

The Journal of the Electric Boat Association
Supported by the Broads Authority

www.electric-boats.org.uk
Volume 20 Number 4 Winter 2007/2008

Electric Boat **NEWS**



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New Hydrogen Hybrid • Solar Power in Somerset**



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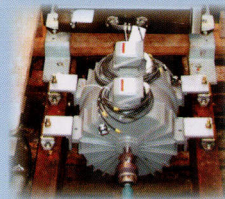
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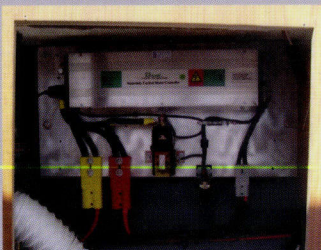
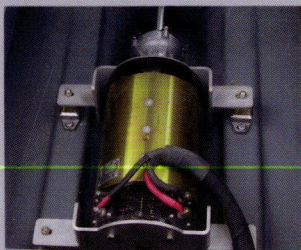
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Battery power Page 7



Solar power Page 13

EBA Calendar

May

17th – 18th	EBA Event	Cambridge Cruising Weekend
24th – 25th	EBA represented	IWA National Trailboat Rally Tiverton, Devon
28th – 31st	EBA represented	Royal Bath and West Show Shepton Mallet, Somerset

June

6th – 8th	EBA represented	Beale Park Thames Boat Show Lower Basildon, Berkshire
23rd - 28th	EBA interest	Solar boat race in Friesland, Netherlands

July

13th	EBA interest	Steam and Electric Boating Festival, Sudbury, Suffolk
19th– 20th	EBA represented	Thames Traditional Boat Rally Henley

August

23rd - 25th	EBA represented	IWA Festival Atherley Junction
30th – 31st	EBA represented	IWA Campaign Rally Welshpool

September

13th – 14th	EBA represented	Somerset River Festival, Bridgwater
20th – 21st	EBA event	Norfolk Cruising Weekend
21st	EBA represented	Green Boat Show, Norfolk

October

tba	EBA Event	Laying Up Supper
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Please note that events and dates may change. For more details of the above, or notice of other events, contact the Secretary or check the websites.

Cover Picture: *Silent Explorer in Norfolk*
Photo: Barbara Penniall
see report on page 10

Contents & Editorial

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Tel: 01491 681449 e-mail: secretary@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:

Spring 1st March

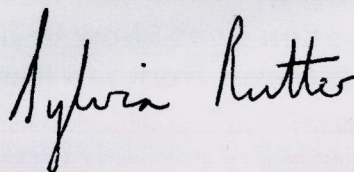


The National Trust has launched a number of 'green' initiatives to reduce carbon emissions. One of them is to promote travel to its properties by means other than by car. As National Trust members, we can take a car to our local NT property, Cliveden on the Thames, and park it free of charge.

If, however, we travel by

environmentally friendly electric boat we are charged £6 to moor. The Trust says it cannot make an exception for an electric boat (why?) and suggests that the solution is to buy a £30 annual mooring season ticket. This rather misses the point and demonstrates that the Trust's commitment to its environmental initiatives is rather stronger in theory than in practice.

Fortunately there is good news to report from the Environment Agency, which does make an exception for electric boats in the form of a 25% discount on licence fees and is keen to tackle problems with its electric charging pillars. After our meeting with EA technical managers last year, the EBA was asked to set out details of members' charging requirements. The EA is now looking to upgrade its existing electric points and, via the River Thames Alliance, will be encouraging local authorities to include electric points at their moorings.



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The London Boat Shows

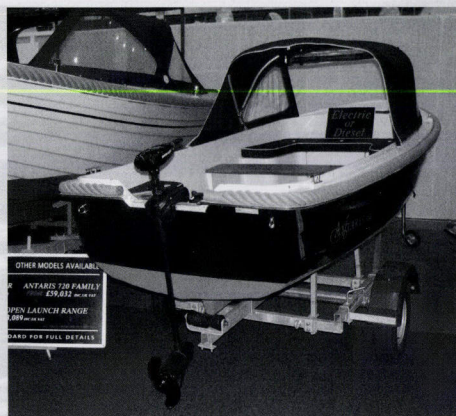
While activities on the water wound down for the winter, boating enthusiasts could check out boats and equipment for the coming season at two London shows. Whyte & Mackay sponsored the Earl's Court Boat Show in December while ExCel in Docklands was the venue for the Collins Stewart London Boat Show in January. Report by Sylvia Rutter with pictures from Ian Rutter.

An impressive array of fully rigged yachts, including *Gipsy Moth IV*, was afloat in the central pool at Earl's Court, along with a variety of motor boats ranging from small Shetlands suitable for river, estuary and coastal use to powerful seagoing cruisers. But any visitors overwhelmed by the seemingly endless

expanse of gleaming white fibreglass hulls could escape to a most attractive display of beautifully varnished wooden river boats. This was EBA member Hambleden Sales & Charter, with an elegantly dressed Gillian Nahum in charge. All the boats were for sale, including electric launch *Polly*, built by Henwood & Dean in 1998 to a design by

Andrew Wolstenholme and powered by a Combi 700 Saildrive. A copy of *Electric Boat News* was on board for visitors who were interested in 'going electric'.

Also on the Hambleden stand was a 1997 racing skiff, slipper launch *Rosie Lee*, a Riva built for the world water skiing championships and the last surviving Tims launch, built in Staines and completed after the Second World War. At the information point, Gillian was on hand to discuss other boats for sale including two new day launches, the Roamer and the Venturer, which can be built to customers' requirements and are available in diesel or electric versions. For EBA members in search of furnishing materials, Gillian



Electric Antaris 400



Salters new Regatta 23



pointed out that when the show was over she would have 100 square metres of black carpet stored in her barn at Pangbourne. Anyone interested should contact Gillian on 01491 578870.

Bushnell Marine Services were exhibiting the electric Antaris 400 with a Minn Kota outboard. Bushnells are the sole UK agents for Antaris, who are one of the largest boat-builders in the Netherlands with a range of around 30 craft. The 400 is priced from £3,089 for the basic boat, with trailer, cushions and canopy available as extras. David Bushnell said that other boats in the Antaris range would be suitable for electric power and they are working with the Thames Electric Launch Company on designs for inboard electrical systems. Bushnells also import the electric Velence 25 from Hungary, which has a mahogany covered deck and small cabin in the bow. The 7.65m boat is powered by twin 12 kW air-cooled DC motors and 16 240 Ah batteries. It has two inboard chargers and an engine monitoring system with two lcd displays and retails at around £35,000.

More Dutch boats were on display at the Val Wyatt stand with the Interboat range of open launches available in diesel or electric versions. The company was also selling electric outboards from Motor Guide.

EBA member Helen Loney had brought her new electric hydroplane *FireFly* which made its first attempt at challenging for a new world water speed record at Coniston Records Week. EBA members Emrhys Barrell, Cedric Lynch and Arvind Rabadia, members of the Electric Record Team, were also on hand to discuss technical details.

At ExCel in January ERT had an even more impressive display. *FireFly* was again

on show, along with the *Telco Flyer*, the electric rigid inflatable which set a new world speed record in November (see report on page 7). Both boats have standard Agni motors, Curtis controllers and Exide batteries from CMP. The six motors from *FireFly*, making up a total 200 hp of electric power, were displayed next to the boat and attracted a lot of interest from visitors.

To demonstrate a quite different aspect of electric boating, the ERT stand included the Coulam 16 Wheelyboat, built by J.M. Coulam of Market Deeping in Lincolnshire and supplied by the Thames Electric Launch Company. The boat is a brand new model designed specifically for disabled anglers on inland waterways. With a low centre of gravity it is very stable and wheelchair users can get in and out by means of a ramp and a hand operated hydraulic platform. An Elva 800 electric outboard gives instant forward or reverse power and a full day's fishing on one charge. Andy Beadsley, Director of the Wheelyboat Trust, explained that pulling a cord to start a petrol outboard was awkward for someone in a wheelchair and of course also noisy – not ideal for an angler. Under electric power the boat can be used on reservoirs or rivers where petrol engines are not allowed.

EBA business members Bossoms had their Isis 14 river launch on display. Leigh French explained that this was the first one to have a new 3kW motor, supplied by CBL Electric Vehicles, which fits neatly under the floor. The Isis 14, and the slightly larger Isis 16, have GRP hulls which come in a range of colours, with toning seat cushions and hand crafted wood interiors.

The electric Antaris, seen at Earl's Court,

was featured on the Bushnells stand and Val Wyatt were again showing the Interboat range of electric or diesel open launches.

EBA business members Nauticalia were selling traditional marine products and boating accessories while Hartford Marina were promoting their moorings, chandlery and boat sales. Navigators & General, who operate the EBA insurance scheme, were being kept very busy with enquiries at their stand in the central boulevard. The company has some interesting ideas for improvements to the EBA scheme, which will be put to the EBA committee later this year.

Business members Fischer Panda were equally busy dealing with customers for their generators and inverters. They have recently installed a complete Fischer Panda system in a traditional Thames launch and their diesel-electric Aziprop powers two Norfolk wherries with 15 kW drive systems. Their small and light motors are also proving popular for use in mini-submarines.

One of the stars of the show was the new electric Regatta 23 from EBA members Salter Brothers. It was featured in the Daily Mail, the show organisers' media partner, who placed it at number three in its 'Top Six Boats in the Show'. The boat, which was finished just in time to get to ExCel, has a low wash GRP hull with a roof over the cockpit area. Side curtains with windows can be fitted as an extra. Maximum speed is five knots and the price for the standard version with 8 batteries and charger is £27,500. Also on Salters' stand was a 19 ft 6 in electric Mystic and an electric Skipper 15, an open launch with optional cuddy or full length canopy. Last year the company produced a diesel version of the Skipper and this year it has been electrified. The GRP hull has a simulated clinker design with a rope fender and the price for the electric version is £11,995. John Salter said that the weather last summer was a set-back for the normally very popular Salters' electric hire fleet but, along with the rest of us, he is hoping for better conditions in the coming season.



Andy Beadsley with the Coulam 16 Wheelyboat



Helen Loney with FireFly



Hydrogen Hybrid

Crowds gather for the launch

A new hydrogen hybrid canal boat was launched in Birmingham on 21st September. Powered by a combination of lead acid batteries, a hydrogen fuel cell and a metal hydride store, it has been designed to test the viability of hydrogen as a fuel for transport on the inland waterways. Report and pictures from Sylvia and Ian Rutter.

The unique experimental boat is 16 metres long and weighs 12 tonnes. Originally used by British Waterways for canal maintenance, it was converted to hydrogen propulsion by a team from the University of Birmingham led by Professor Rex Harris. The boat has been named the *Ross Barlow* after a postgraduate student who worked on the project in its early stages and tragically was killed in a hang gliding accident in 2005.

The parents of Ross Barlow, who was an enthusiastic supporter of sustainable technologies, were at the launch ceremony to hear tributes to their son from Professor Harris and the University Vice Chancellor, Professor Michael Sterling. Professor Harris reminded the audience that it was in Birmingham in 1781, when the canal system was being

built, that Joseph Priestley undertook the first recorded experiment to mix hydrogen and oxygen in a test tube and produced water. Professor Sterling outlined plans for the universities of Birmingham, Nottingham and Loughborough to be a hub of forward-thinking research into renewable energy.

Electricity can be stored as hydrogen

by splitting water (H_2O) by electrolysis. Hydrogen can then be converted back to electricity and pure water by a fuel cell. The canal boat project also uses this technology in rare earth magnets and metal hydride hydrogen storage systems which have been developed by research groups at the university.

Converting the old boat involved members of the team in welding, grinding, painting and plumbing. The old paint was stripped off and the hull repainted for corrosion resistance. The main cabin was opened up into a walkthrough area where equipment can be displayed. The original diesel engine was taken out and replaced by a 48 volt electric propulsion system, comprising a battery bank and a rare earth permanent magnet high torque electric motor, supplied by EBA business member the Solar Boat Company. The conventional rudder was removed and replaced by a drive-by-wire system so that the boat can now be steered by a joy-stick as well as remotely using wi-fi technology.

The hydrogen store linked to a proton exchange membrane (PEM) fuel cell was installed in the bow cabin where passengers can see it. The metal hydride storage system has been developed with



Professor Michael Sterling, Terry Tricker of British Waterways and Professor Rex Harris

EMPA laboratories in Zurich and enables large quantities of hydrogen to be reversibly stored at room temperature and at a safe pressure of around 10 bar (150 psi). The store works by absorbing hydrogen into the metal lattice at a higher pressure and then desorbing the gas at a lower pressure. When charging, the cylinders get hot. When used they cool, but are heated by the waste heat from the PEM.

The hydrogen storage capacity of the system is equal to that of four large standard high pressure (200 bar) cylinders. The metal hydride powder weighs 130 kg and is thought to be the largest store of this kind in the UK. Although the cylinders are heavy, their weight is easily accommodated in a canal boat by the removal of both the diesel engine and ballast.

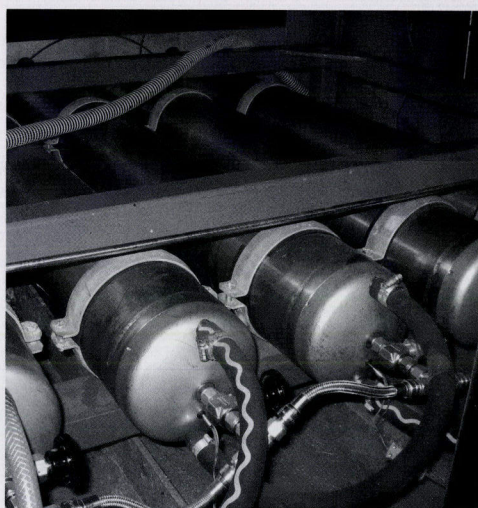
The PEM fuel cell works like a battery. The hydrogen fuel from the metal hydride store is fed into one side of the cell with oxygen from the air on the other. The hydrogen becomes ionised and releases electrons to provide the electric current with the only by-products heat and pure water.

The power produced depends on the number of fuel cells in the stack.

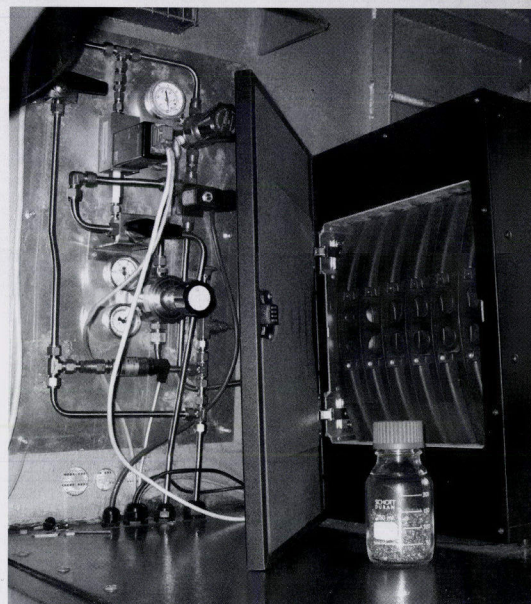
The university Protium Project team hopes to establish the viability of hydrogen as a fuel and improve science and engineering knowledge with real working experience. Based at the heart of the canal system, the boat will be able to travel the waterway network, demonstrating a practical green alternative to diesel boats. In the long term the team hopes that the entire waterways fleet might be converted to

hydrogen, generated from carbon-free forms of primary energy, with a hydrogen re-fuelling infrastructure throughout the inland waterways. We are very pleased that the project team has joined the EBA as business members and we look forward to getting reports on their progress.

For more information see the website www.hydrogen.bham.ac.uk.



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Dredging Takeover on the Broads



The Broads Authority has taken over control of dredging the rivers and broads from its main contractor May Gurney. Under the new arrangements, the Authority hopes to achieve up to 25% more dredging for the same amount of money, estimating that 290,000 cubic metres of mud and silt can be removed over the next five years. The dockyard at Thorpe, bought as part of the deal, will give the Authority an operational base in the southern rivers, invaluable for storage and for dealing with sunken and dangerous vessels. Barges and equipment transferred will increase the capacity for repairing moorings and cutting trees and shrubs. The picture shows the former May Gurney dredging team, now working for the Broads Authority, with Director of Waterways Trudi Wakelin and Richard Farley, Head of Navigation Works on the far right.

Slough Arm Link to the Thames

Proposals to link the Slough Arm of the Grand Union Canal to the River Thames are gaining support within Slough Council. The idea of a navigable link between the two waterways was proposed in the 1960s by the founder and first Chairman of the EBA, Viscount St Davids, using a route to the east of Slough town centre. Since then the concept of a link has appeared in publications from government-backed waterway bodies, including British Waterways. However, some of the original route has now been built over and BW have suggested a provisional construction cost of at least £28 million.

Mike Timms of the Inland Waterways Association is looking at the viability of pursuing the proposals and would welcome support. He can be contacted at 14 The Ridings, Iver, Bucks. SL0 9DU, Tel. 01753 651975

New Electric Water Buses in Paris

Two new all-electric water-buses have begun operating on the canal Saint-Denis, offering a free shuttle service for employees commuting to their offices in the 19th district of Paris. The boats carry up to 75 passengers at speeds of between six and twelve km/h over a 1.1 km route from Corentin Cariou Metro station to the dock at Millénaire Park, a journey of around seven minutes.

The boat propulsion system, supplied by Saft, comprises two strings of 64 STM 5-140 nickel-cadmium modules connected in parallel, providing a nominal 400V and 110 kWh capacity. Its total weight of 2150 kg is estimated to be some 30% less than the equivalent lead-acid system. The light weight and high energy storage capacity of the batteries, supplemented by solar panels, enables the water buses to remain in constant operation for a six hour shift of around 30 return trips between charges.



International Entry for the Mansura Trophy

Eleven candidates from five countries have submitted entries for the Mansura Trophy, open to cruising vessels using hybrid electric propulsion systems. Boats from EBA members include *Maud*, Graeme Hawksley's offshore hybrid auxiliary yacht, Ian Rutter's steam and electric launch *Irene* and the Thames Electric Launch Company's narrowboat *Catspaw II* with Selectric hybrid system. This system was also installed by TELCO in the Environment Agency's entry, the patrol boat *Colne*. Swiss EBA members MW-Line have entered their catamaran *Sun21*, which made the first crossing of the Atlantic under solar power, and new EBA members at Birmingham University have entered the hydrogen hybrid canal boat the *Ross Barlow* which

is featured on pages 4 to 5.

Another interesting UK entry is *Collinette*, a hybridised 1885 yacht from Helston in Cornwall. Australia's entry is *Solar Sailor*, a 21 metre, 100 seater Sydney Harbour ferry and from France comes the Lagoon 420 hybrid catamaran, built at the Construction Navale de Bordeaux, a subsidiary of Beneteau. The Dutch have entered the cabin cruiser *De Grote Beer*, built by Excellent Yachts of Aalst and also *Hydrogen Xperience*, the first fuel cell boat in Holland.

The winner of this year's competition will be announced at a reception at the Royal Thames Yacht Club on 19th February, when the club's patron HRH the Duke of Edinburgh will present the awards.



Pb Batteries World Speed Record

EBA Business Member Pb Batteries has been taken over by Powercell Industrial Batteries of Rayne in Essex. The company will continue to trade as Pb, but as part of a larger group will be able to extend its coverage of the inland leisure boat market. Dave Millin is still with the company and the EBA is very pleased that he will continue to represent EBA business members on the Executive Committee.

Powercell/Pb Batteries will offer an extensive range of batteries, chargers and watering systems as well as advice on maintenance and service support. The company intends to have a strong presence at shows in 2008 with a developing range of products making up a complete environmentally friendly energy package.



PAUL WAGSTAFFE

Telco Flyer on Coniston

An electric rigid inflatable set a new world speed record in the 48 Volt Hydroplane Class at Speed Records Week. Driven by Emrhys Barrell of the Thames Electric Launch Company, the *Telco Flyer* achieved 18.8 mph on Coniston Water in November. The company plans to fit the outboard to a lighter, faster hull to push the record still higher.

The 3 metre RIB, fitted with TELCO's new Electron 7000 outboard and four Exide Orbital batteries, is light enough to carry on the roof of a car. It is the prototype for a new junior racing class, offering safe, environmentally-friendly sport for younger

competitors while allowing the rest of the family to use it for more sedate trips. The outboard is based on a standard Agni motor and has been designed for use on a wide range of craft from dayboats to cruisers.

Also at Coniston was the new *FireFly*, driven by Helen Loney, with back up team of Chris Loney, Emrhys Barrell, Cedric Lynch and Arvind Rabadia, bidding for the outright world speed record. *FireFly* reached a speed of 44 mph on one run but unfortunately ran out of power on the return. New UIM rules no longer allow recharging between runs.

New Swiss Solar Boat

EBA member Theo Schmidt has been involved in work on a new solar boat, owned by Matthias Wegmann. Matthias piloted Sun21 down the Rhine on the first leg of its transatlantic journey and is also the owner of a solar Frolic 21. His new boat, *Basilisk 3*, is a 12 metre long trimaran with 1.8 kW of solar panels. It is 5 metres wide with outriggers extended and about half that with them folded, which can be done while underway. It displaces two tonnes when empty and can carry 12 passengers.

The boat has two small masts and sails which can be stowed horizontally or erected manually. It will be used for a local ferry project around Basel, Switzerland's only port connected to the sea via the Rhine or the Rhine-Rhone canal. Future plans for the boat include some coastal cruising, for which the outrigger beams may need to be strengthened.



THEO SCHMIDT

Basilisk 3

The Broads Green Boat Show



White Admiral

The 2007 show – the only green boat show in the UK and perhaps in the world – was held on Saturday 8th September. EBA members Tony Fogarty and Tony Dunning report on a unique event.

For the second year running, thanks to owner Henry Cator, the secluded wooded setting of Salhouse Broad was the venue for the show. It was an overcast day with light breezes but not cold, providing ideal conditions for visitors to try out the various craft.

On the Broad there was an impressive display of electric boats. Launches included *Silver Dart*, Alice Cullin's *Firefly*, David

Simister's *Sigridur*, Paul Morton's skiff (a grp hull moulded from a Yare rowing skiff), *5 Amp* owned by Roger and Julia Woodhouse and Tom Moore's elegant *Merlin*. Larger craft were well represented by the Nancy Oldfield Trust's *White Admiral*, *Helen of Ranworth* taking visitors to the Hoveton Nature Trail, the Broads Authority Inspector's hybrid launch *Charles Collier* and Tony Fogarty's 27' cruiser *Moonglow*.

Solar powered craft present were Cedric Lynch's canoe, Paul Lynn's new catamaran *Solar Flair III*, brought from Somerset by Tony Rymell, and David Williams' *Terrapin*. During the show David was presented with the Julia Moss Solar Trophy by EBA Chairman John Hustwick for his commitment to the development of solar powered boating.

Yachts with electric auxiliaries on display included Peter Howe's *George Thetford*, David Williams' *Myrtle*, and John Thorncroft's *Sceres*. The smallest electric boat was *Ripple*, a coracle fitted with an electric outboard and a fishing rod, which was built by the Coracle Company from Wales. On land the company was demonstrating coracle building and

selling kits, alongside companies showing kayaks, canoes, inflatables and boats made from reed.

Boats powered by muscle power – rowing, canoeing and pedalling – added to the fun on the water. These included the pedal-powered canoe *Lifecycle* and *Winsome*, a two-person cycle-pedalled boat from Swallow Boats of Wales, originally designed by David Williams, in which Tony Dunning took Nigel from the Broads Authority for a quick spin round the Broad.

Up the hill in the marquee there was plenty for visitors to look at. Rupert Latham discussed conversions to electric power, Robert Paul from Ludham Bridge was displaying electric outboards and Cedric Lynch of Agni was on hand to discuss his electric motors. The remarkably light lithium-ion powered outboards from Torqeedo, shown by distributor John Arnold, also attracted a lot of attention. The display from Colin Facey of Woods Dyke Boatyard included fuel cells and Sunpower solar charging systems. There were environmentally-friendly cleaning products from Enjo and recycled plastic pontoons from Filcris, with wind turbines, solar panels and LED lights from Sun Wind and Rain. Galleon Storage of Beccles showed plastics recycled into floating mooring modules as well as a system for cleaning boats with minimally toxic outputs. Broadland District Council was giving out leaflets on sustainable living and



NICK GOLDING

David Williams receiving the Julia Moss Solar Trophy from John Hustwick

the Anglian Boatbuilders' Association had drawings of their Concept Boat. The Broads Authority offered leaflets and the magazine Broadcaster while the Broads Society had the Harnser magazine and other literature.

Outside French Marine showed their 2.2kW Vetus motor and batteries, Kernowrat from Cornwall had a variety of intriguing bits and pieces including fold-up solar panels, inflatable canoes, batteries, outboards and Piranha propellers while Earth Wind and Fire demonstrated producing very hot water from their thermal solar panel (although they had to borrow French Marine's generator to power the pump). The Electric Boat Association were kept very busy all day fielding questions from visitors, with the support of Dave Millin from Pb batteries. Four new members joined the association at the show.

Carol's Crepes and Snackers Burger Bar provided catering. Poor Carol never managed a break all day, her products were so popular – and very filling too, said Tony Dunning. There was also a (non-electric) ice cream boat which occasionally shot off in a cloud of two-stroke when the ferry boats from Broads Tours appeared. The traditional jazz band Lumiere Rouge



Merlin, Paul Morton's skiff and Charles Collier

played on, inducing nodding heads and impromptu jiving. And the water taxi service from Wroxham, using electric day boats, was well patronised and a great environmentally friendly way of coming to the show.

The Project Team of Tony Fogarty, Peter Howe, Tobi Baker and Charlie Middleton are grateful for the support from the Sustainable Development Fund, the Electric Boat Association, the Broads Authority and the Broads Society and look forward to another great show next year.



Kernowrat stand



Sceres

Cruising on Sunshine and Laughter

Barbara Penniall reports on the Norfolk Cruise which followed the Green Boat Show in September.



Picnic at How Hill

After the pressures and sheer hard work of manning the EBA stand at the Green Boat Show, it was a complete contrast to meet with the relaxed and happy band waiting for us at John Williams' Boatyard, ready to set out for the evening cruise.

A perfect September evening, calm, warm and six boats gliding through the early evening dusk. John Hustwick's *Rhapsody* led the way with Tony, Janet Dunning and myself then Rod and Judy Birks' *Winsome*, driven by Peter Fletcher with Peter and Marie Willingham, David Mole in a very smart *Matilda*, minus the canopy and offering a ride to Tony Rymell, Hilary Goldsmith and Mark Rainer. *Oscar* belonging to Diana and Richard Hyde joined us for the evening, but as they were in fact already staying at the hotel as part of a longer visit to Norfolk, they did not return to the boatyard later. Nick and Yvonne Goldring's canoe *Silent Explorer* hosted Elaine and Les Fidler and of course, there was also the solar canoe belonging to Cedric Lynch, who had spent the day with

us either on the water at Salhouse Broad or on Agni Motors' stand.

Sutton Staithe Hotel was our destination and they had provided a very generous buffet meal in a room allocated for our sole use. This was probably just as well, as a very cheerful gathering of 23 EBA members spent the evening exchanging stories, technical expertise and lively conversation. We had been joined by a recent member James Cox, old friends Julia and Roger Woodhouse and of course, John and Sandy Williams, without whose help in providing craning, mooring, charging facilities (and finding the venue for the meal) the weekend might have had to be postponed.

For new members who had not previously experienced an EBA evening cruise there then came the moment they were waiting for as we left the circle of light to set out again, this time into a warm dry evening and the total darkness of a night over the Norfolk Broads.

It is an experience difficult to describe, but it really is magical to see these silent, ethereal craft gliding through the black

water with only the occasional noise from a jumping fish or a disturbed water bird.

As if by mutual consent, it was a silent return journey, quite different from the hilarity of the outward cruise, but I did have to explain who we were to a startled hire boat's crew, who had been about to retire to bed. The alternative would have been to leave him convinced he had had 'one too many'!

On Sunday morning seven boats set off in hazy sunshine and perfect cruising weather. We were joined by *5 Amp*, Julia and Roger Woodhouse' folding dinghy and by new business members, Elaine and Jim Avery from Kernowrat, who had come all the way from Cornwall to take part in the Green Boat Show and had been invited to join us on the cruise. They used an inflatable with an electric outboard and also brought Tasha, a very well behaved canine member, certainly a lot quieter than some of us!

So it was with much laughter that we set out for How Hill, the beautiful nature reserve on the River Ant and were



BARBARA PENNIAL

delighted to pass *Oscar* again, going in the other direction, followed by Tom Moore in *Merlin* and Mary in *Moorben*, returning from Salhouse Broad.

John and Sandy offered to transport our picnic and various goods and chattels in their narrowboat, and they joined us for lunch on the banks of the nature reserve in the shadow of its famous windmill. It was an ideal place to picnic and wander and a very happy couple of hours was spent in excellent company before we cast off and turned our bows again towards Stalham and home.

Cedric, who had been running on solar power during the morning, was able to recharge the battery for the inflatable during our lunchtime stop-over and we noticed he offered them a couple of 'top ups' while still going along during the return journey. Crossing Barton Broad in a small boat can be an interesting experience, but both the inflatable and the folding dinghy had intrepid crews who didn't mind the odd wave or dodging racing yachts.

It was an excellent weekend made possible by the help given by John and Sandy Williams, together with advice offered by members with local knowledge but mostly by the happy participation of so many EBA members. Definitely a cruise run on sunshine and laughter!



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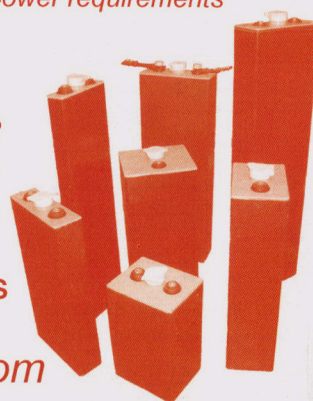
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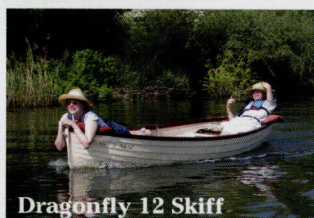
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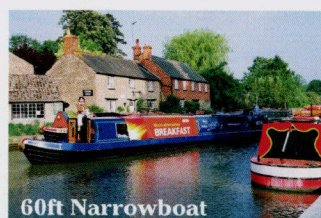
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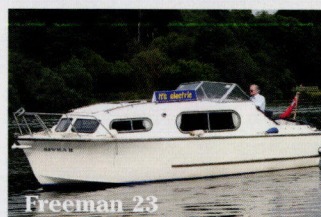
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Somerset River Festival

PAUL LYNN



EBA members and boats attracted a lot of interest at a West Country festival in September as Barbara Penniall reports.

Solar Flair III in the boat parade

The Association had been invited by Somerset Water Management Partnership to attend Somerset's largest event on water, held at French Weir Park, Taunton. So for its last outing in 2007, the EBA stand was set up in an idyllic setting by the River Tone.

The day was bright and breezy with only a few intermittent showers to remind us how much better this was than the majority of boat shows in the summer and it certainly did not keep the crowds away. The atmosphere was very much a River Festival, with a variety of entertainments to suit all family members, but the attendance was very impressive, with the day focussing on activities on the river.

The EBA was exhibiting two solar boats – *Solar Flair II* by the stand and her big sister *Solar Flair III* on the water. We also had the Cellcraft boat on display but, as always, the crowds were drawn to the solar powered craft and we were delighted that their designer, Paul Lynn who had built them both and the original *Solar Flair I*, was able to join us and see at first hand the interest and enthusiasm his craft generated from visitors to the stand.

As an added interest Paul had brought with him a display of LED lights picking out the letters 'EBA' and a low energy light bulb, all of which were powered by a solar panel (temporarily removed from *Solar Flair II*). This was an effective way to show visitors that solar panels did not need bright sunshine to operate. Even on that dull day they were brightly lit, the large light bulb only failing during rain and the smaller lights burning all day.

Paul Lynn, Tony Rymell and I were all kept very busy with a constant stream of visitors and signing up new members, one or two bringing very interesting ideas and projects to the Association. One of our business members, Kernowrat, had travelled from Looe in Cornwall and was sited close by. We could see they were also being kept constantly occupied with enquirers and many would be potential sales of outboard motors and batteries. Enthusiastic members of the public were delighted to find electric boats for the first time and were eager to enter our quiet world of pollution-free boating, even if it



Paul Lynn with visitors to Solar Flair II BARBARA PENNIALL

was with a dinghy, skiff or inflatable with an electric outboard.

The parade of over 20 boats drew a huge crowd of spectators and the star of the show was *Solar Flair III*, driven by Tony Rymell. It was the only craft to receive lengthy applause as it swept by, showing a fair turn of speed and remarkable manoeuvrability.

It was certainly an entertaining day for the estimated 4,600 visitors with activities on both land and water (including a 90 minute performance by The Wurzels – remember them?) We felt that the EBA played a significant part in promoting electric boating to the public in an area where the authorities are delighted to welcome and encourage silent and pollution free propulsion on their beautiful and often completely unspoilt waterways.



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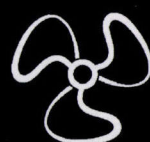
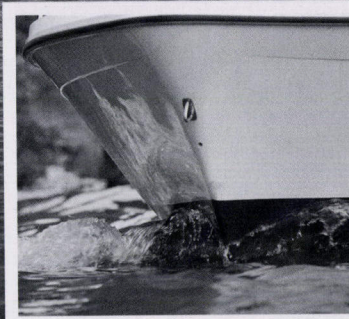
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Technical Report

ELECTRIC POINTS: 'CRUISING ON SUNLIGHT'

In the eleventh of a series of short articles on technical aspects of electric boating, EBA Technical Officer Paul Lynn discusses photovoltaics and solar modules.

Photovoltaic (PV) technology has a strong claim to be the most elegant way of producing electricity. Solar photons, reaching our planet after a 93 million mile journey from the best-sited nuclear reactor of them all, certainly work their magic 'without noise, pollution, or fuss'. No fuel or waste either – just photons in, electrons out. As our thoughts turn to the new boating season, hopefully to be blessed with plenty of sunshine, I have decided to devote this article to photovoltaic (PV) electricity and the PV modules that are increasingly used to power electric boats.

The amount of energy reaching the earth from the sun is staggering. In a few days it exceeds that from all fuel burned over the whole of human history and in a few weeks, that of all known fossil fuel reserves. The trouble, of course, is that this energy is very diffuse, intermittent and, in our climate at least, unreliable. Yet the recent transatlantic voyage of the solar-powered Swiss catamaran Sun21, previously reported in this magazine, confirms the value of solar electricity for boat propulsion, especially for craft with efficient motors and propellers driving well-designed hulls.

In bright sunshine the amount of power reaching a PV module facing the sun is about 1kW per square metre of surface area. Modules suitable for boats are based on various semiconductor materials with different conversion efficiencies. Rigid monocrystalline silicon modules have the best efficiencies of around 15%, in other words they can produce about 150W per square metre in strong sunshine. Rigid

polycrystalline silicon is not quite as efficient but slightly cheaper. These two have a major share of the PV market, with current UK prices around £4-£5/watt. Semi-flexible polycrystalline modules with efficiencies around 13% are attractive to many people (including Ellen MacArthur) for mounting on gently curving surfaces such as boat decks, but they are roughly twice as expensive per watt. There are also various so-called 'thin-film' products of which the best known among boaters is flexible triple-junction amorphous silicon with module efficiencies around 8% selling at around £6/watt. All these efficiency figures tend to rise slowly as solar cell R&D and module manufacturing techniques improve. And if prices seem high, remember that typical PV module guarantees of 25 years are almost unique among manufactured products.

If you have limited area for mounting PV modules, or wish to maximize your solar yield in the summer months, you will probably choose crystalline silicon for its efficiency. If you have a large canal barge with a long curved cabin-top, module efficiency may not be paramount and flexible thin-film modules could be more attractive. We should also note that although thin-film is presently a lot less efficient than crystalline silicon in bright sunlight, it performs relatively well in cloudy conditions. So there is no 'one size fits all' in PV modules - a point well illustrated by the wide variety of solar installations now in the EBA fleet (see the Solar Power section of our website at www.electric-boats.org.uk). How much PV is

needed to make a boat 'solar-powered'? I tackled this complicated question in two previous articles (EB News vol.18, no.4 and vol.19, no.2, the first of which is now also on the website). I proposed a new performance measure called the Solar Boat Index (SBI), suggesting that any boat with an SBI value of 1.0 or above may reasonably be considered solar-powered in the UK and similar climates. To achieve this you need to install PV peak power equal to at least one third the value of motor input power required to run at standard speed (5mph on rivers or lakes, 4mph on canals). For example, if your boat requires 1.2kW of motor power at standard speed you should install at least 400Wp (watts peak) of PV. If you opt for monocrystalline silicon with efficiency 15%, the modules will occupy around $400/150 = 2.7$ square metres of deck or canopy. If you decide on flexible thin-film modules with 8% efficiency, you will need $400/80 = 5$ square metres. Of course these figures are just examples; your local climate and boating activities may require a different SBI value.

The other essential item in a boat's PV system is a solar charge controller, to regulate the flow of current between PV modules, batteries, and motor. The latest models include comprehensive protection and monitoring and offer very good value – for example around £100 for a controller for a small solar boat. Although prices rise steadily with power rating, in most cases a suitable unit costs far less than the PV modules it controls. I aim to cover this and other 'systems' topics in my next Electric Points article.

Noticeboard



Welcome to New Members

Private Members	Location	Boat where notified
Cheryl Hodds	Cookham Dean	Butterfly II, Frolic 21
Dr Sheena Tyler	Hyde, Cheshire	Cinderella, kayak
David & Joanna Alloway	Charvil, Berks	Juliana, 1910 8m canoe
Iain Sanderson	London	
Don & Catherine Sidebottom	Windermere, Cumbria	Helver, open launch
Roger Kenny	Cumbernauld, North Lanarkshire	Wee Duffy
John E Harris, CBE	London	
Trevor S Warnock	Fen Ditton, Cambs	Jacana, 26ft carvel cabin cruiser
Göran Westin	Jarfalla, Sweden	
Serge Cador	Woodcote, Berks	Canoes
Revd. Margaret and Ken Johnson	Frogmore, Devon	Otter, Riverette from Water Roo



Business Members

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Research and development of fuel cells for a hybrid hydrogen canal boat

Messing About On The River Ltd. Bristol
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Stealthdrive UK, Farringdon, Exeter
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The EBA is very grateful to the Broads Authority for their continuing support which goes towards the cost of producing Electric Boat News. With postage costs increasing, additional sponsorship would be very welcome. If any members know of companies able to offer help, please contact Barbara with details. Even a small sum would enable us to print more colour pages and improve the look of the magazine.



EBA Directory

The latest issue of the EBA Directory and Product Guide is enclosed with this magazine for EBA members. Please check your entry and send any corrections or missing details to EBA Secretary Barbara Penniall. Please also let her know if your postcode is not in bold type but you would be able to offer a charging point for members.



New e-mail Addresses

EBA committee members now have additional e-mail addresses reflecting their roles in the organisation, e.g. chairman@eboat.org.uk and secretary@eboat.org.uk, which should be easier to remember. For the full list, see page 20.



EBA Shop

Our Webmaster Nick Goldring has updated the Shop section of the EBA website so that all items for sale can now be viewed and ordered on line. For details go to www.electric-boats.org.uk and click on 'EBA Shop'.

Dear Editor

Do any of your members know of water-side houses or boathouses using sustainable energy (solar/wind/human-dynamo) to directly or indirectly re-charge electric boats? Or projects for the same? Equally of solar-powered boats which, once topped up, provide electricity for the local grid? I would be most grateful for details and jpgs sent to me at desmond.book@wanadoo.fr

*Yours sincerely,
Kevin Desmond
(Bordeaux, France)*

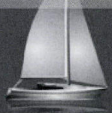
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3. **ELECTRIFYING YOUR BOAT** by Hawthorne & Wagstaffe
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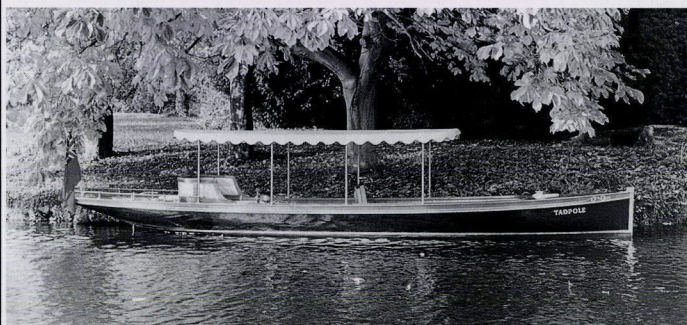
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The EBA stand at Grantham

BARBARA PENNIAL

Annual Report

A Summary of the Activities of the Electric Boat Association during 2007

Besides being the busiest period for the EBA, 2007 will be a memorable year for mud and flood and the draconian action by the government to reduce funding for the Navigation Authorities. This will inevitably lead to higher costs for boaters and deterioration of the waterways due to reduced maintenance and cuts in restoration budgets. The EBA is continuing to add its voice to the arguments on behalf of our members.

We are hoping that the removal of the derogation on red diesel will cause more people to become interested in electric boats, although we do appreciate that we have business members who also build and supply diesel powered craft.

Shows

The fourth Boat Show at ExCel took place in January 2007, and EBA Business Members exhibiting were Bossoms, Fischer Panda, Nauticalia, and Salters Steamers. Colin and Lucie Henwood from Henwood & Dean were on the Classic Boat stand discussing traditional boatbuilding techniques and Navigators & General were offering their discounted policy for electric boats. The Broads Authority, British Waterways and the Environment Agency were represented at the Show.

Grantham on Water (renamed Grantham under Water) was the venue for the IWA National Trailboat Festival and the EBA stoically braved the extreme cold and wet to promote electric boating in a new area. This was followed by our first venture into a non-boating

event. Our President, Malcolm Moss was closely involved with the Royal Bath and West Show and as a result the EBA was invited to exhibit in the Sustainable Transport area within the Eco Section. This proved to be extremely worthwhile as it enabled us to bring electric craft to the notice of thousands of people, some of whom were completely unaware that electric propulsion for boats existed.

Our annual participation in the Beale Park Thames Boat Show in June proved to be as successful as always and we were happy to support our business members CMP, Hambleton Sales & Charter, Henwood & Dean, Pb Batteries and Thames Electric with the hull of Helen Loney's new boat, to be used for another attempt at the electric speed record. The 30th Thames Traditional Boat Rally was held at Fawley Meadow, Henley and although the weather was fine, it was the worst week of the summer downpours and the River Thames was in flood. This caused great disruption to all activities on the river and Peter Freebody, Henwood & Dean, Hambleton Sales & Charter and the EBA were forced to dismantle stands very quickly as the rally

was abandoned on the Sunday morning.

The IWA National Festival took place over August Bank Holiday at St Ives, Cambridgeshire and that too came very close to being abandoned due to the muddy conditions on the water meadows where it was held. However the determination of the IWA's Waterways Recovery Group to overcome the mudbath, made the festival possible and in fact resulted in a very successful event. Pb Batteries, Hartford Marina and the Broads Authority were there and we were pleased to welcome new Business Members, Kernowrat from Looe in Cornwall. It was good publicity for electric boating that the VIP boat used by Baroness Young of the Environment Agency to open the Festival was *Annie*, the solar powered cabin launch owned by EBA members, Les and Elaine Fidler.

The second Green Boat Show was held in September at Salhouse Broad, Norfolk. Among the many 'green' exhibitors were EBA Business Members Agni Motors, Kernowrat, Pb Batteries and Rupert Latham, together with the Broads Authority who are sponsors of EB News. This proved to be a well attended and successful venue for the promotion of electric boating.

The show also provided the venue for the presentation of the Julia Moss Solar Trophy to David Williams for his commitment to the development of solar powered boating.

The last show of the year for the EBA took the stand back to the West Country and the Somerset River Festival at Taunton. This was a busy show attracting a lot of interest in an area that could become



IWA Festival at St Ives

IAN RUTTER



Georgie, 5 Amp and Annie cruising in Cambridgeshire

very popular for electric craft in the near future.

Our attendance at the many shows throughout 2007 has added a tremendous workload to the EBA administration but has been greatly assisted by the support of various private members who have offered help in many ways.

At the time of writing this Report, the new Whyte & Mackay Boat Show is taking place at Earls Court and is reported elsewhere in the magazine together with the January London Boat Show at ExCel. We shall wait with interest to see whether the industry can support two major shows in London, as we remember the inland waterways trying to hold two shows in the same region and only a few weeks apart, namely Boats on Show at Penton Marina near Chertsey and Beale Park at Pangbourne. Only one show evolved from this experience.

Social Gatherings and Events

Through the kindness of Les and Elaine Fidler, the May cruise took place again in Cambridgeshire, this time on the Lodes of Wicken Fen with a somewhat damp journey to the historic city of Ely on the Sunday. In spite of the weather, enthusiastic and hardy members (including two who had travelled from Canada for the occasion) had a most enjoyable weekend including another impressive barbecue which once again had 'desserts to die for' courtesy of Julia Briars-Filby and Elaine.

Our AGM in June was supposed to have been followed by a sunny afternoon's cruising on the River Thames. However, following the familiar pattern of this summer's weather, only hardy (or foolhardy) members took to the water in less than perfect conditions.

This year the Norfolk Cruising Weekend was arranged to coincide with the Green Boat Show in order to give members the opportunity to attend both events over one weekend. Once again John and Sandy Williams provided their boatyard as a base for mooring and recharging and a very successful weekend ensued, including an evening cruise to and from dinner, another to How Hill and a riverside picnic.

The social season was brought to a close in October by the annual Laying Up Supper at the Maidenhead Rowing Club, which was, as always, well supported by both business and private members.

Membership

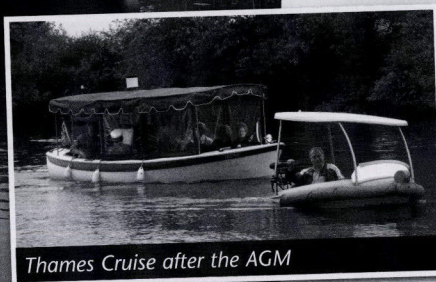
This year has seen a continuing upward trend in private membership and more significantly an increase in business membership, including applications from companies overseas. This is in part due to our excellent website which is attracting enquiries from around the world.

Committee Matters

In order to facilitate the smooth running of the administration, the Executive Committee has been meeting on alternative months throughout the year. The work involved with membership and technical enquiries has rocketed in recent years and is now increasing at an alarming rate. This growth in workload for the Secretary is becoming unsustainable and seeking additional support from members has become a matter of urgency.

At the Annual General Meeting outstanding matters regarding our Articles of Association were resolved and the current committee who had agreed to continue in their roles, were re-elected.

Various members of the Executive



Thames Cruise after the AGM

Committee have been attending meetings with the relevant authorities to discuss items such as slipways and problems with electric hook-up/charging points in different areas of the UK. We have also been in discussion with the Olympic Delivery Authority regarding the use of electric boats for transport throughout the 2012 Games.

We are also monitoring and taking part in discussions regarding the cuts in funding for the Navigation Authorities which will inevitably have a detrimental effect on everyone using the inland waterways.

You will see from the calendar that 2008 is already looking busier than 2007, which stretched our resources to the limit. With an even greater workload looming, we cannot meet every request to attend and support events throughout the country. Therefore I do appeal to our membership to give serious consideration to volunteering some help, however small, to enable us to broaden the promotion of electric boating at a time when people are becoming more aware of their environment.

If you would like to make a major positive contribution to the running of the EBA, then we would ask you to consider the role of Membership Secretary, thus allowing Barbara to concentrate on the general administration of the Association and dealing with the increasing number of enquiries. These are arriving from all parts of the world on a daily basis, as currently the EBA appears to be the only active English speaking electric boat association in operation.

At the time of writing this report, the outlook for the inland waterways in 2008 does not look very encouraging. However, with the hope that we shall see much better weather next summer, I look forward to seeing many of you on the water or at events over the next twelve months. Good Boating.

John Hustwick
Chairman



Electric Boat Association



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Honorary Vice Presidents

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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.

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.



SOS THE SHIP'S SINKING

Is there anyone out there willing to throw a lifeline to the Secretary and take over responsibility for the membership records?

All you need is a computer and internet access.

If you would like to know what this would involve, please contact Barbara on
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