view of Solaris, showing the catamaran configuration of the hulls

I was born in Windsor and became infected with the River Thames Bug at the tender age of four, when my older brother and I lifted the family zinc bathtub off its hook on the outside wall of our house and used it as a boat to explore Windsor's flooded streets in 1947. Like malaria, the infection can be controlled but never eradicated.

In 1980 – along with many others – I was badly hit by the poor economy of the time and left these shores. I found a home in Germany as a 'Liedermacher' (singer/songwriter) and married my German wife in 1991.

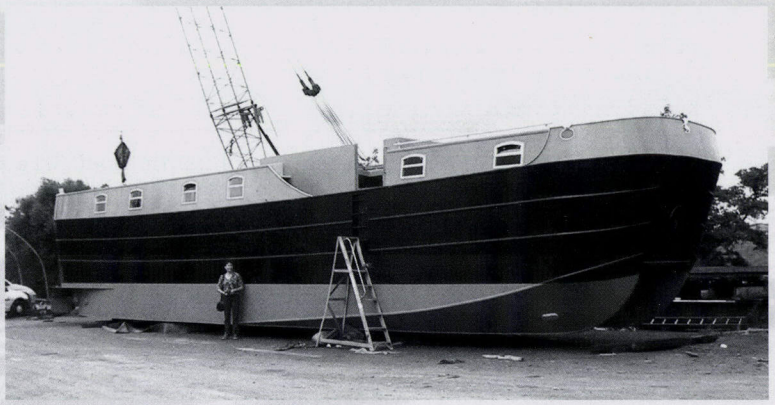
Facing early retirement, I thought of buying a cabin cruiser which we could use on the Thames during our frequent visits to the UK from our home in Bavaria. So it was that I bought *La Petite Souris*, a pretty James Taylor of Chertsey 30 ft by 9ft craft, built in 1953 of mahogany with a hard chine hull. She was in need of some serious attention which kept us busy for the next couple of years. Power came from a smelly old Perkins 4108 diesel motor which spewed filthy black oil into the bilges every time it was used, and was also extremely noisy so it had to go. The obvious replacement was electric and Rupert Latham in Norfolk sold me a package which I installed myself: a 6 kW SEM motor with about one ton of batteries wired to provide 72 volts with around 600 Ah capacity. A full charge gives about three days' cruising, depending on cruising speed of course, and I am delighted with the conversion. Two solar panels on the cabin roof provide a maximum of 100 watts which is sufficient for the domestic 12 V circuit.

With this new toy we spent most of our time on the river when in the U.K. and our house in Maidenhead was more of a liability than an asset, so I had the idea of building something large enough to combine the joys of boating with the comforts of a house. Over the winter of 2004/5 I spent many hours at my drawing board developing ideas for a suitable craft. It would be steel and must have all modern conveniences. My original plan was to fit a single diesel engine supplemented with an AC generator, but I was so impressed with the electric conversion of *La Petite Souris* that my thoughts turned to electric propulsion. Hugh Swann of the Solar Boat Company at Reading suggested including solar panels which appealed very much and this became my choice.

Having decided on electric propulsion, I looked at minimising water resistance and the idea of a catamaran hull was born. The new design came out at 60 ft long by 13 ft beam with 2ft 6 in draft. Each of the twin hulls is 4 ft wide with the bridge deck 1 ft above the waterline. At the stern is a poop deck extending to the sheerline of the hull and below decks a master suite, guest cabin, galley and lounge. With bridge clearance in mind, ballast tanks to contain about 7.5 tons of water were incorporated to lower the boat on to its bridge deck and reduce air draft by 12 ins.

Solaris has four Lynch motors of 15 hp each giving a total of 60 hp. Two motors are connected with a chain drive which gives a 2:1 reduction and turns a 17 in propeller through a Stillete drive leg (like the lower leg of an outboard motor). The drive leg allows the motors to be mounted right aft. They are powered by 3 tons of lead acid batteries wired to produce 1000Ah at 48 Volts. Four Zivan battery chargers produce a total of around 230 Amps. These are supplemented with four Outback inverter/chargers which can produce 5 kW of charging power, and 11kW of domestic power. Solar panels will provide about 2.4 kW peak. For extra power a 14kW encapsulated diesel powered generator is installed beneath the wheelhouse floor. *Solaris* will have electric cooking and heating, a washing machine and a fridge/freezer. The Outback inverter/chargers are connected to the generator and Zivan chargers and the sophisticated solar panel controller via a 'Hub' which manages them all and can be programmed to work automatically, starting the generator, for example, if the battery voltage drops below a determined level.

A 'sailaway' version of the boat for me to complete myself was custom built by RLL Projects of Bristol. As transport of such a large vessel by road to Maidenhead was difficult, I decided to take *Solaris* (minus the wheelhouse) to the Thames by water via the River Avon and the Kennet & Avon Canal,



Side view of Solaris with Chris' wife Gabriele giving size perspective

allowing two weeks for the journey. So last September my nephew Andy and I began the eventful trip, accompanied as far as Bath by Hugh Swann, giving the motor installation a proper trial. All seemed to be in order and the following morning Andy and I set out on the Kennet & Avon.

Early morning joggers and the occasional cyclist stopped wide-eyed at the sheer size of *Solaris* and expressed amazement that she was powered by electric motors. At a small marina onlookers called out "Where are you going?" "Reading – and the river Thames" replied Andy from the foredeck. "Thank the Lord for that!" came the reply, accompanied by laughter from the group.

Our first major obstacle was a moored broadbeam barge. We had to pull over to the side of the canal to get past but there was not enough water and we became stuck. We were saved by the crew of a hire boat on a 'men only' cruise who untied the moored barge and manhandled it around us over the shallower water, allowing us to pass.

There were many jokes shouted over to us: "Dover is that way", "How many cars are you carrying?" but for all the joviality I was feeling very stressed and tired from the high level of concentration required to navigate the hazards that presented themselves at every turn. The catamaran hull had a particularly frightening trait of slewing the boat to port or starboard as either of the hulls made contact with the bottom of the canal, which was particularly worrying when passing other moored craft. It was slow progress and quite nerve wracking. Sometimes we stuck on the bottom and were able to proceed the next day when the water level rose a little, but we were sliding through the silt almost all the time.

When we became stuck fast at Hilperton near Trowbridge I phoned British Waterways and within the hour three men turned up in a 4x4. They told us that because the canal was man made it relied on water being pumped into it to maintain levels, which dropped through the day as locks were used. This explained why we tended to run aground early in the afternoons. They arranged for extra water to be pumped in overnight, and the next morning we were able to force a passage over this particularly shallow spot.

Ahead lay the lowest bridge of them all. Having been warned about it, I had done some measurements which confirmed that with the tanks flooded *Solaris* would just get underneath, but nevertheless we approached with great apprehension – theory is one thing, reality another. I went below and opened the valves to flood the tanks and the water gushed in. To the amazement of the onlookers we passed underneath the bridge with just two inches to spare. We were delighted with this success but soon had to get the pump going to raise *Solaris* to clear the shallow water that lay ahead.

We now started to encounter swing bridges which Andy, proceeding ahead of *Solaris* on a bicycle, unlocked with a borrowed BW key. Ballast tanks again had to be flooded for us to pass under an arched stone bridge.

Then came a flight of four locks a couple of hundred yards apart and, with water levels lowered by traffic, we were soon fast aground in front of the next lock gates. Our solution was to flush water through by opening a sluice in the top and the bottom gates at the same time. This solved the problem but only temporarily as the water level on the next reach was lowered. We persevered and finally emerged from the fourth lock, but again by early afternoon we were firmly aground once more and forced to relax with a (very welcome) beer or two. Fortunately there was just enough room for other barges to pass us.

The water level was up a couple of inches the next morning and we were able to get underway with a bit of to-ing and fro-ing but at Martinslade, between Melksham and Devizes, we were faced with a very tricky bridge on a sharp bend. We tried flooding the ballast tanks but became firmly wedged with the cabin roof against the archway, the port hull against the towpath wall and the starboard hull sitting on the bottom. We had met our Waterloo!

For about four hours, with the help of a BW safety engineer, we tried to move *Solaris*. Finally, with four heavy people pulling down on a balk of timber pivoted against the rim of the not yet present wheelhouse and all motors going astern the boat moved an inch or two. With a whoop of delight we continued to apply the technique and managed to extract *Solaris* from the bridge hole.

The next morning we set off once again – in reverse, and returned to Hilperton marina where *Solaris* was craned out and taken by road to Shepperton. We then had a pleasant cruise up the Thames to Maidenhead – a great contrast to our challenging 20 miles on the Kennet & Avon.

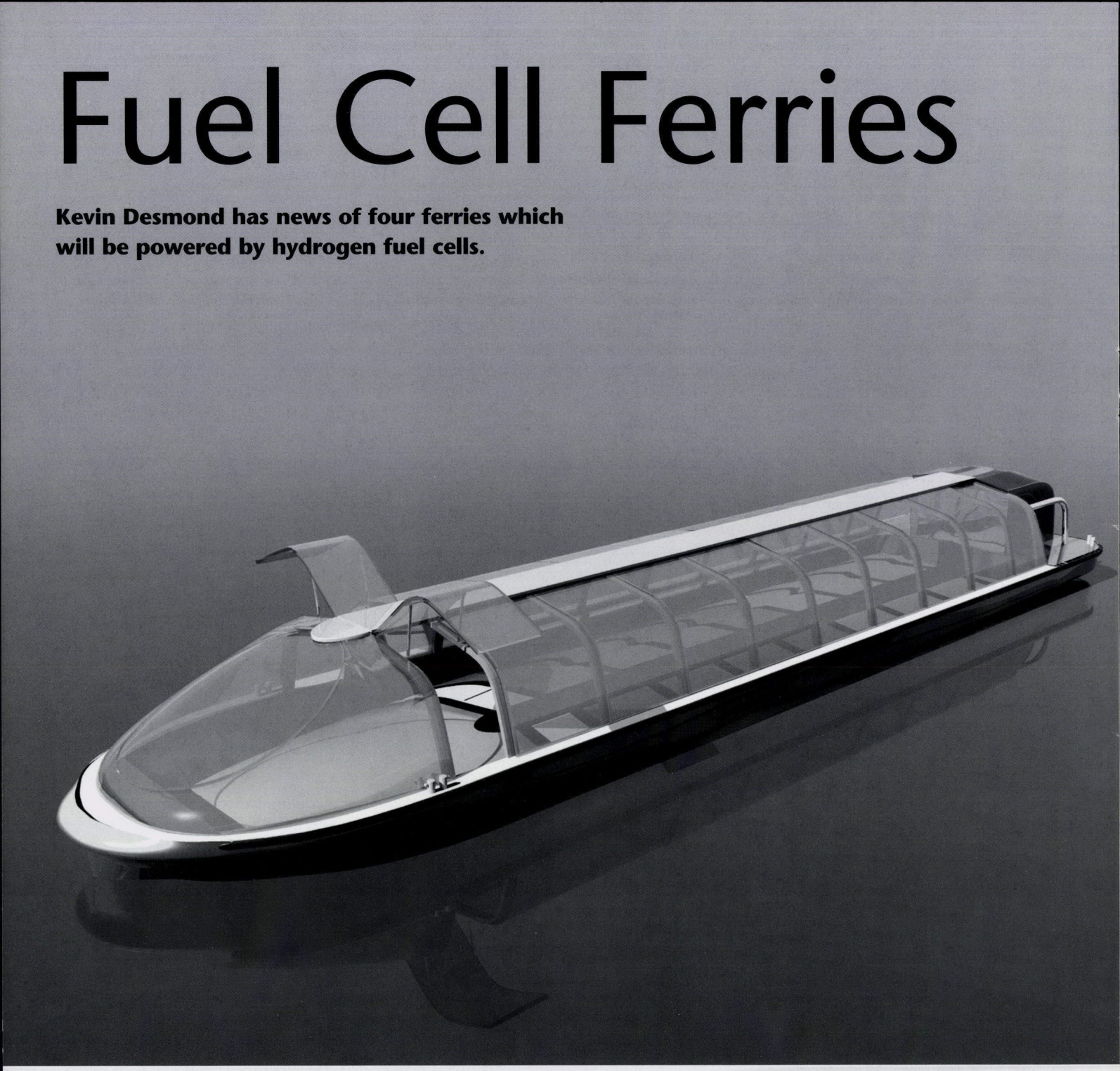
The following week I began to install the wheelhouse, which I had built in my back garden earlier in the summer. With the help of my wife I had the sides in place and a roof on within the following two weeks. The double glazed windows were installed and *Solaris* was laid up for the winter while I went back to Germany for some rest and recuperation. I plan to return in the spring, refreshed and eager to continue with the fitting out.

Solaris being craned out for transport by road to the Thames

Solaris as she is now with the wheelhouse installed

Fuel Cell Ferries

Kevin Desmond has news of four ferries which will be powered by hydrogen fuel cells.



Hydrogen powered ferry from Fuel Cell Boat BV

This February, it was announced that Fuel Cell Boat BV, a consortium of Dutch companies, was developing a vessel with a hydrogen fuel cell as its power source for the Anglo-Dutch oil company Shell. The boat is being designed by a small naval architectural practice in the Netherlands and is expected to be ready for service in 2008. The fuel cell system on board will provide a total of 65kW of energy, but it is not yet clear whether this will be provided by a single large unit or a number of smaller fuel cell modules. Once the craft is completed, it will be rigorously tested by the classification society Germanischer Lloyd and approved by the Dutch government, prior to entering service with Shell.

Apart from the fuel cell craft itself, the other key feature of the project will be the construction of a hydrogen station akin to a petrol station, at which the vessel will be topped up with hydrogen once a day. The hydrogen required will be produced by electrolysis using electricity generated by a wind farm in the North Sea, making the process 'green' from production of the hydrogen right through to its consumption onboard.

Shell in Amsterdam will use the vessel to transport its employees to and from work over the river, between Amsterdam Central Station and the Shell's New Technology Centre. Amsterdam-based shipping company Lovers will acquire and operate the boat.

The consortium responsible for the project includes Alewijnse, Integral, Linde Gas, Marine Service North (MSN) and Lovers.

The Dutch Ministry of Economics has provided a subsidy for the development of the vessel. Alewijnse specialises in onboard electronics, Integral will be responsible for project management, Linde Gas is responsible for production, storage and distribution of the hydrogen and MSN is responsible for the mechanical engineering on board.

Elsewhere this summer a 100-passenger fuel-cell ferryboat will go into operation on the Alster lake in the centre of Hamburg, Germany. The green ferry is part of the 5.2m Zemship project which involves nine German and Czech partners and is led by Hamburg's State Ministry for Urban Development and Environment. Proton Motor is building the drive train using an existing bus fuel-cell adapted for marine requirements. The ferry will not only operate on the Alster, but also on the River Elbe, within the port of Hamburg. Fuel will come from compressed hydrogen, at 350 Bar. The refuelling station for the ferry will be located in Hellbrokstrasse at a depot of Hamburg's public transport operator Hochbahn, directly on the Alster, with hydrogen being taken directly from an LH2 storage tank at 8 Bar pressure. The project will demonstrate the safe application of a 'Ship of the Future for Europe' with zero local emissions, low noise, high energy efficiency and no risk of water pollution. Following the Hamburg project, further fuel-cell powered ferries are planned for Bratislava and Prague in the Czech Republic.

Norsk Hydro has started work on a hydrogen ferry for Norway. The fuel cell ferry is being built in co-operation with Marintec at NTNU in Trondheim and is part of the Nordic H2 Energy Foresight Action plan. Originally the intention was to get an overview of the technical changes necessary to convert an existing ferry into a hydrogen ferry run by fuel cells. After some time, the goal of the project was redefined and widened to questions concerning the use of hydrogen in marine transport in general. That is, the focus is no longer only on ferries, but also on ships, submarines, barges etc.

Last but not least, a 50-seat fuel cell ferryboat is being planned for Cardiff Bay, the home of the Welsh National Assembly and the Wales Millennium Centre. This project, from the University of Glamorgan Hydrogen Research Unit, has the backing of the Welsh Development Agency and a boat operator already running a diesel powered ferry in Cardiff Bay. It is still awaiting sufficient funding before it can go ahead. Anyone who can help with ideas for funding should contact Professor Dennis Hawkes on dlhawkes@glam.ac.uk or telephone 01443 482212. **For more information see www.serc-wales.org.uk**

News

Grantham on Water

The East Midlands Development Agency has confirmed a £350,000 grant to re-open a three kilometre unnavigable stretch of the Grantham Canal between Woolsthorpe and the A1 in time for the Inland Waterways Association National Trailboat Festival over the Spring Bank Holiday.
The grant, awarded to the Grantham Canal Restoration Society, will make seven kilometres of canal available for the festival.

Built in the 1790s to link Grantham with the River Trent, the 33-mile canal was closed to navigation in 1929. Campaigning for restoration began in 1969 and improvements costing over £6 million have been made in the last 15 years. But with the recent cutbacks in British Waterways funding there are fears that restoration work may be halted, which is why the organisers are particularly keen to see large numbers of boaters and friends at the festival at Woolsthorpe Wharf, Woolsthorpe-by-Belvoir, five miles west of Grantham, Lincolnshire from 26th to 28th May. The EBA stand will be there to promote electric boating and EBA members, both with and without trailable boats, will be very welcome. Manned slipway facilities for boats up to 31 ft long are available if booked in advance.

Boat, exhibit and camping enquiries to Dave Carnell on 01469 630138. All other enquiries to Chris Tizzard on 0115 953 1153. More information on the website www.granthamcanal.com.

Tom's Top Award

Boating Instructor Tom Sowerby has been named RYA Inland Waterways Instructor of the Year 2007. Tom, a Senior Instructor at Bisham Abbey Sailing and Navigation School, received his award at Alexandra Palace on 3rd March. Roy May, owner of the Sailing School, who nominated Tom for the award said "We were delighted to hear Tom's hard work had been recognised with this award, particularly after the School's recent short-listing in the Service Category of the Motor Boat of the Year Awards 2007".

New Battery Chargers

Chloride Motive Power has launched a new range of high frequency battery chargers which are lighter than conventional chargers, weighing up to 8.5 kg. The 2100 range can charge a variety of traction battery types including flooded lead acid, low maintenance and gel. The chargers continually monitor the battery to regulate the charge to an optimal level and have a tri-coloured LED to show the charging status. The SP version can be wall mounted, bench mounted or free standing while the OP version can be installed on the boat. The chargers are connected via a normal 13 amp 3 pin plug to a single phase power supply.
For more information contact Elaine McLeod on 01204 661212 or email elaine.mcleod@eu.exide.com

Stratford TV Star

EBA member David Higgins was caught by surprise (and in his boiler suit) when the crew of the ITV programme 'Heart of the Country' arrived at his house near Stratford-upon-Avon, having been tipped off that he had an interesting boat at the bottom of the garden. David gallantly offered the presenter a trip on *The Princess Marina*, a 26 ft steel riveted ex-Thames launch, which carried tourists at Stratford from the 1930s to the mid 80s and which David rebuilt and converted to electric propulsion. The twenty minutes of silent cruising gave him plenty of time to promote electric boating and demonstrated that the interviewer could almost whisper her words as they made their way upstream.

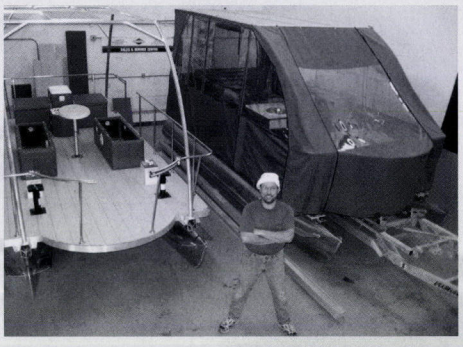
Record-Breaking Boats

Helen Loney, who piloted the electric hydroplane *An Stradag* to a new world speed record of 68.09 mph in November 2005 was the star of the show at the International Materials Handling Exhibition in March this year. Chloride, whose batteries powered *An Stradag* for the record, had invited Helen on to their stand at the National Exhibition Centre in Birmingham to unveil her brand new boat, which she hopes will be even faster. In the picture, exhibition visitors behind Helen and the new (as yet unnamed) boat are studying the report of her record-breaking run on Coniston Water.

EB News Founder Editor, Kevin Desmond, is co-author of a new book about record runs on Coniston, although not under electric power. The book features colour pictures taken by the late Leo Villa, Chief Engineer to Donald Campbell and his father Sir Malcolm, taken with a Stereo Realist camera. The pictures can be viewed in 3D by using the special glasses supplied with each book. **Leo Villa's Bluebird Album (ISBN: 0 85184 071 X) is published by Transport Bookman Publications and available from book shops and from Chaters Motoring Booksellers (www.chater.co.uk). Price £45.**

Developments in Canada

Canadian EBA member Monte Gisborne, whose solar voyage on the Rideau Canal was featured in the last issue of EB News, has joined forces with two partners to develop his business. They have bought a marina on the Trent Severn waterway near Kirkfield where they are building a manufacturing facility, employing 24 to 30 people, for a redesigned version of Monte's solar powered pontoon boat the 'Loon'. The new 22 ft boat will be sleeker and sharper, incorporating advanced hydro-dynamics and ultra-light materials to enable it to move through the water more efficiently. Monte, just back from Mexico's Mayan Riviera, is looking at the export potential of his boats in that country and also at the UK market. He has recently been featured in the Toronto Star newspaper as one of nine entrepreneurs chosen for the Star's 2007 'Build a Business Challenge'.



Monte Gisborne with a Loon under construction for a customer in Mexico

Beale Park Show

A wide variety of boats on land and water will be on show from Friday June 8th to Sunday June 10th in the beautiful setting of Beale Park at Lower Basildon in Berkshire. The Beale Park Thames Boat Show will cater for boating enthusiasts, families and newcomers to boating and will encourage people to get afloat with free boat trips on the lake and the River Thames. The EBA stand will be there, supporting EBA business members who will have boats and equipment on display. EBA members Simon and Pat Davis will be promoting the Rivertime Boat Trust, which is raising money to build a specialist day boat for disabled and disadvantaged children and adults. **Tickets, which include half price entrance to the wildlife park, are £7 for adults and £2 for children aged 2 – 15 with under 2s free. For advance tickets at £6 for adults telephone 0118 976 7498. For more information see www.bealepark.co.uk**

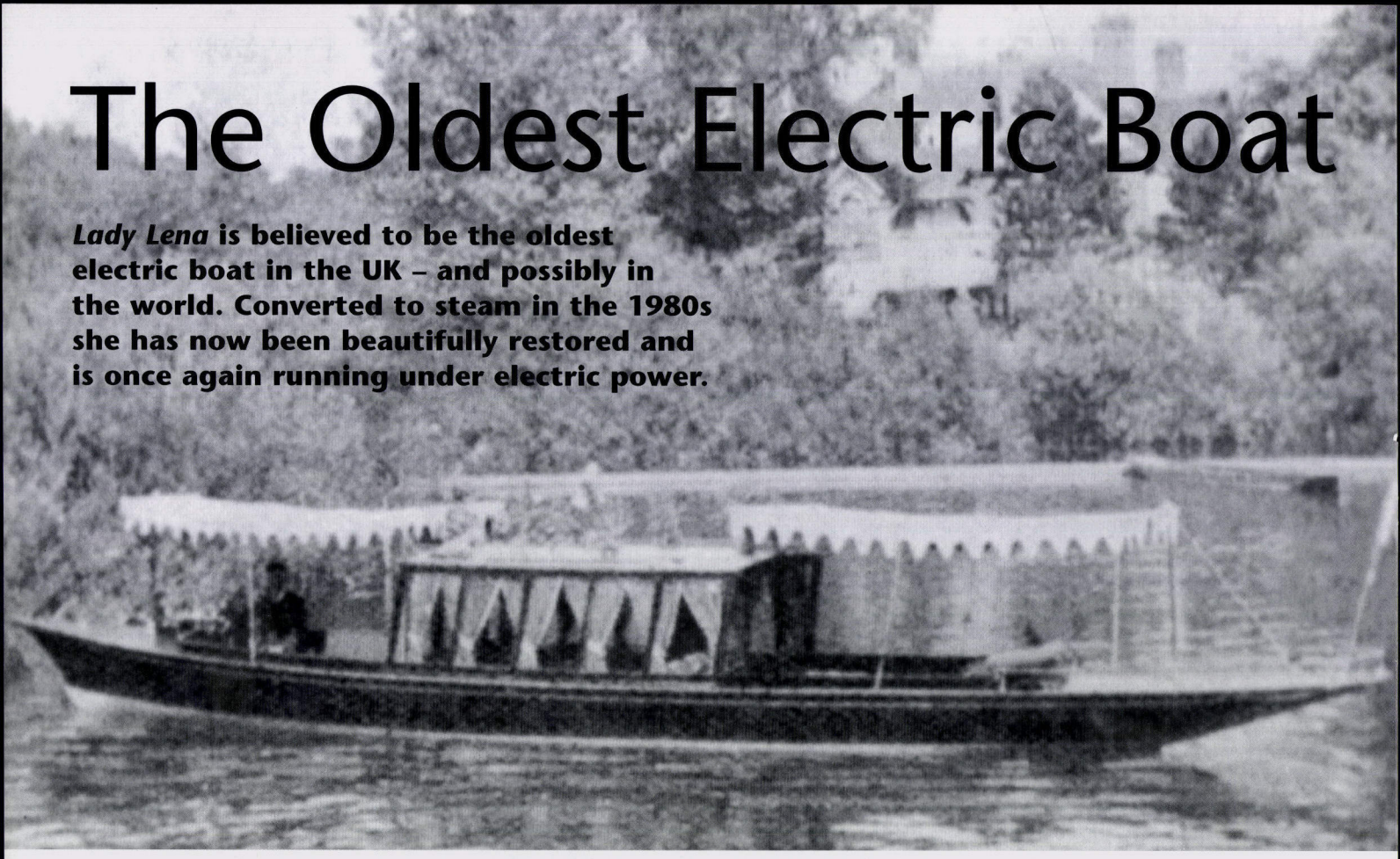
Electric Swans

A Danish company is looking for a business partner for the production and sale of electrically driven boats in the shape of swans. The four-seater swan boats are designed for use in theme parks, and flamingoes (although sadly not grebes) are also available. The factory was established in 1985 by the Danish brothers Ib and Ole Christensen and exports to over 24 countries including the USA, Japan and China.

For more information see the website www.andehuset.com or e-mail rap@andehuset.dk

The Oldest Electric Boat

Lady Lena is believed to be the oldest electric boat in the UK – and possibly in the world. Converted to steam in the 1980s she has now been beautifully restored and is once again running under electric power.



Lady Lena 1904 from the Immisch brochure

CRUISE
ON THE
"OUSE"
THE ELECTRIC LAUNCHES
"LODORE" "LADY LENA" "LORNA DOONE"
Now Running Daily (including Sundays) at frequent intervals :-
Leave Town Bridge for one hour trip 1/-
or half " " 6d.
" Newnham Bridge for one hour trip 1/-
or half " " 6d.
CHILDREN HALF PRICE. ON HOURS TRIP

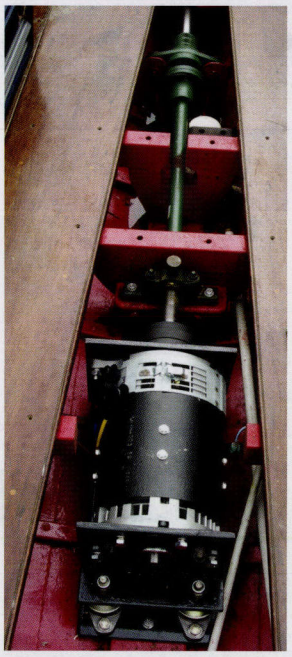
Bedford Steamboat Company advertisement. Bedfordshire Times, supplied by Alan Faulkner

Lady Lena with steam plant installed

Lady Lena was built in 1890 by Burgoine of Kingston-on-Thames for the General Electric Power and Traction Company owned by Moritz Immisch, one of the early pioneers of electric boating. The previous year Immisch had set up a fleet of electric boats for hire on the Thames, operated in conjunction with a chain of charging stations from Richmond to Reading. *Lady Lena*, with an overall length of 41 ft 6 in, beam of 6 ft 5 in and a draught of 2 ft, was carvel built of mahogany on ash frames and with alternate teak and pine planking on the bow and stern decks. In June 1891 she was licensed to operate a river service in smooth waters and to carry 24 passengers. She became a familiar sight in the Maidenhead area and stayed in the Immisch fleet until probably 1914.

In 1919 *Lady Lena* was bought by the Bedford Steamboat Company, along with another electric launch from Maidenhead *Lorna Doone*. These two launches, together with the steamboat *Lodore*, which was converted to electric in 1920, ran a regular service on the River Ouse through Bedford. Starting either from the Town Bridge or Newnham Bridge, the launches carried 25 to 45 passengers and were also hired for private parties.

In 1943 the company was taken over by Mr. and Mrs. E.H. Smith who set up Silvery Ouse Pleasure Craft. Unfortunately, due to neglect during the early years of the Second World War, the fleet lay submerged in a backwater. Only *Lady Lena* was worth salvaging and after restoration she was put back into operation under the new name *Silver Stream*, joining the 25 ft boats *Silver Foam* and *Silver Spray* which had been brought from London and fitted out with electric propulsion. A leaflet issued by Silvery Ouse stressed the comforts of a trip on board the electric launches with no fumes, smoke, vibration or noise.



IAN RUTTER

New electric motor installed

Silver Stream was taken out of service in 1963 and the hull, minus all machinery apart from the rudder and steering gear, was rescued from the river bank by Peter Bridge of Cotterstock near Oundle. After several years of storage in his back garden she was bought by her present owner Jenkyn Knill and rebuilt by Terry Hardick of Bath Boating Station between 1980 and 1982. Jenkyn gave her back her original name and converted her to steam.

In 2003 Jenkyn decided to return *Lady Lena* to electric propulsion. The heavy steam plant was removed and in 2004 the Thames Electric Launch Company installed a 4.5kW Sepp-Ex system with 16 Chloride batteries and a Curtis controller. Jenkyn, having researched old photographs of the original boat, then built a replica cabin and returned the helm to its original position in the bow. The newly restored electric launch made her maiden voyage on the Kennet & Avon Canal near Bathampton on 19th January this year.

Information on the history of *Lady Lena* from Jenkyn Knill and from Edward Hawthorne's book 'Electric Boats on the Thames 1889 – 1914'.

IAN RUTTER

Preparing to lift out the boiler

IAN RUTTER

Removing old steam clips (batteries in temporary installation on old boiler tray)

ROBERT COLES

The restored boat

Sun21 arriving in Martinique

First Solar Atlantic Crossing

The Swiss catamaran *Sun21* has made the first crossing of the Atlantic under solar power. On 2nd February the boat arrived in Martinique in the Caribbean, having covered 3,500 miles from Spain – the first time a powered boat had crossed the Atlantic without using a drop of fuel.

Sun21, launched in Basel on 16th October last year, left the Spanish coast on December 3rd. The last issue of EB News followed her progress as far as the Canary Islands and the start of the Atlantic leg of the journey, on Christopher Columbus' historic route. Having encountered some very rough weather at the start of the voyage, the crew were pleased to report sunshine and calm seas as they set course towards Martinique. On 20th January they watched in delight as around 50 Atlantic dolphins played and danced around the boat. And by evening, for the first time after 'long, shaky days', the crew were able to sit together on the deck enjoying a meal of Swiss 'Rösti'.

By 24th January, crossing the mid-Atlantic ridge – a huge invisible mountain range below the surface of the sea – the solar panels had generated 870 ampere hours in spite of some cloudy days. Meanwhile, as Martinique drew nearer, the crew's thoughts turned longingly to fresh fruit and vegetables and also, with increasing admiration, to the early pioneers Columbus, Drake and Magellan, navigating the oceans without the benefit of modern technology and without even knowing whether they would find land.

At 3 p.m. local time on 2nd February *Sun21* arrived in the harbour of Le Marin in Martinique, having taken just under 30 days for the Atlantic crossing. The total journey time from leaving Spain was 63 days, including stops at Casablanca and the Canary Islands. Their arrival coincided with the publication of the UN report 'Climate Change 2007' and, in the words of crew member Martin Vosseler, 'sent a clear signal about the arrival of the age of solar power'. Several radio and television stations, including those from the French Overseas Service, covered the arrival. The correspondent from the French channel TF1 spent half a day with the crew to produce a report for the main evening news bulletin and on 7th February a Swiss television crew arrived for two days filming. Local dignitaries, politicians and business people, as well as classes from a nearby technical college, came to visit the boat and at an official dinner the crew of *Sun21* were presented with the sailor medal of Le Marin by the Deputy Mayor.

On 12th February *Sun21* moved on to the town of St. Pierre below Martinique's highest mountain, the volcano Pelée. The crew anchored off-shore but when the Mayor and his staff came to greet them the boat was moved to the landing stage so they, and many other people, could come on board and go for short trips.

The journey then continued to the island of Dominica where the boat was taken over by over 200 school children and students under the supervision of Renate Siegenthaler. Originally from Basel, she now runs a project providing lunchtime meals at five Dominican schools so the children can stay at school for the whole day. The young people were very interested in the boat and entertained the crew with dances and songs. On 20th February *Sun21* headed for the small island of Marie Galante in pouring rain and choppy seas. Soon after the arrival in the

harbour of Grand Bourg the mayor came to welcome the crew with a reception and speeches. They were joined by environmental activist Alain Blaze, who accompanied them on the next leg of the journey, a very rough crossing of the Antilles Channel to Guadeloupe. There they were welcomed by the owner of a new guest house who escorted them in his boat through fishing nets and coral reefs to a good mooring. At Guadeloupe there was time for a few repairs and modifications to the boat and detailed checks of both electric motors. And also time to enjoy island hospitality – something of a culture shock to the Swiss, judging by one rather bemused comment: "Now, at midnight, the music goes on and nobody calls the police".

From Guadeloupe *Sun21* set a new course, almost due north, between the islands of Montserrat and Antigua to St Martin, where they moored among the superyachts in the old harbour. North east wind and ten foot waves, as well as a constant stream of visitors and journalists, kept them in port for three days but the crew did find time for a thorough spring clean of the boat. The solar roof was washed with fresh water and two divers scrubbed all the barnacles and algae from the hulls, ready for the next 80-mile stretch of the journey to the Virgin Islands.

Strong sunlight enabled the boat to travel at 6 knots, with the batteries still full when it reached harbour. At St. Thomas Bay the crew were amused to meet the luxury liners *Adventures of the Seas* and *Sun Princess*, both they felt very appropriate names to describe their own journey.

The coast of Puerto Rico was next, with apartment blocks and skyscrapers, and on 7th March *Sun21* reached the Dominican Republic and the beautiful Bay of Luperon. Between here and the Bahamas there was a frightening incident when at night and in rough seas a cargo ship headed for *Sun21* on a direct collision course. Fortunately the noise of its engines alerted the skippers who just managed to get out of the way in time.

Floating through shallow turquoise water along a seemingly endless necklace of small flat islands – Long Cay, Long Island and the Exuma islands, the crew were reminded that Columbus in 1492 had written: 'I simply do not know where to go next' as he navigated between reefs, atolls, cliffs, lagoons and stranded ships. Arriving in Nassau, the capital of the Bahamas they said the boat looked like 'the inside of a potato chip bag', having been splashed with salt water during a six hour crossing in a north wind with high waves. They were pleased to find a lot of interest in their solar power boat from the owners of luxury private yachts and a patriotic welcome from the Swiss butler on board the huge black superyacht *Octopussy*, who greeted them from the upper deck with a big smile and the wave of a Swiss flag.

Sun21 has been travelling at an average speed of four knots in deep water, covering around 100 nautical miles a day. Average prop speed with the two Agni 8 kW motors is 315 rpm and the 60 square metres of solar panels produce a maximum 44 kWh per day.

On 29th March, after a calm and sunny crossing to Florida, *Sun21* arrived at the Miami Yacht Club, where the crew did several media interviews, including two live shows for the BBC World Service. Plans now are to cruise up the American coastline, with arrival in New York scheduled for 8th May.

You can follow the progress of *Sun21* on the website www.transatlantic21.org.

VIANNEY SAINTENOY

VIANNEY SAINTENOY

The crew of Sun21 in Martinique ***left to right:*** *David Senn, Michel Thonney, Beat von Scarpatetti, Martin Vosseler, Mark Wuest*

VIANNEY SAINTENOY

Sun21 in the harbour of Le Marin, Martinique

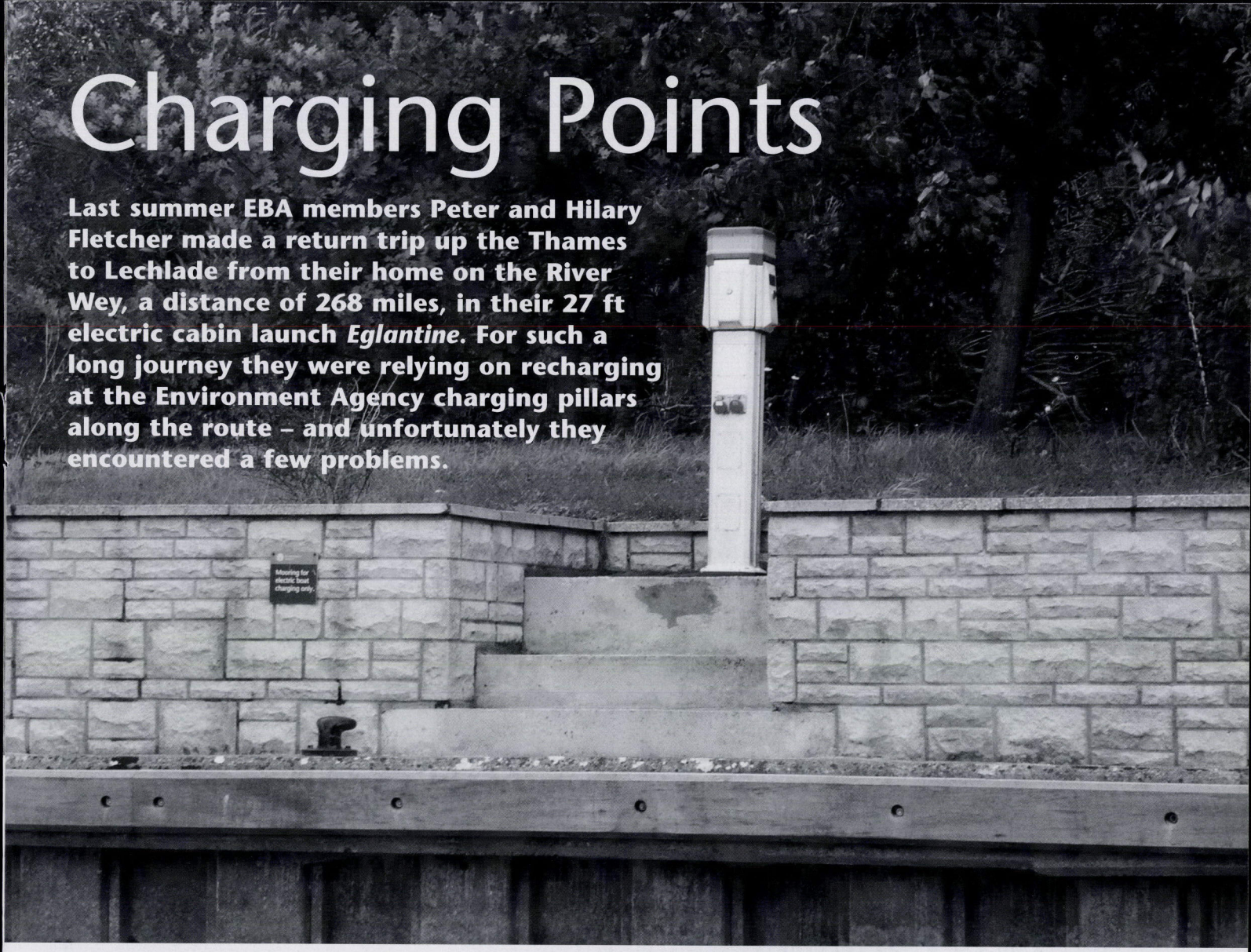
VIANNEY SAINTENOY

Solar roof of Sun21

TRANSATLANTIC21

Renate Siegenthaler and children on Sun21 in Dominica

Charging Points



Last summer EBA members Peter and Hilary Fletcher made a return trip up the Thames to Lechlade from their home on the River Wey, a distance of 268 miles, in their 27 ft electric cabin launch *Eglantine*. For such a long journey they were relying on recharging at the Environment Agency charging pillars along the route – and unfortunately they encountered a few problems.

Eglantine was designed to travel up to 20 miles on one bank of batteries with a second bank in reserve. She has a 4kW SEM 72V motor, a Curtis charger and 72 2 volt cells in two banks of 36. Before embarking on their 3½ week journey, Peter and Hilary did some initial trials of one and two-day outings, charging the batteries at home, at Pyrford Marina and at a boatyard at Staines from a direct 16 amp supply with no problems. This gave them the confidence to undertake an extended trip for their summer holiday. They checked the locations of the Environment Agency charging points, which they felt were well spaced. They understood that they had to book ahead by 4 p.m. and buy a card at each lock to cover the charging and mooring fees.

At the first few locks on the Thames they were dismayed to find that the charger shut down after three to four hours. They then had to disturb the lock keepers out of hours to get a second card in order to complete the charging of one bank of batteries. Fortunately *Eglantine* had a system which could take an interruption in the charging cycle, but no-one appeared to know how long a charge the cards were supposed to give and the cost of £12 for two seemed out of all proportion to the electricity used of around 1.8 kW.

One lock keeper locked the card box with the card inside 'to prevent tampering' so they were unable to complete the charging overnight. And on another occasion, having booked the overnight mooring and charging, they had to move on a further seven miles because a (non-electric) boat-owner was using the power to watch television and hadn't told the lock keeper that the second point was not working. At Shifford Lock, where the charging pillar was out of order, they were allowed to charge directly from an old point by the lock keeper's office – and interestingly experienced none of the problems they had with the pillars.

The good news was that most of the lock keepers and EA officials en route were very helpful and the Fletchers enjoyed the quiet and peace of their electric cruise. Safely back home, they wrote to the Environment Agency with details of the difficulties they had encountered. This led to a visit by Paul Power, the EA Engineering and Technical Specialist with his electrician Garth Cochrane to look at *Eglantine* and discuss the problems with charging. Ian Rutter, as EBA Vice Chairman Private Members, has also talked to Paul and Garth and a meeting has been arranged at a Thames charging point in June when the Fletchers are bringing *Eglantine* to the EBA AGM. The Environment Agency are keen to sort this out and encourage electric boating on their waterways.

Any other EBA members who have had difficulties using EA charging points should contact Ian with the details and he will bring them up at this meeting.

Technical Report

ELECTRIC CONTACT

In the eighth of a series of interviews with members, EBA Technical Officer Paul Lynn talks to Douglas Smith about *Solar Winds*.

EBA: It's good to make contact with an EBA member in Wales for a change, and to learn something about your extraordinary project. Could you give us a little of the background?

DS: Perhaps I should start with a few personal comments to put things in context. I am dyslexic and although I was always good at maths I left school with no qualifications and went down a Derbyshire coalmine. Later I worked in paper mills in Somerset and Algeria but on returning to England found that more coalmining was my only option. I decided to start building a boat in my spare time, with the firm idea of creating a totally self-contained unit and eventually living aboard. She's a 42 ft by 21 ft cat of around 3 tonnes which I have designed from scratch, starting by building the twin hulls in the back garden of our semi-detached house. To make them less conspicuous I placed them in 18 inch trenches. The boat has now been on the water for many years and since leaving the mines I have devoted all my time to her, summer and winter, five or six days a week. I hope to finish the basic system this year, and then get busy installing the electronics.

EBA: When you say 'self-contained unit' you are presumably thinking especially of energy?

DS: That's right. The boat is essentially a sealed unit, very well insulated, with no windows – a sort of 'virtual world' using many modern technologies to create a self-contained living space. Energy input is by solar photovoltaic (PV) panels, wind generators and, when the boat is moored, using the tidal stream to generate electricity. I have used a number of PV panels over the years, and eventually intend covering most of the decking and sides with them. The deck joining the twin hulls acts as a solar water heater. Humidity control is quite a challenge – more so than temperature – so I need dehumidifiers. There will be orange trees in the twin hulls to take up carbon dioxide and give off oxygen, brightly lit by highly efficient LEDs. The power to drive the electric motors will come from hydrogen fuel cells and my eventual concept is to produce hydrogen. That is the final frontier.

EBA: How on earth are you able to cope with all these technologies, both theoretically and in practice?

DS: My father used to tell me as a child "What man thinketh, that is also possible". One can do almost anything with technology these days - the limit is one's own mind. I'm aware that many people think I must be going round in circles, but I assure you I am my own sternest critic!

EBA: Even a casual look at *Solar Winds* shows what an enormous amount you have already achieved. Since she is an electric boat, could we talk a bit about propulsion motors?

DS: Actually she is not entirely electric because I shall use wind as well as electricity for propulsion. In fact I have already fabricated two 10 ft vertical wingsails to a special design by Robert Quinton of Felixtowe which are stored horizontally when not in use. As far as motors are concerned, I am very attracted to a novel German design for a 60 ft boat I saw in a magazine a few years ago. It takes the form of a circular coil with a propeller in the centre, so that the propeller is effectively also the motor. I need to research this in the coming months. As I have already said, I intend to use hydrogen fuel cells to power the motors, rather than carry large and heavy battery banks.

EBA: Do you see the boat mainly as a live-aboard in Wales, or do you intend to make substantial voyages?

DS: I'm not planning any trips to the Mediterranean as I have already done this. Rather my idea is to have a pontoon 'mothership' alongside allowing me to download excess electricity into the grid and then take it back when I need it, but to be independent of the pontoon whenever I do decide to do some cruising.

EBA: It's an amazing project which will surely interest and inspire many of our readers. We wish you well in your personal quest and hope to hear more about *Solar Winds* in due course.

Noticeboard and Letters

Welcome to New Members

Private Members	Location	Boat where notified
Doug Johnston	North Carolina, USA	
R Bruce Roberts-Goodson	Kinsale, Ireland	Caramanc – Thames Launch
David Wozencroft	Deeping St James, Lincs	16ft Coleman Canoe
Martin & Julie Clayton	Malden, Essex	Silverpoint, Sheerline 740 Broads Cruiser
Trish Johnson (welcome back Trish)	Grange-over-Sands, Cumbria	23'6" traditional electric launch

Royal Bath & West Show

The EBA has been offered free space in a marquee at this show at Shepton Mallet in Somerset from 30th May to 2nd June. Solar boat *Collinda* will be on display in the 'Sustainable Transport' section along with pictures and information from the EBA and at least one other electric boat. Volunteers are needed to man the display. If you can help on one or more of the four days (even if only for part of a day) please contact EBA Secretary Barbara Penniall or Press and Publicity Officer Tony Rymell.

London Olympics

EBA Chairman John Hustwick has been in touch with the Director of Transport for the 2012 Olympics to suggest that electric boats should be used for the waterborne transport of spectators. Funding is already in place for restoration of the waterways on the Olympic site. The Olympic Delivery Authority Transport Team is considering the use of electric vessels and the director has suggested a future meeting to discuss the issue further.

Cambridge/Wicken Fen Cruise

If you are still thinking about joining the EBA cruising weekend on 12th and 13th May please contact Barbara straight away, as she is co-ordinating details now.

EBA Suppers

Instead of holding a Launch Supper this year, the EBA is hoping to arrange informal get-togethers after the boat shows in different parts of the country. If you are planning to attend a show where the EBA will have a stand, or just live in the area and would like to meet other EBA members for a meal in the evening, please contact Barbara.

Standing Orders

If you don't already pay your annual EBA subscription by standing order, please consider changing to this method next time it is due. It makes the Secretary's job very much easier.

EBA President Malcolm Moss
requests the pleasure of the company
of EBA members at the

President's Pimms Party

on the first day of Henley Royal Regatta
Wednesday 4th July 2007
at Remenham Meadows

For your personal invitation please contact Barbara Penniall by 6th June

Dear Paul Lynn

We always enjoy reading your Technical Reports in the EB News and the 'Start Motoring' in the last issue is particularly good; it's the best-written and clearest introduction to electric motors that we have ever read. Well done!

Our own electric vehicle is a converted Ford Fiesta with 100 V Li-Ion battery and a pair of elderly but excellent Lynch motors.

Alan Ward
Deputy Chairman,
Battery Vehicle Society

Phoenix Fleet Ltd

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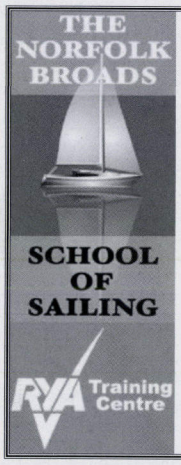

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Information sheets from the Electric Boat Association

1. **PRODUCT GUIDE & EBA BUSINESS MEMBERS**
(free upon request)
2. **SOLAR PHOTOVOLTAICS** by Paul Lynn
3. **ELECTRIFYING YOUR BOAT** by Hawthorne & Wagstaffe
4. **HULL DESIGN FOR ELECTRIC BOATS**
by Andrew N Wolstenholme
5. **LEAD ACID BATTERIES – OPERATION & MAINTENANCE**
by CMP Batteries
6. **HIGH SPEED ELECTRIC BOATS** by Lorne Campbell
7. **HYBRID POWER** by John Hustwick
8. **TRAILERS AND TRAILING** by Paul Lynn
9. **FITTING OUT AND LAYING UP YOUR BOAT** by John Hustwick and Ian Rutter

Available:
Free to members Nos. 2-9
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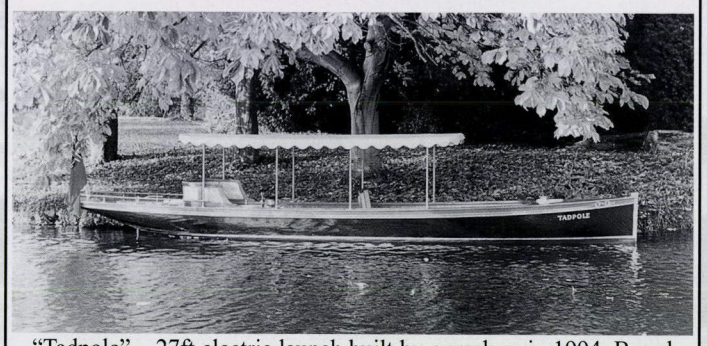

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Just untie and unwind

The Mansura Trophy

On 7th February a new ecological design competition was launched by the Royal Thames Yacht Club. The Mansura Trophy, named after a historic boat, will be awarded for innovation in the design, development and operation of boats with hybrid or all electric propulsion systems.

The bronze trophy

A striking bronze sculpture depicting the tiller head from the 1912 hybrid motor yacht *Mansura* has been donated as a trophy by Julian Delmar-Morgan, grandson of the yacht's original owner, and David Barratt. They hope that the engineering concepts represented by *Mansura* will be brought into the 21st century and applied while the world is seeking solutions to its ecological challenges. The competition will highlight the use of sustainable power sources and publicise the opportunities for hybrid propulsion in the marine environment.

The Royal Thames Yacht Club is promoting and organising the competition with the support of the Royal Yachting Association and The Green Blue, a joint environmental initiative by the RYA and the British Marine Federation. It is open to anyone in the leisure and commercial marine world showing innovation in designing, developing and operating craft with hybrid propulsion. Economical use of fossil fuels and the overall environmental impact of the craft will be considered and the propulsion system may include electric power derived from wind, solar radiation, fossil fuels, biomass, fuel cell or other sources of electrical energy.

The Trustees have appointed a panel of judges, chaired by David Arnold, a Master Mariner and experienced sailing and motor yachtsman. He will be assisted by Derek Bernard, a noted engineer and industrialist, Kevin Desmond of the EBA, Kim Hollamby, consultant editor and HISWA DAME awards chairman and Tom Nighy, recently head of the British Marine Federation EU Recreational Craft Directive team and previous chairman of the BMF/RINA Concept Boat design competition. The judges will be looking for significant advances in the application of hybrid power and the ability to make extended passages without recourse to frequent charging from land-based sources. Applicants should be able to demonstrate novel energy generation and storage, improvements in environmental performance and pollution reduction and clear advances in endurance, noise reduction and eco-friendliness.

The Mansura Trophy will be offered in an annual competition for cruising vessels of any nationality with an overall length not exceeding 122 metres (400 feet). The winner will be announced each January. The Trustees have already received expressions of interest from the UK, Australia, China, France, the Netherlands, Switzerland and the USA.

The story of the original *Mansura* was told by Kevin Desmond in Electric Boat News Volume 17 Number 4, Winter 2004/5. Named after an Arab mare, the 33 ft boat was built by Taylor and Bates on the Thames at Chertsey. She was designed to run on petrol power alone, electric power alone, sail alone, petrol and sail or electric and sail. This highly innovative design was worked out by Jack Delmar-Morgan, using what was available in the early 1900s.

The petrol unit was a V8 aero-unit by ENV, designed in England and built at Courbevoie in France, the name derived from the fact that its configuration was 'en V' in French. It had been used by the legendary Louis Bleriot, the first man to cross the English Channel in a monoplane. It was one of the best engines available and among its innovations were the electro-deposited copper water-jackets on cast-iron cylinders, two valves per cylinder driven from a camshaft. To this Jack added a Zenith carburettor. For the unit developing 60 hp at 1200 rpm but geared down, Jack paid £450. A dynamo which charged the two tons of lead acid batteries was chain-driven from the Thorneycroft propshaft. If the main engine was temporarily put out of action, the clutch was thrown out of gear and the dynamo could be used as a reversible electric motor, obtaining its current from the batteries. The accumulators replaced the lead normally used to ballast such a boat.

This configuration, with the electric engine running in either direction, made a mechanical reverse gear unnecessary. At a time when nearly all petrol-engined transport was started by using a crank handle, the engine could be started electrically.

As if this were not enough, Jack Delmar-Morgan equipped *Mansura* not only with electric lighting, electric fans and bilge pumps, but also with constant hot water, an electric cooker, electric kettle, electric frying pan and saucepan. No other cabin cruiser in 1912 had such luxuries!

Mansura's speed under petrol power was 9 knots. Speed under

electric power was 5 knots for 6 to 7 hours, 8 knots for 3 hours. Top speed obtained by running electric and petrol together was 11 knots. Electric cruising was easy to control, offering complete silence and wonderful manoeuvrability. Weak points were considerable weight and bulk of machinery, great initial expense and keeping the electric apparatus functioning properly in salt-laden air.

In 1913, flying the burgee of the Royal Thames Yacht Club, *Mansura* crossed to Boulogne and on to Dieppe, running her petrol engine offshore and cruising silently in and out of harbours.

When war was declared *Mansura* became part of the Motor Boat Reserve. As ML 41 she was painted grey, given a White Ensign flag and a searchlight and, with a light rifle as her sole armament, was sent to *HMS Thames* at Harwich where she was used by 'Major Jack' for carrying despatches and code books. *HMS Thames* was the depot ship for the 5th Submarine Flotilla made up of C class submarines fitted with 16-cylinder Vickers gasoline engines developing 600 bhp at 400 rpm. 'I examined the engines and electrical gear of a submarine the other day' wrote Jack. 'It is exactly like *Mansura's* arrangement on a large scale….'

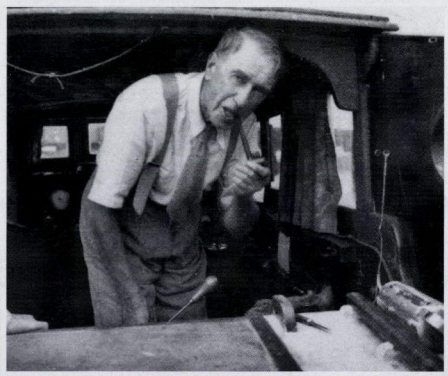
Mansura's machinery must have driven the boat many thousands of miles. 'On one occasion she made a passage of 25 miles on battery power alone. The battery was only half discharged on arrival and the speed averaged 6 knots. It was not unusual for her to do a 15-hour day in any weather and at any time; her ease of control and silence were frequently commented on by admirals and dockyard hands.'

Following the Armistice, Jack replaced *Mansura's* original engine with a lighter, more compact installation consisting of a 6 hp two-cylinder two-stroke Watermota inboard engine and dynamo as auxiliary, and a set of Edison batteries. Unfortunately this was not a success. So from September 1924 to August 1925, working in the Grosvenor Canal, Jack again gutted the machinery, replacing it with an American-built 4-cylinder Redwing 18-24 hp 'Thorobred' and with a 10 hp Aster coupled to a suitable dynamo as auxiliary. He also built a new wheelhouse. The electric control system was identical to that used on a London tram.

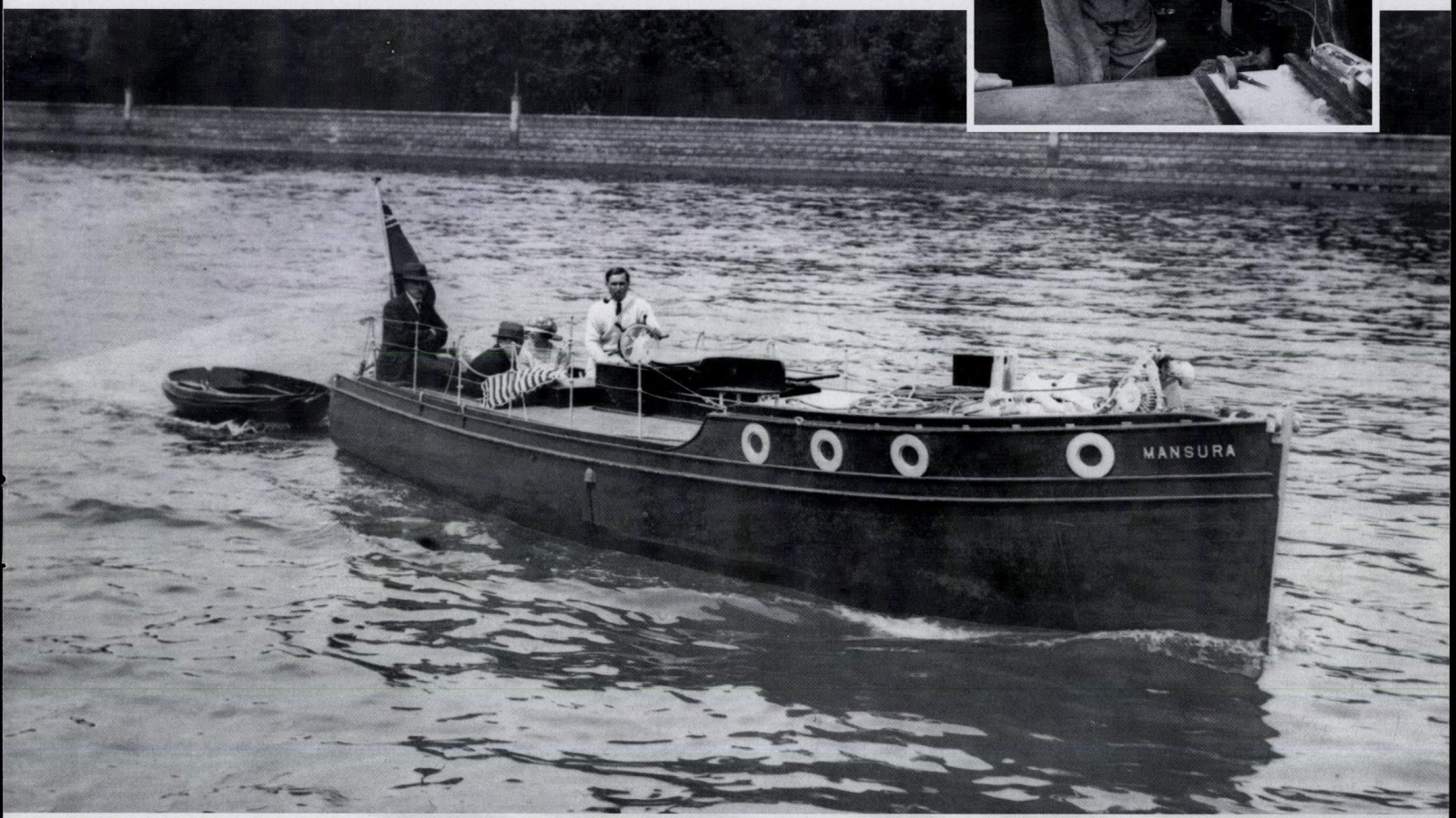
The new approach seemed to work. During the late 1920s and 1930s *Mansura* not only cruised around the British coast, she crossed over to the Scilly Isles, the Channel Islands and even to Holland.

In 1948, *Mansura* left the Delmar-Morgan family but as a souvenir they kept the original oak tiller, carved in the form of an Arab horse's head, which has now been reproduced in bronze as the Mansura Trophy.

For more information on the competition and entry details visit the website www.mansuratrophy.royalthames.co.uk



Jack Delmar-Morgan on board Mansura



Mansura on the tidal Thames

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Classified Advertisements

For Sale

Traditional Electric Launch 23'6", Andrew Wolstenholme design, built by Patterson Boatworks in 2006. White grp hull, aft cabin in Cumbrian aged oak, interior in Cumbrian cherry, teak floors, galley, toilet, 3.6kW Bellman electric drive system. As new - £40,000. See picture opposite. Telephone Trish Johnson 015395 33573, e-mail trish.johnson@dsl.pipex.com

Electric Skiff: 16'3 x 4'2 black grp simulated clinker hull (moulded from original Yare rowing skiff). Pine/Jarrah planked decks and cockpit sole, mahogany inset transom. All woodwork epoxy treated both sides, high gloss varnish finish. Fitted Briggs and Stratton electric motor, 4QD controller, 4 x 12v (38 ah) batteries giving 24 volts. Side wheel steering, many brass original parts used. Complete with fully galvanised custom built trailer. £4,200. See picture opposite. Contact Paul Morton 01603 721343 Mobile 07860 731767.

SL Hero, formerly electric launch Avondale for sale as partially restored project. Keel, ribs and underwater planking have been replaced by a professional boat builder and this is the moment to decide if she is to be returned to electric propulsion. Probably built circa 1900, length 35 ft, width 5 ft 10 ins, approx. draft 2 ft. Hull shape and design very similar to electric launch Pike. See picture opposite. Contact Nigel Thomson Tel. 07710 474158, e-mail nigel.thomson@btinternet.com

Hale Bopp 16 ft Salters double skiff – dark blue with varnished hardwood thwarts and trim, two pairs of oars and rowlocks, battery platform, upholstered seat cushions, Minn Kota electric outboard + tiller extension, 3 x 12v batteries. Snipe MST400 road trailer, battery charger. Located in Herts. £1,800 o.n.o.(as one lot). Enquiries to Anthony Oliver on 01727 841553 or at anthonyfoliver@aol.com

Electric Zelec, as new, unused. 5.5m loa, 5.25m lwl, 2.10m beam, 0.45m draft, displacement 825 kgs. CE Category D in sheltered waters. Up to 8 persons. Max design speed 5.5 knots. Range 10 hours at 4.5 knots, 6 hours at max speed. Complete with trailer and every conceivable extra. Suit new boat buyer. Cost £15,000. Will accept best offer over £9,000. Telephone Trevor Slowen 01962 777077.

Four handmade fenders (not plastic) suitable for Frolic or similar boat, £10. Also telescopic boat hook and kedge anchor. Telephone: Chamberlain 01628 474232.

Wanted

'Vintage' Electric motor suitable for a 30ft river launch, power in the region of 4HP but anything considered, or if anyone has any information on vintage electric motors, or a steam launch called WILLIAMETTE, I would very much like to hear from them. Frank Kitching. Evenings, Tel 01642 723848.

BOAT SHARE – BOURNE END. Considering buying Water Roo (see ad opposite) to moor at Marina. As past launch owner, 4 or 6 sharing seems more sensible. Per person costs say, capital c£1.5K; fees say £10-15 pm – about 60 days use each. Interested? Contact Peter Willingham 01628 850 999 07973 224 999 or ptw@acceleratedmortgages.co.uk

Members wanting to buy or sell electric boats, motors, fittings or associated equipment are invited to submit a 50-word entry direct to the Editor (Note: No agents or brokers). The information contained in members' private advertisements is provided by the advertiser and the Editor is unable to vouch for their accuracy. It is the responsibility of prospective purchasers to satisfy themselves as to the accuracy of the information given and of the condition of goods advertised.