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Volume 18 Number 3 Autumn 2005

Electric Boat **NEWS**

The Journal of the Electric Boat Association

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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.

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EBA CALENDAR

October 2005

30th – 3rd November **EBA represented** World speed record bid
Coniston Water

January 2006

6th – 15th **EBA interest** London International Boat Show
at Excel

April

15th – 17th **EBA represented** Trail Boat Rally
Lancaster Canal

tba **EBA Event** Launch Supper

May

13th – 14th **EBA Event** Cruising weekend
on River Great Ouse

13th – 14th **EBA represented** Lowestoft Boat Show

21st **EBA represented** Somerset River Festival

31st – 3rd June **EBA interest** Time and the Thames pageant
Henley

June

9th – 11th **EBA represented** Beale Park Thames Boat Show
Pangbourne on Thames

tba **EBA Event** AGM

July

8th – 9th **EBA represented** River Festival, Evesham

9th **EBA represented** Steam and Electric Boat Day
Sudbury, Suffolk

15th – 16th **EBA represented** Thames Traditional Boat Rally
Henley

August

25th - 28th **EBA represented** IWA Festival
Beale Park, Pangbourne on Thames

September

9th **EBA Event** Norfolk Cruise weekend
incorporating

10th **EBA represented** Broads Electric Boat Show

Please note that 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.

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Electric Boat Association

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**Cover Picture: The Prince of Wales and the Duchess
of Cornwall on the Broads Authority's
solar-powered boat Ra**

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The EBA has had a very active and successful summer season with shows and rallies on the Ouse, Thames and Stour, the Bridgwater Canal and the Broads. There have been interesting technical developments in hybrid, solar and fuel cell power and later this month attention will focus on the Lake District with the attempt to win back the world speed record for electric boats.

Along with the website and the new brochure all this activity has led to a higher profile for the EBA, reflected in an increase in enquiries and new members. Concern about oil supplies has led to greater interest in 'green' technologies and the EBA is increasingly being invited to contribute to discussion groups and participate in events.

The provisional programme on the left, which is likely to expand as the season progresses, indicates that the boating season next year will be even busier – and set to be a most interesting and enjoyable one too.

Sylvia Rutter

Editor

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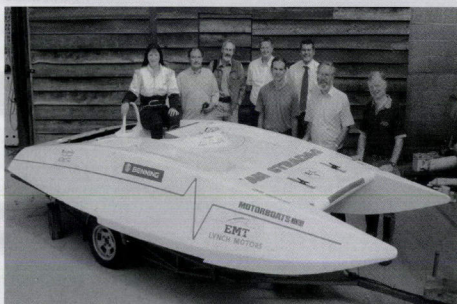
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Copy Deadlines:

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:

Winter 1st December



Speed boat Page 5



Fuel cell boat Page 12



African boat Page 18

HOORAY HENLEY

Punts, gigs, canoes, skiffs, Dunkirk Little Ships and steam and electric launches met on the Thames for Europe's largest gathering of traditionally built boats. Report by Sylvia Rutter with pictures by Ian Rutter.

The sun shone, the varnish gleamed and the champagne corks popped as traditional craft paraded at Fawley Meadow alongside the Thames at Henley on 16th and 17th July. The EBA stand attracted a constant stream of visitors and EBA Chairman John Hustwick and Secretary Barbara Penniall were kept very busy dealing with enquiries and signing up the seven new members who joined the association over the weekend.

EBA business members were well represented at the rally. Peter Freebody & Co. were showing a stunning 30 ft electric slipper launch *Bunnybelle* with brass fittings and upholstered seats. 16 gel batteries under the fore and aft deck provide 48 volts to run the Lynch motor.

Bunnybelle is two years old and based on the Thames at Hurley.

Rupert Latham had travelled from Norfolk with a large steam engine to display as well as panels showing some of his recent work on electric boats. These included the wherry *White Moth* and a new passenger ferry for Trentham Gardens, both of which are featured later in this magazine. Openworld Yachts had come down from the Lake District with their elegant 30 ft Windermere launch, available in a diesel or electric version. Nearer to home territory was Gillian Nahum of Hambleden Sales & Charter,

discussing a variety of boats for sale and for hire, as well as getting information on nautical fashions.

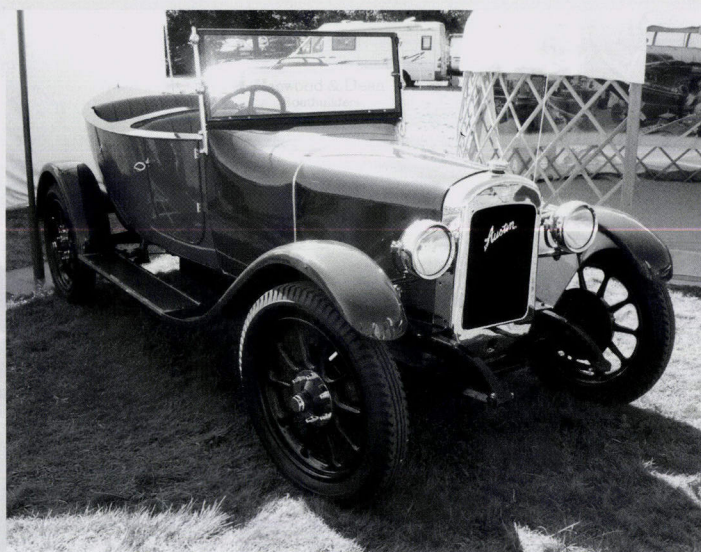
Henwood & Dean caused a lot of interest not with a boat but with a car. In the early 1900s boat-tailed cars were very fashionable and, to demonstrate the craftsmanship skills normally used to restore classic boats, they were displaying a 1924 Austin tourer with a wooden boat shaped body. Chief designer and coachbuilder Richard McGuinness was alongside to explain some of the details of the restoration which involved steam bending the highest quality mahogany planking on to ash frames with copper nails and roves.

The show also attracted a lot of private EBA members, with and without boats. Jack Henley's 1899 Andrews launch *Pike* was looking just as elegant as she does on the front cover of the new EBA brochure. Also on the water was the canoe *Kobe*, built in 1924 by Hobbs and now based on the Abbey River at Chertsey. Owner Guy Cooke (prompted by his wife) revealed that the boat's

unusual name, Swahili for 'tortoise', was inspired by his nickname! *Kobe* has a 24 volt electrical system with a Briggs & Stratton electric motor attached to a sonic sail drive and will shortly be moving with her owners to Norfolk.



Bunnybelle



Boat-tailed car



Kobe



Daphne, with Shiel Water in the background

Graham Mackereth had brought his elegant cabin launch *Daphne* from her home on the Bridgewater Canal in Cheshire. *Daphne* was built in 1908 by Borwicks of Bowness, originally with an early Gardner petrol engine but was converted to electric power by Rupert Latham with a Lynch motor and Whispagen Stirling engine which provides heating and recharging. *Daphne* was moored beside the much younger electric launch *Shiel Water*, which had travelled to the rally by water from her home at Bourne End with owners Terence and Ann Casey.

The Simonds Trophy for electrically powered craft was won by *Polly*, owned by Phil and Karen Smyth. *Polly*, which has a Combi 700 Saildrive electric motor, was designed by Andrew Wolstenholme to match the original owner's 1920s sailing boat and was built in 1998



Polly

by Henwood & Dean. Runner-up for the Simonds Trophy, and also for the Thames Heritage Cup, was *Humble* owned by Victoria Fash. *Humble* was built in 1902 as an electric launch and in the early 1900s was taken on a European tour by the Prince of Wales. During the Second World War the boat had a petrol engine and a steam-driven fire pump: a somewhat dangerous combination when she was operating as a fire-fighting boat in the London Docks. Restored by Peter Freebody in the 1980s *Humble* is once again an electric boat with a Nelco 3 kW motor and 24 6 volt batteries installed by Rupert Latham.

The 2006 Thames Traditional Boat Rally will be at the same location on 15th and 16th July and boats taking part must register by 3rd June. The rally's website is www.tradboatrally.com.

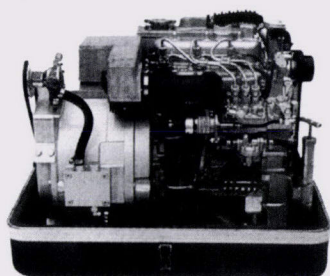


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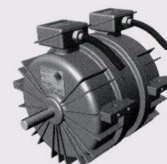


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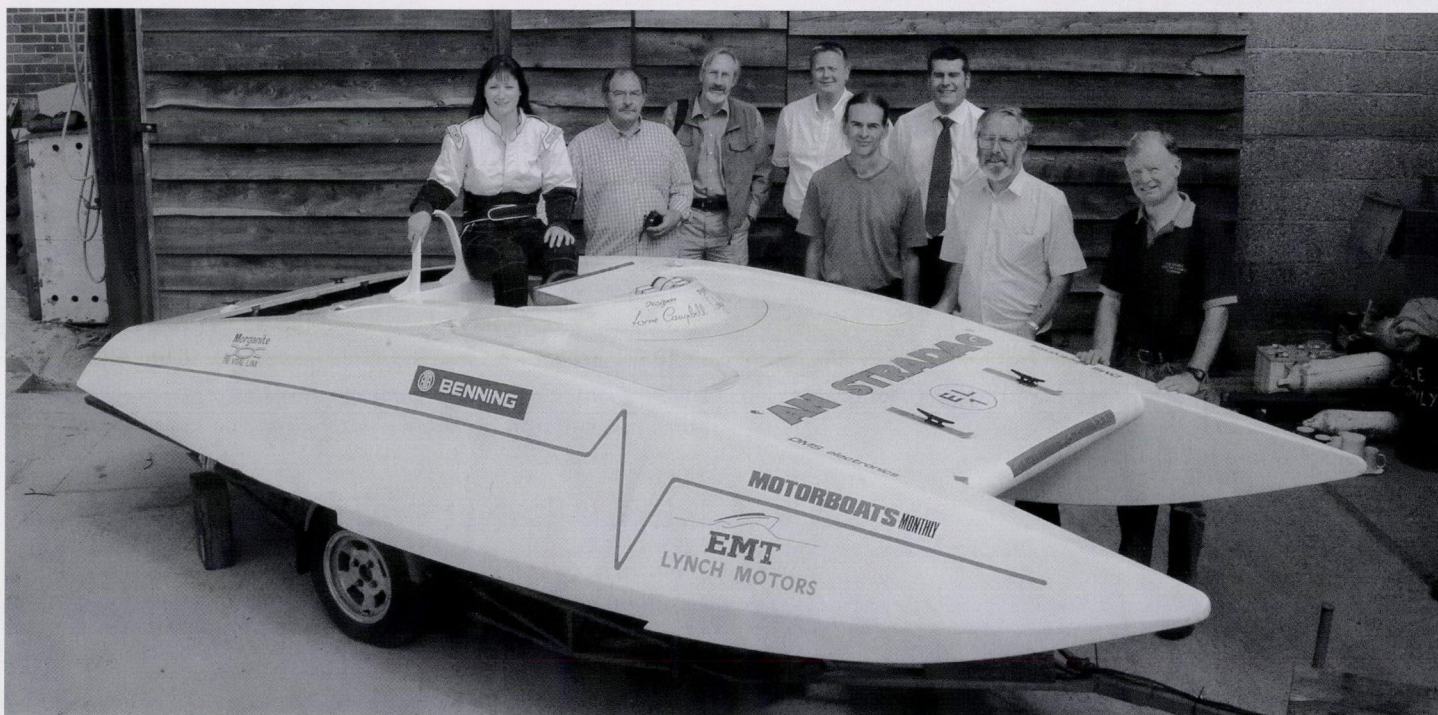
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WORLD RECORD BID

It's all systems go on *An Stradag* (The Spark) which is aiming to recapture the world speed record for battery-powered electric boats on Coniston Water in late October/early November. Ian Rutter has been taking pictures of the work in progress.



The team from left: Helen Loney, Henry Engelen, Lorne Campbell, Chris Loney, Cedric Lynch, Paul Bates of CMP, Emrhys Barrell, Ian Rutter

The 16 ft hydroplane *An Stradag*, with her owner the 71-year old Countess of Arran at the controls, first set the world record in 1989 with a speed of 50.825 mph. Since then the boat has been on display in the Lakeland Motor Museum, while the record (now held by the United States) has climbed to 70.6 mph.

On August 8th *An Stradag's* new owner, Cumbrian businessman Henry Engelen, brought her south to Hambleden where Colin and Lucie Henwood had generously offered work space in one of their boat sheds. There he met members of the team involved in the 1989 record attempt: the boat's designer, Lorne Campbell, Emrhys Barrell who drove the support boat and Cedric Lynch who supplied the motors. Helen Loney, who (as well as Henry) will be driving the

boat for some of the runs, came to meet the team with her husband Chris, who will be acting as 'pit crew' for the record attempt.

Cedric Lynch is supplying four new 25 kW motors, manufactured by Agni Motors in India, CMP are providing AGM batteries and Curtis the controllers. Emrhys Barrell and Ian Rutter of the Thames Electric Launch Company are installing the controllers and electrical systems and Chris Pattison is preparing the hull. With everything in place and the boat painted, the next stage will be trial runs on Chase Water in the Midlands before the record attempt on Coniston from 30th October to 3rd November.

More information about *An Stradag* is on the website www.electricrecordteam.com



Henry, Helen and Lorne



Cedric and Arvind Rabadia working on the new motor installation



Helen trying out the driving position

ROYAL TRIP ON RA

Our front cover picture shows the Prince of Wales and the Duchess of Cornwall, making their first public appearance in Norfolk as husband and wife, on board the Broads Authority's solar powered boat *Ra*. On July 26th, to celebrate National Parks Week, the royal couple toured Barton Broad, the second largest of the broads, and inspected the Broads Authority's multi million pound lake restoration project.

Unfortunately the Daily Telegraph described *Ra* as 'the nation's only solar-powered passenger boat', prompting EBA President Malcolm Moss to write to the Editor, pointing out that there are at least three others: the Swiss-built catamaran *Solar Heritage* in Chichester Harbour (which appeared in EB News last autumn) and the two 1920s Coniston launches *Ruskin* and *Ransome*, converted to solar power this year and featured in the last issue.

SAVE LONGRIDGE BOATING CENTRE



A boating centre which has introduced hundreds of thousands of young people from all over the UK to fun and skills on the water is threatened with closure. Established fifty years ago, the Longridge Scout Boating Centre on the Thames near Marlow has 28,000 visitors every year who are taught to handle river craft expertly and safely. Many have become prominent in water sports and some have gained Olympic medals. Others have simply overcome their fears, learned to work as part of a team and discovered new talents.

The Scout Association has put the Longridge site up for sale and an independent charitable trust has been formed to secure its future. The first task is to raise £1.5 million to buy the freehold and an estimated further £3.5 million will be needed to improve accommodation and facilities on the site.

You can become a Friend of Longridge for £10 and get updates on the campaign; contributions can be made through the website www.friendsoflongridge.org.uk or by post to: Longridge, Quarry Wood Road, Marlow, Bucks. SL7 1RE.

ELECTRIC BOAT AT TINTIN'S CHÂTEAU

Visitors to the French Château Cheverny in the Loire Valley have been enjoying trips on a silent electric boat over the summer. The richly furnished château, which was Hergé's model for Moulinsart in the Tintin stories, is surrounded by beautiful parkland, including a canal, which can be explored by electric car and electric boat so that there is no disturbance to the wildlife.

The château is open to visitors all the year round but the car and boat trips are only available from April to November.

More information on the website www.chateau-cheverny.fr



NEW INLAND WATERWAYS GUIDE

The Association of Inland Navigation Authorities has launched a new best practice guide 'Making more of our waterways' which focuses on working with local communities to promote and secure the future of our inland waterways. AINA has 30 members including British Waterways, the Environment Agency and the Broads Authority as well as local authorities, property developers, canal companies and national parks. The new guide outlines the advantages for communities in coming together for mutual benefit and enjoyment of the waterways.

Copies of the document can be downloaded from AINA's website www.aina.org.uk or contact Wendy Jones on 0113 243 3125

LINCOLNSHIRE WATER TAXI SERVICE

A water taxi service using electric boats opened on July 22nd, linking Spalding town centre to the Springfield's Shopping Centre and Gardens. Four boats, carrying up to twelve passengers, take 30





minutes for the two mile journey which costs £2.50 per person. The taxis are in radio contact in case queues develop and with all four craft in operation a 20 minute service can operate.

The boats were built by Phoenix Fleet of Potter Heigham with the electrical systems installed by Rupert Latham and batteries supplied by Pb. A full report from Vic Scott of Pb Batteries will appear in the next issue of EB News.

ELECTRIC BOATS ON THE STOUR

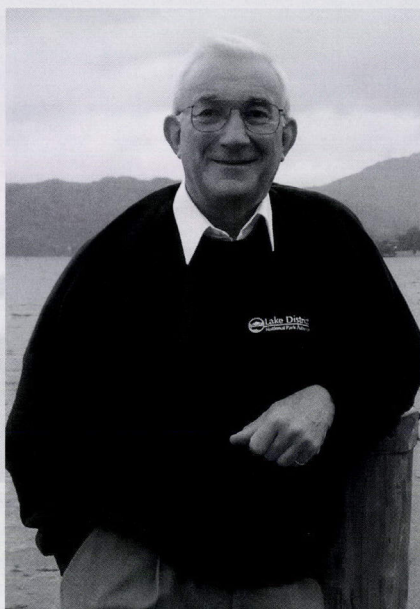
In another major step towards getting permanent through navigation on the River Stour in Suffolk, the Environment Agency granted permission for electric boats to use the whole length of the river for the August Bank Holiday weekend.

EBA members Emrhys and Linda Barrell brought along three portable boats plus a selection of electric outboards and, together with Stour Trust member Mike Finch, covered several sections of the river from Sudbury down to Flatford, going through the restored locks wherever possible and carrying the boats round others.

The boats were generally well-received by riverside residents, pubs, businesses and anglers, and it is to be hoped this will help the EA's initiative to get the river permanently opened to light, electric-powered boats.

NEW LAKE DISTRICT CHAIRMAN

The newly elected chairman of the Lake District National Park Authority intends to be an ambassador for the 885 square-mile area which attracts 12 million visitors a year. David Thornton wants to make the National Park more inclusive and accessible to groups from all walks of life while working with government, regional agencies and local authorities to keep the area as a working place and not a museum.



A former yachtsman, David now enjoys cruising around Lake Windermere on his electric launch. As a schoolboy in Windermere he remembers being taken to Coniston where speed ace Sir Malcolm Campbell was preparing for a record bid. "I handed him a little scrap of paper, which he signed and jokingly implied it would soon be lost. Almost 60 years later, I still have it!" he said.

42-SEAT PASSENGER FERRY



Trentham Gardens Leisure Ltd. have recently taken delivery of a new 11 meter 42 seat catamaran ferry, built by Ecocats Ltd, Torpoint and fitted with twin electric propulsion motors supplied by Rupert Latham. The boat is used for day and evening trips on the one mile long lake at Trentham Gardens, Stoke-on-Trent.

The ferry has a flat deck with seating for 42 passengers. Each hull is fitted with a 4 kW direct drive SEM motor and a Zapi controller with power supplied from a 48V 700 Ah battery pack, providing eight hours cruising time. Thanks to the twin installation the catamaran is highly manoeuvrable and will turn in its own length.

DUTCH SOLAR CHALLENGE

Teams of students from all over the world are being invited to enrol for the Frisian Nuon Solar Challenge to be held from 26th June to 1st July 2006 in the Netherlands water sports province of Friesland. Competitors will travel over a 220 kilometre course through 11 historic cities linked via lakes, rivers and canals in boats powered only by solar panels. The challenge is open to teams from universities and institutes of technology. Participants must build their own boats but will be provided with the solar panels.

For more information e-mail info@frisiannuonsolarchallenge.com or look at the website www.frisiannuonsolarchallenge.com

STEAM AND ELECTRIC ON THE STOUR

Trustees of the River Stour again welcomed steam and electric boats for a festival on 10th July. Report by Barbara Penniall with pictures by Linda Barrell.



Robin's Nest

The sun shone and the mood was calm as we enjoyed the peace of this tranquil stretch of Suffolk waterway.

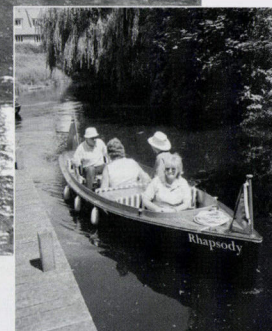
Robert and Tina Baker, owners of the beautiful steamboat *Firebird*, recently restored by EBA business members Henwood & Dean, kindly invited us to launch at their slipway. Nick and Yvonne Goldring with their electric canoe *Silent Explorer* and John Hustwick in *Rhapsody* met at Bakers' Mill where Robert was preparing *Firebird*. As the electric craft slipped easily into the river (sorry Robert, one of the advantages of electric craft – we don't have to wait half an hour for steam up!) we were joined by Stephen and Veronica Worrall in *The Lady Susan*. Stephen and Veronica had guests for the day, so were unable to join us at The Granary, but we cruised as far as Cornard Lock together on what is, of course, their home stretch.

Once through the lock, we continued to the Granary where fellow EBA members Paul and Diane Rusher with *Robin's Nest* and Emrhys and Linda Barrell of the Thames Electric Launch Company with their Mobiboat were already taking visitors on to the water. The Trust's electric Frolic *Rosette* was there together with their non-electric *Frances D*, so there was ample opportunity for visitors to sample our quiet, pollution free boating.

Firebird, in all her splendour, cruised with us for the afternoon, representing the 'steam' element of the day, and demonstrated her superiority by being able to brew pots of tea – whereas the electric



The Mobiboat



Rhapsody

boaters had to be content with sharing a bottle of wine. However, it has to be mentioned that Tina appears to be quite keen on the obvious benefits of 'instant' electric boating, and both Robert and Tina spent some time cruising around in *Silent Explorer*.

Endless trips were made on the stretch of water between Cornard Lock and the Granary, copies of the EB News and our new brochure were handed out and from the comments received from delighted passengers – most of whom had not had the opportunity to experience electric boating for themselves – the day proved to be not only enjoyable, but successful for the River Stour Trust.

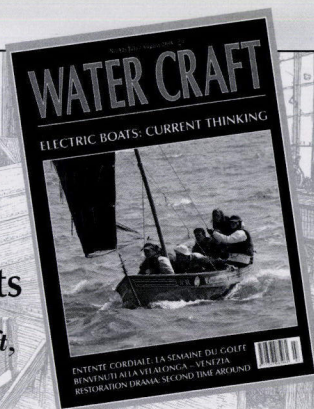
In order to comply with recent insurance restrictions governing these events, no charge was made for the public to take part in any activities at the Granary or the offered boat trips, but John Morris, the Trust Operations Manager, was very pleased to tell us later that £320 had been collected in donations.

The day finished very pleasantly, with a gentle evening cruise in *Firebird* to the local riverside pub, where en route we again met *The Lady Susan* and her guests. It was truly a day devoted to both steam and electric boating.

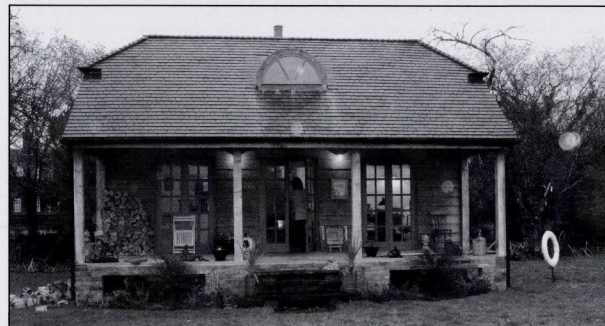
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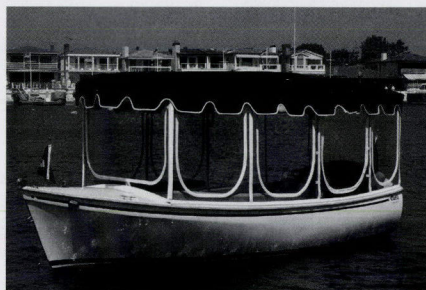
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BIENNIAL GENERAL MEETING

The EBA Biennial General Meeting was held at Cookham Reach Sailing Club on 18th June. This is a summary of the day's proceedings.

EBA members arrived by car, train, bicycle and, of course, electric boat. After coffee the official business of the day began at 11 a.m.

EBA Chairman John Hustwick drew members' attention to the new promotional brochure which had been instigated at the last BGM. The brochure had been distributed with the current issue of *Water Craft*, to coincide with an article by Andrew Wolstenholme on electric boating, as well as with a third of the UK subscription run of *Practical Boat Owner*.

John reported on the recent meeting he and EBA Secretary Barbara Penniall had had with the Lake District National Parks Authority. Steps were already being taken to put an additional hook-up point on Lake Windermere and interest had been expressed in a 'Go Electric' grant scheme like the one in Norfolk. Contact had also been made with IWA representatives about the Trailboat Rally to be held on the Lancaster Canal next Easter.

John and Barbara had taken the EBA stand to the Bridgewater Festival and the Association had also been invited to events at

Evesham, Lincoln, Shrewsbury and the Severn, which would be considered for 2006. John made a plea for help with future social events and shows.

John praised *Electric Boat News* as a promotional tool and also the excellent website which had had 1,414,000 'hits' since October. He thought that business members would be interested

to know that the Product Guide on the website was the most downloaded page.

Barbara reported that she was getting many enquiries, often of a technical nature, which were passed on to business members. She was pleased to report a steady increase in membership with a current total of 268 private and 39 business members. New advertising was also coming in.

Treasurer Brian Pickess distributed copies of the accounts, showing a surplus of income over expenditure for the year of £3112. Having expressed

his wish to step down as Treasurer after seven years, Brian was thanked for all his hard work.

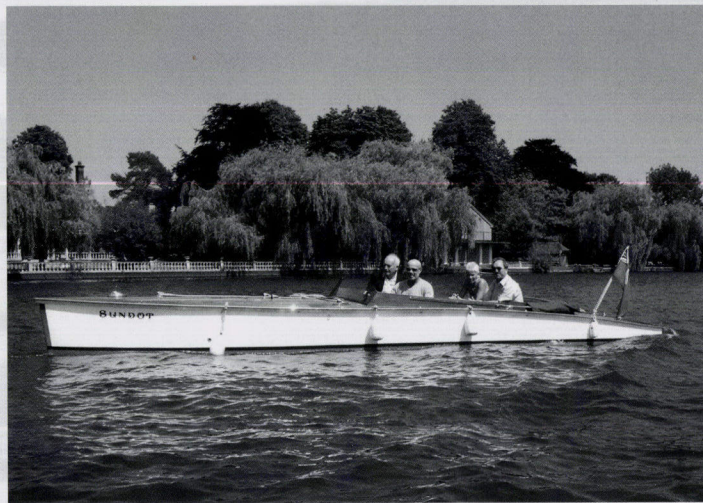
Business Representative Dave Millin was unable to attend the



Malcolm and Simon Moss with Les and Elaine Fidler and the solar trophy



Georgie with John Hustwick and the Waterson family



Slipper Launch Sun Dot



IAN RUTTER



Punt Thames Bank

NICK GOLDRING



Irene at Marlow Weir

BGM but reported that since his appointment he had attended every committee meeting and brought up requests, problems or comments made by business members.

There was considerable discussion about the proposed changes to the Articles of Association, aimed at improving the organisation's efficiency. It was stressed that members would always have access to the Executive Committee: business members through Dave Millin, or – for any commercially sensitive matters – through the Chairman or Secretary, and private members through their representative Ian Rutter. With an annual (rather than biennial) general meeting in future, items could be raised by members in open discussion. While business members Gillian Nahum, Paul Bennett and Simon Davis agreed with the amendments, Phil Horsley and

IAN RUTTER



Webmaster Nick Goldring with Ian Webb in Silent Explorer

Emrhys Barrell had concerns and had drawn up a further document with amendments to those proposed by the EBA committee. It was eventually decided that the amendments which were agreed should be adopted, and that the committee would have further discussions with the two objecting business members, after which they would circulate the proposed changes to the membership. The changes would then be voted on at the next Annual General Meeting.

The committee members were all re-elected and the meeting was

very pleased to appoint Malcolm Moss as the new EBA President. Brian Pickess agreed to continue as Treasurer until the appointment of a successor.

The meeting concluded with the awarding of prizes and trophies. Matt Strange had been awarded the place on the Boat Handling

Course offered by the EBA in conjunction with Bisham Abbey Sailing School. The EBA was very pleased to announce a new trophy for a significant contribution to solar boating, donated by Malcolm Moss in memory of his late wife. The Julia Moss Trophy, which includes a bursary, was presented by Simon Moss to Les and Elaine Fidler. Emrhys Barrell announced the award of the Thames Electric Launch Company's Explorer Trophy which was collected by Phil Horsley on behalf of the winners Paul and Diane Rusher.

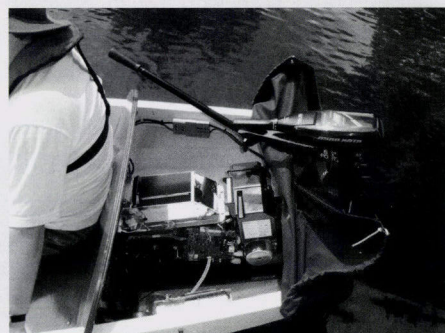
With the formal proceedings over, EBA members were able to take advantage of the beautiful location and sunny weather to have picnics by the river, followed by a cruise up to Marlow weir in *Collinda*, *Dinya*, *Georgie*, *Irene*, *Mystère*, *Shiel Water*, *Silent Explorer*, *Sun Dot*, *Thames Bank* and *Wysteria*. The day's events concluded with drinks (and birthday cake) in Edward and Dinnie Hawthorne's riverside garden at Bourne End.

FUEL CELL TEST ON THE THAMES

After our report on fuel cell boats the EBA was asked by Cellcraft Ventures of High Wycombe to supervise an endurance test for an experimental hydrogen powered boat. Report by Sylvia Rutter with pictures by Ian Rutter.



Simon Jeffs and Nigel Penn-Simkins on board Cellcraft



Fuel cell with voltage regulator

The area chosen for the test was the four and a half mile lock-free stretch of the Thames between Marlow and Cookham. On 15th July, EBA Chairman John Hustwick and Secretary Barbara Penniall, together with Sylvia and Ian Rutter and Barbara's father,

Geoffrey Nunn, who was visiting from his home in Wales, set off upstream on board the solar-powered launch *Collinda*, which was acting as pace boat. Soon the experimental *Cellcraft* emerged from Marlow Lock, crewed by Company Director Simon Jeffs and Marketing Director Nigel Penn-Simkins. An outwardly conventional 14 ft skiff with a Minn Kota outboard, *Cellcraft* was distinguished by the fuel cell and voltage regulator neatly installed behind the stern seat and the lap-top computer on which Simon continually monitored progress. At 1.45 p.m. Simon connected the hydrogen cylinder and the test began.

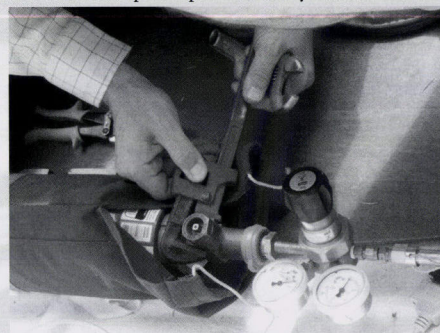
In this prototype a commercially available hydrogen cylinder weighing 16 kilos and costing £35 is used to power the boat. The pressurised cylinder of nine litres volume contains 1480 litres of hydrogen at 175 bar in a steel bottle. In the future a high-tech carbon fibre cylinder will be developed which will hold more hydrogen and weigh a lot less.

The fuel cell produces a varying voltage from 18 to 50 volts. This is

fed into a DC/DC converter to give a constant 28 volt output to charge the battery. The output power of the fuel cell is automatically adjusted to match the load up to a maximum of 1.8 kW. The motor can be run from the battery or the fuel cell alone. Two air blowers provide cooling and a sensor shuts the fuel cell down if the cylinder runs out of hydrogen. The power is clean and silent and the only 'waste' product is water which dribbles out on to a tray.

In the early stages of the test the boat was travelling at 3.5 knots using 15.8 amps, 27.8 volts, 440 watts. On full power it was able to do 4.6 knots. On one of the runs a brief pause was made at Bourne End when we spotted EBA Vice President Edward Hawthorne with his wife Dinnie in their boat *Mystère*. As author of 'Electric Boats on the Thames 1889-1914' Edward was fascinated to bring his knowledge right up to date with this 21st Century technology.

We have to admit that *Collinda* ran out of power before *Cellcraft* did. To be fair to *Collinda* the skies were rather cloudy and she had used up a lot of solar power in the batteries on a trip the previous day. So the EBA observer team did a hasty transfer to *Irene* for the final stages of the test which finished at 5.25 pm. Simon's figures showed that in the three and a half hours *Cellcraft* had averaged 3.7 knots over a distance of 13 nautical miles.



Connecting the hydrogen cylinder

WHITE MOTH

Rupert Latham reports on the conversion of a traditional Norfolk wherry.

The Broads wherry yacht *White Moth* was built by Ernest Collins of Wroxham in 1915. She has an overall length of 60ft and displacement of 26 tons. Her launch coincided with the rapid growth of the Broads holiday market to embrace affluent middle-class people, ending an era when it had been the preserve of the upper classes. Originally she relied solely on the power of the wind, but to increase manoeuvring ability and to ensure tidal flows did not delay her schedule for the next charter, she was fitted with a petrol engine in the early 1920s.

Mike Barnes, a director of the Norfolk Broads Yachting Company which owns the craft and operates her for charter, first thought of the idea of replacing the diesel engine, fitted in the 1980s, after installing an electric system which I supplied earlier in the year for *Doris*, a 26 ft river launch. He was so impressed with the smooth power delivery he began to think electric.

The conversion of *White Moth* coincided with her 90th birthday and was partly funded by a grant of £4,000 of European and Broads Authority funding. Once again I was commissioned to supply the propulsion system and to advise on the installation.

The old diesel engine and hydraulic drive arrangement was enclosed behind mahogany panel doors on the starboard side aft

close to the cockpit. After removal of the engine there was just about enough room for a sound encapsulated Panda 6000 AGT DC generator and the battery box containing 36 2V cells with a system voltage 72V and capacity 390 Ah. The 8 kW separately excited motor took the place of the old hydraulic drive motor and was direct coupled to the existing shaft. The motor controller is a SEM-3 500 amp Zapi unit. In addition to the generator a high frequency charger is fitted to take the cells periodically through a full charge cycle.

On trials all 26 tons of wherry moved swiftly from her moorings and her performance and manoeuvring ability surprised all the sceptics watching on the quay. At full power she has a speed of around 5 knots and running time around 5 hours without the use of the generator. At half power (normal cruise speed) the cruise time extends to around 8 hours.

Normally the electric motor would be little used during sailing, but a quick burst of power is always useful to assist tacking in a narrow busy river system. On return to her moorings Mike Barnes had to admit performance was quite that of the old 26 HP diesel engine. He said "It is fitting that this will take *White Moth* back to the early, silent days of holidays on the Broads".



NOTICEBOARD



WELCOME TO NEW MEMBERS

Private Members	Location	Boat where notified
Quentin Hoodless	Abingdon, Oxon	The Juliet
Alex Khot	Portslade	100 year old 42ft cruiser
Keith Burton	Norwich	Electric Canoe
Frank Altomare	Reading	Unio
Mark H Joslin	Norwich	
David Foster	Kendal, Cumbria	Peaceful – Mystic
Liza & Peter Sutcliffe	Shipton-Under- Wychwood	Mythical Maid
Dr P Slee	Hampton Wick	Polarity – Mayfly
Simon Mcmurtrie	Wargrave, Berks	
Tim Kingham	Bath	
John Paoli	London	
Chris Evans	Germany	La Petite Souris
Nick & Louise Puttick	Chearsley, Bucks	
Mr & Mrs Grimes	Fakenham, Norfolk	Sylveric
Judy & Rod Birks	Westcliffe-on-Sea	Winsome
Jenny & Derek Smith	Stalham, Norfolk	Teal
Kaye B Gray	Henley-on-Thames	Elden Voyage
R I Cotterill	High Peak, Derbyshire	
Roy Johnson	Grange Over Sands	Patricia
J M Worthington	Shrewsbury	Gem
Bob Layton	Bourne End, Bucks	Tulip Rose
Frank Kitching	Middlesbrough	
Mike Dolan	Cambridge	
Pat Jordan Evans	Henley-on-Thames	Vanda Belle
David Simister	Norwich	Sigridur
David Fitzjohn	Goring Heath, Berks	Frolic 21
Keith Pawson	Thame, Oxon	Electric slipper launch
Stan Ashton	Poulton-le-Fylde	
Geoff Beck	Rugby, Warwicks	My Boy Rick
Cyril Forbes	Ireland	



EBA TREASURER

After the EBA's plea for a new Treasurer to come forward, several offers have been received for which the committee (and Brian Pickess) are very grateful.



RIVER THAMES ALLIANCE

On 6th September Barbara Penniall represented the EBA at the AGM of the River Thames Alliance, a partnership between the Environment Agency and over 100 public and private sector organisations with interests in the non-tidal river. The EA reported that there had been a good response to their consultative document, the Thames Waterway Plan, outlining their vision for the future management of the Thames. The EBA's contribution had included a request for more and improved slipways, toilet facilities at all locks and the provision of further hook-up points.

The final document will be published in November when it can be viewed on www.visitthames.co.uk/twp.



RED DIESEL

The EBA has contributed to the recent debate about whether the tax concession on red diesel should continue for private pleasure boats by pointing out that this fuel is the worst quality diesel available and yet boat exhausts are discharged into inland waterways which are often used as a source of drinking water. The EBA feels strongly that inland waterways should be given separate consideration from off-shore waters. As an organisation which promotes quiet pollution-free boating, the EBA cannot endorse any proposals that reduced duty concessions should continue past the expiration of the current agreement.



SALES AND WANTS

The Classified Advertisements on the back page of the magazine can be used by members wanting to buy as well as to sell electric boats and equipment. Entries, which are free to EBA members, are restricted to 50 words and should be sent direct to the Editor.



CHARGING POINTS

If you have had any problems with re-charging at hook-up points at locks, please let Barbara know the details and she will take it up with the appropriate navigation authority.

TECHNICAL REPORT

ELECTRIC POINTS: 'THE HARE AND THE TORTOISE'

In the sixth of a series of short articles on technical aspects of electric boating, EBA Technical Officer Paul Lynn discusses the relationship between range and speed.

It is widely understood in EBA circles that if you are running out of battery power and worried about reaching your destination, you should reduce the current to your motor and go more slowly. Be a tortoise not a hare, as Aesop's fable recommends. The cruise will take longer, but you are more likely to arrive. In some respects this is a conundrum, for if you take longer over the voyage and run the motor for more hours, surely the batteries are more likely to go flat? Why not go hell for leather instead? In this article I should like to address these questions and indulge in a little gentle mathematics.

Let's consider an electric boat with a usable battery capacity denoted by C ampere-hours (Ah) at a voltage of V volts. Since volts multiplied by amps equals power in watts (W), we may also express this capacity as CV watt-hours (Wh). Now suppose that the motor requires P (power) watts to drive the boat at speed S kilometers per hour (kph) in smooth water. This means that the run-time at this speed is CV/P hours and the boat's range R equals CVS/P km. (Later we can insert typical numerical values for all these algebraic quantities to see what they mean in practice).

So far so good? Well the next point is a little more challenging, and lies at the heart of the matter. It is important to realise that the power required to move a displacement boat through the water is not proportional to speed. For example if we wish to go twice as fast, we must much more than double the power. The nonlinear relationship between power and speed may be expressed as $P=KS^n$, where K and n are constants related to the boat's displacement and hull form, and n is always greater than 1. This equation holds reasonably well at speeds below the so-called *hull speed* when the boat's drag is mainly caused by surface friction rather than wavemaking. (The hull speed in knots is often quoted as 1.34 multiplied by the square root of the boat's waterline length in feet. For a boat with 20 ft (6.1m) waterline this works out as 6 knots, or 6.9 mph, or 11 kph).

We now have two algebraic equations:

$$R=CVS/P \quad (1) \quad \text{and} \quad P=KS^n \quad (2)$$

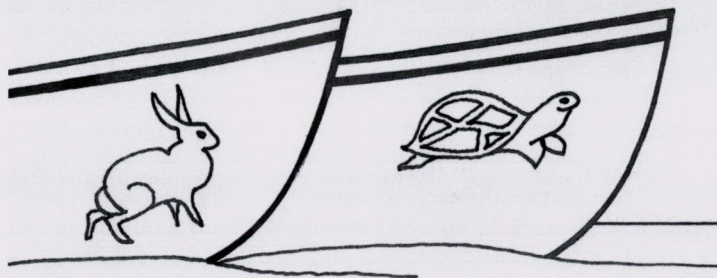
Substituting for P in equation (1) we get an interesting result:

$$R=CVS/KS^n = CV/KS^{n-1} \quad (3)$$

This gives a simple relationship between range R and speed S for a given battery capacity CV . If we can specify the values of the constants n and K for a particular boat, we can predict its maximum range at any speed.

Let's start with the value of n . I have analysed power-speed data for various EBA members' boats having widely differing displacements and hull forms, including my own solar catamaran, a Canadian canoe, two boats with Frolic hulls, and a canal narrowboat. I find that, provided we stay comfortably below hull speed in all cases, a value $n=2.0$ fits most

of the data rather well. This means that the input power to the motor is approximately proportional to the *square* of the speed (see Equation (2)). Double your speed, and you need about four times as much power. Turning to



Equation (3) we see that if $n=2$ so that $(n-1)=1$, then range becomes *inversely proportional* to speed. Double your speed, and you get only half the range. These general results are quite easy to visualise and remember.

To calculate the actual range in kilometers we need to know the value of K . You may find this for your boat if you know the motor power at any one speed. For example, suppose your motor takes 30A at 24V, or 720W, at a boat speed of 8 kph (which is below its hull speed). Then using equation (2) we find that $K=11.25$. Let's further assume that your battery bank's usable capacity is 200Ah at 24V, or 4800 Wh. Equation (3) gives your range as $4800/(11.25 \times 8)=53$ km. Now suppose you decide to reduce speed to 6 kph in order to increase range. Equation (3) gives your new range as $4800/(11.25 \times 6)=71$ km. And so on. Armed with the values of n and K for your boat, you can predict the maximum range for any value of speed, without further ado – or so I contend!

After a pleasant recharging stop at the Waterman's Arms, *Tortoise* heads gently down river leaving *Hare* to catch up later. Half way home *Hare* overtakes ostentatiously, little realising that the values of n and K are about to exact their revenge. *Tortoise* is last seen enjoying evening refreshment at the Traveller's Rest, entirely alone.

WEBMASTER ON THE AIRWAVES

EBA Webmaster Nick Goldring will be appearing in a television series about boat restoration. This is his report on the recording day in July.



Bill, Larry and Bill's daughter Sarita at Marsh Lock

The day started at 8.30 at a friend's Thames-side house in Shiplake where I met Larry (Lawrence Walford) the cameraman/producer and was introduced to Bill Ward, the owner of a 1930s clinker built rowing boat *Tern*, which is being restored and converted to electric propulsion using a Lynch motor with an 'Autoprop' variable pitch propeller.

Some close-up shots of my boat *Silent Explorer* were taken before the three of us got on board for a cruise up the Hennerton backwater. Larry was so bowled over by the peace and tranquillity of this stretch of river that he asked me to travel

back downstream again for a second 'take'.

The recording was for a documentary series, due to be shown on the Discovery Home and Leisure channel later this year, about ten separate boat restoration projects. Each one hour episode will follow

the progress of a different project from conception though to completion. The programme about Bill Ward's boat will look at various electric power options and use *Silent Explorer's* Minn Kota conversion as an example of how a standard electric trolling motor can be integrated seamlessly into a canoe. I had to demonstrate the amazing manoeuvrability of a rudderless 'pod' installation and discuss the workings of *Silent Explorer* and the benefits of small electric boat ownership 'on camera'. I did a bit of name dropping for the EBA and plugged the electric-boat-association.org.uk website. I hope this won't be edited out.

Later Larry recorded me launching and recovering *Silent Explorer* single handed from my trailer at Ferry Lane in Wargrave to show the benefits of owning a small lightweight boat. Don't tell anyone, but this also required a second take because I forgot to grab the mooring rope during the first take as the canoe slid effortlessly into the water from the trailer and had to leap into the river and run after her. I'm hoping Larry will destroy this out-take. **Editor's note: if he does we'll look forward to seeing it in one of those out-takes compilation programmes (along with some of mine from my BBC days!)**

Later we went downstream into Henley and had a picnic lunch moored up alongside the course staging, and we watched some rowing and drank champagne (wearing silly hats of course).

LETTERS

From Nathan Arnold, Environment Agency, Peterborough

Dear Barbara

Electric Boat News Summer 2005

I have just read the latest issue of the *Electric Boat News* and would like to commend you on the lovely article you wrote regarding your weekend cruise on the River Great Ouse. The article was very informative and gave a very good reflection on what we think is a wonderful river.

I was also pleased to read that you are planning to organise a similar event again in the future. Please do not hesitate to contact me nearer the time and we would be more than pleased to assist you in any way we can.

Yours sincerely,

Nathan Arnold

Team Leader, Great Ouse & Stour Waterways

From Graham Hardy, Australia

Dear Sylvia

I'm very keen to find out more about the early history of my boat *Zitania*. I know she was built sometime around the 1890s and was owned by the Tolley family around the turn of the century.



Zitania

She used to run around Maidenhead and her brass wheel has 'Kerby Bowen, England' engraved on it. I understand he was an entrepreneur of the day and hired out electric launches. *Zitania* was brought to Australia on the deck of a mail steamer in 1908. Her aft cabin was moved forward at that time and since then, other than restoration, she remains as she was. I have owned her since 1969. I attach a recent photograph for interest.

I would be thrilled if you could assist in helping to obtain more information about her and narrow down her date of construction.

Regards

Graham Hardy

Edward Hawthorne (who has been in touch with Graham Hardy) has a chapter in his book on Kerby Bowen, who owned the Ray Mead Hotel at Boulter's Lock, but has nothing on this boat. If you can help Graham his e-mail address is Graham@hardymilazzo.com.au

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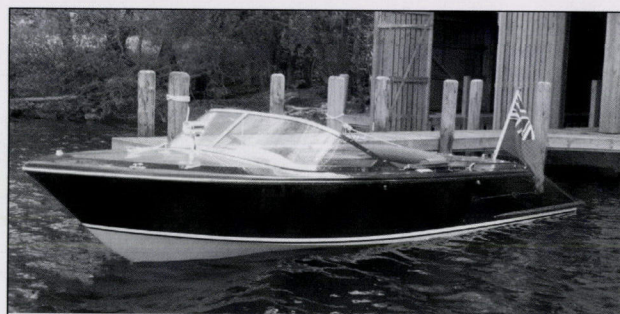


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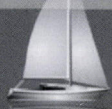
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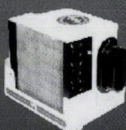
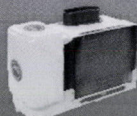
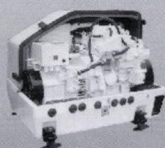
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Just untie and unwind

Neville Passmore tells the story of a home-built electric launch from the southern tip of Africa.

My home water is the magnificent Keurbooms River Estuary near Plettenberg Bay, South Africa. It is about 10 km in extent and consists of a shallow coastal lagoon and the lower tidal reaches of a very scenic river. Several trends have been evident on this water in recent years. Although the boats were always over-powered, they are today massively so. Rubber Ducks, once small and single-engined, are now bloated beasts that sport twin outboards of around 150 HP or more.

The shallow lagoon suffers from increasing levels of noise pollution as expensive propellers are made to grind their way through the many sand banks and the occupants seem to prefer this to the obvious alternative of wading through the six-inch deep water! In my own case, outboard engine size has decreased from 20 HP to 5 HP over a succession of three boats and I have recently taken to drifting with the tide rather than having to endure the noise and vibration of the 'infernal'

combustion engine. It was at times like this, when I could hear the birds without disturbing them and watch the fish without sending them scurrying off, that the mind turned to electric propulsion.

This idea was given new impetus when my wife presented me with a little American book 'Twenty boats you can build' published by Arco Publishing Co., NY in 1958, containing a number of designs that originally appeared in 'Rudder Magazine'. The craft described ranged

from runabouts with tail fins like Cadillac automobiles to some very unappealing yachts. A drawing of a classic round-bottomed inboard launch *Mary Jane* (loa 17' 8", beam 5' 8", draft 14") by Robert Steward restored my faith in the American designers of the mid-twentieth century and culminated in a home-built project that lasted for the next three years.

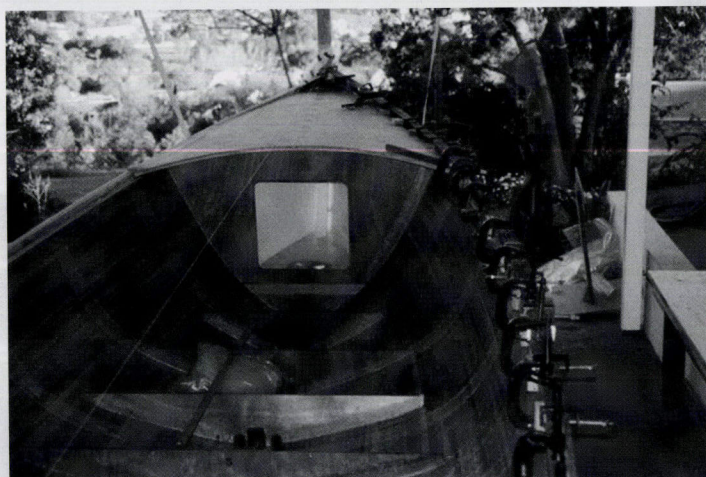
Eight moulds were cut from chip-board and mounted on a building

frame in the carport adjacent to my workshop. The inner stem was laminated from thin strips of Philippine mahogany and a laminated inner keel of the same material was notched into the moulds. A 1" marine plywood transom was added and the hull was strip planked with 7/8"x1/2" epoxy-glued camphor wood strips procured locally. After a month, about 60 strips per side were in place and the hull was faired off. A laminated mahogany outer stem was added, effectively trapping the strips at the bow. A solid teak keel was made in two halves and bolted

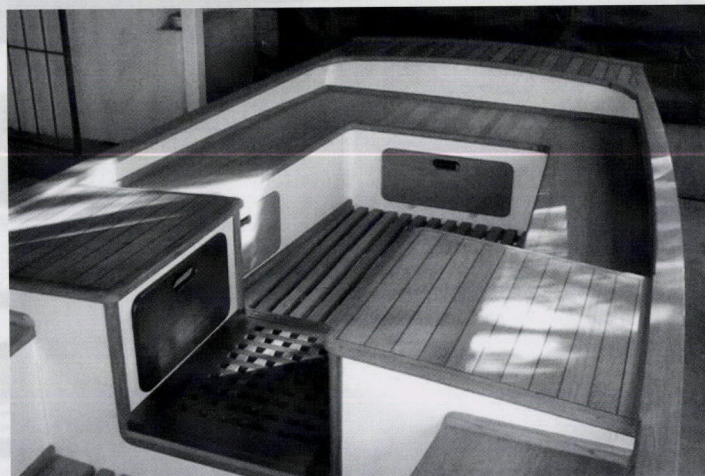
in place. Epoxy-glass sheathing was applied to the outside of the hull and finished off with white epoxy flowcoat. Several orbital sanders went to machine tool heaven before a properly faired off surface was achieved. The shell was then removed from the moulds and similarly treated inside. Laminated gunwhales, floor bearers and three bulkheads epoxied to the shell stiffened the structure considerably.



Hull after fairing off



Laminating gunwhales out of nine strips of teak



Interior woodwork



Marine plywood under-decks and yacht-style seating with lockers beneath were then added.

All exposed timber including the transom is Burmese teak, much of it very old and a pleasure to work. Procurement of a sufficient quantity of this timber delayed completion considerably and the completed launch contains material from one laboratory bench, several elevator door frames, a number of household doors and an office desk! It was given several layers of oil finish which does justice to the beautiful timber. Fairleads and cleats are bronze and were machined from the solid. Instead of being screwed directly into the teak, each is removably attached to a bed-plate let into the timber and meticulously sealed to prevent water ingress. An EBA pennant now adorns the foredeck.

On account of the shallow and very weedy nature of the Keurbooms estuary, I opted for a large electric thruster motor rather than an inboard. A Minn Kota RT101 Saltwater motor was imported from the US. On delivery the rather oversized transom bracket was removed with a hacksaw and a smaller and more suitable bracket manufactured and attached to the rear of the transom. This removes the possibility of tilting the motor but it can still be withdrawn vertically from the water and is able to 'kick up' should the motor strike an underwater object.

This motor (and many others that I have seen pictures of) has a very long and unsightly shaft and superstructure. These were later altered but left intact until the actual waterline of the boat could be determined. Three 105 Ah Delphi Voyager Sealed Marine Batteries were installed in series low down in the hull amidships and concealed from view by a teak grating. My wiring, circuitry and general workmanship had to survive frequent inspection by a friend who was chief electrical inspector on some of South Africa's deep level gold mines. His winding engines safely conveyed thousands of workers to their daily place of work deep beneath the surface. I am confident that my wiring could



Before modification of thruster shaft length

speed trials with 2 occupants indicated that a speed of 6 km/h consumed about 15A at 36V. The thruster can propel the vessel at 7 km/h but the required current is over 30A and is rather unkind to the batteries.

I have therefore settled on 6 km/h and am very happy to discover

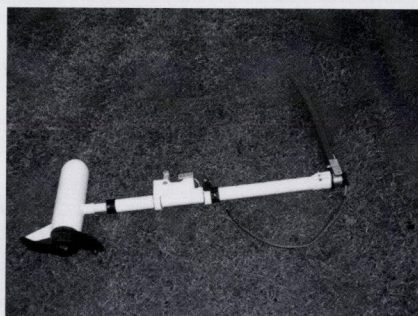
that I can journey to the limit of the navigable portion of the estuary (about 5 km) in 42-55 minutes, depending on the current. Voltage measurements indicated that the batteries had 60-70% remaining capacity after one return journey, depending on current and wind.

My first experience with electric boating has been totally up to expectations. The sight of a boat under way in virtual silence prompted a number of bemused glances from onlookers who had never seen such a vessel before. On returning home after my first electric boating holiday, I set

about shortening the motor shaft by about 10". The tiller and the 'pod' to which it attaches were also removed, together with the geared steering arrangement and the twist throttle. These have been replaced with a conventional laminated wooden tiller. The speed control board

has been re-located remotely and connected via a cable to a purpose-made brass lever accessible to the helmsman. These latest modifications will be tested shortly.

I am most grateful to John Hustwick, Ian Rutter and Barbara Penniall who entertained my many questions and gave most useful advice from time to time during this project. EB News was a continual source of inspiration and I hope to be able to attend one of the future cruising events.



Shaft modified



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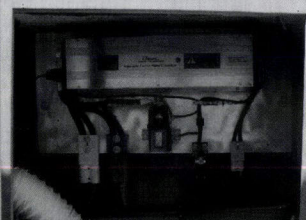
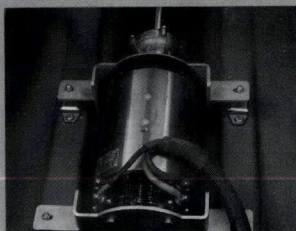
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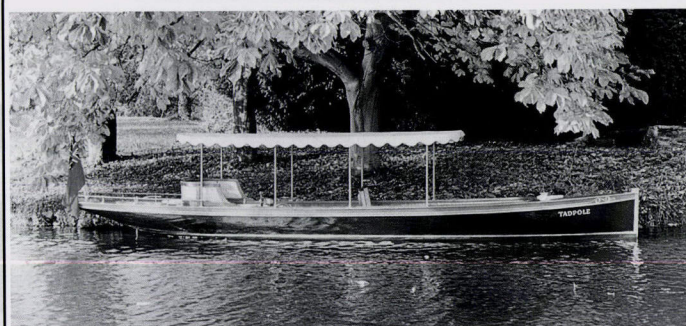
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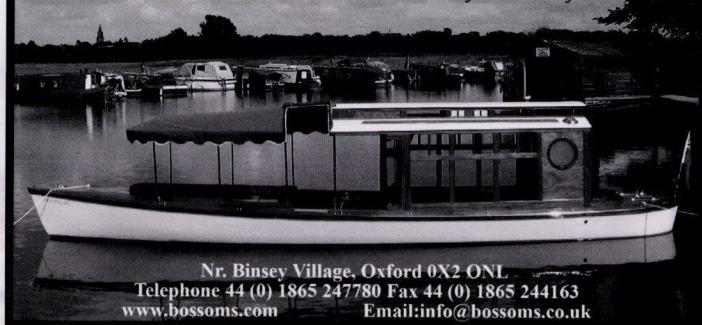


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