NEWSLETTER

RETIRED CHARTERED ENGINEERS ASSOCIATION
WORTHING

Hon. Secretary: S. Oliver. Elphin, North Drive, Angmering, BN16 4JJ ☎ 01903 787116

FORTHCOMING EVENTS

20th Oct	Thursday	Coffee - at Three Crowns, East Preston
20th Oct	Thursday	**Annual Dinner** 7 for 7.30 p.m. at the Windsor House Hotel
27th Oct	Thursday	Coffee - with Ladies at Beach Hotel, Worthing
1st Nov	Tuesday	**Visit** to Gatwick Airport at 2.00 p.m
2nd Nov	Wednesday	Coffee - at Albion Inn, 110 Church Road, Hove
17th Nov	Thursday	Coffee - at Three Crowns, East Preston
24th Nov	Thursday	Coffee - with Ladies at Beach Hotel, Worthing
25th Nov	Friday	**Cooch Memorial Lecture** 2.30 p.m. Worthing Library Wey & Arun Canal reclamation by J. Woods & P. Beresford
7th Dec	Wednesday	Coffee - at Albion Inn, 110 Church Road, Hove
13th Dec	Monday	Copy date for next Newsletter
14th Dec	Wednesday	**Talk** - "Things that go wrong" by F.J. Adams, member 2.30 p.m. Durrington C.C.
15th Dec	Thursday	Coffee - at Three Crowns, East Preston
29th Dec	Thursday	Coffee - with Ladies at Beach Hotel, Worthing Publication of next Newsletter
Every	Monday	Coffee at Laing's Arcade Cafe, Montague Street, Worthing

Coffee mornings commence at 10.30 a.m., except at The Beach, which is from 10.45 a.m.

Corrections to last Newsletter

Please note that in the secretary's report included with the last newsletter, Ray Parsons' name was omitted as co-author with Peter Harvey for the talk on 9th March, 1994, entitled " A Model Railway". Also, the date of the Cooch Lecture " Southern Water" should have read 26th November, 1993.

Annual Subscriptions

These are now due. Please send your cheques for £6 to the Hon. Treasurer, D.R. Collard, 9 Meadway, Rustington, Littlehampton, BN16 2DD. If you are not sure whether you have already paid, and to save sending out reminders, please contact the Hon. Treasurer on 01903 785580.

St. George's Vineyard, Waldron - 6th September, 1994

Eighteen people met on an overcast but dry afternoon for a visit to the vineyard. Most were wearing jackets and sensible footwear - but who was the man in sandals?

The vinegrowing area covers three fields of gently sloping ground, with good wide grassed areas for walking and many informative notices. This whole area is hedged by brambles - the idea being that the birds will eat the blackberries in preference to the grapes! However, the now ripening grapes will soon be covered in protective netting until the October harvest.

Afterwards we looked into the winery, where we also saw the History of English Wine Exhibition, and then back to the well-stocked shop for a free glass of wine. All the St. George's wines, except the sparkling champagne types, were available for tasting. Canny couples chose different wines, then tasted more by trading sips with others.

The afternoon was very enjoyable and informative and was rounded off with cream teas in the winery restaurant. On fine days one could eat outside in the lovely gardens.

Val Bailey

43rd Annual General Meeting - 14th September 1994

The retiring President, L.D. Bannister, opened the 43rd Annual General Meeting in the presence of 39 members, with apologies for absence being received from 10 members. The minutes of the 42nd A.G.M. were read and approved and in the matters arising it was stated that the Committee had decided to continue the R.C.E.A. Prize to a student from the University of Brighton. The Treasurer, R.A. Carey, presented his report highlighting the fact that once more the committee had decided to keep the annual Subscription at £6, the shortfall being subsidised from the association's savings account. The Committee proposed to modify the rules by raising the joining fee from £1 to £5. After a lively discussion, the motion was carried. The Secretary's Report was presented and accepted, with the addition of the name of R.A. Parsons as the joint presenter for the talk about "Model Railways" on 9th March,1994 at

the Durrington C.C., and the date for the Cooch Lecture "Southern Water" being 26th November, 1993.

The following officers and committee were elected for the year 1994/95:

President	Secretary	Treasurer
S.R. Renew	S. Oliver	D.R. Collard

Vice President	B.R. Knight
Asst. Hon. Sec.	R.G. Bailey
Asst. Hon. Treasurer	D.H. Lear

Committee members	T.J. Morgan	E.B. Trotter	L.A.E. Fosbrooke
	J.L. Fowler	D.J. Fuller	A.H. Rudd

Membership Secretary	E.W. Ayling
Auditor	A.G. Standbridge

Retiring President's address

In spite or suffering a stroke soon after my inauguration as President, I have thoroughly enjoyed my term of office, thanks to the support I have received from the Committee, Bernard Knight and Stan Renew. And my wife, Peggy, in the background.

As the Annual Programme has to be arranged well in advance, all the planning for it was complete which, in my particular case, was an advantage indeed. But I have to comment that, as the R.C.E.A. has operated in this area for so many years, it is becoming increasingly difficult - both for technical visits and the Ladies' outings - to find new venues within reasonable distances.

Taking my first Committee Meeting in January proved a very rewarding experience with lively comment and plenty of humour. This was a milestone for me.

It is my great pleasure to welcome the goodly number of new members (and their wives) who have joined us during the year . I would entreat them to take an active part in our very worthwhile organisation, and to be willing to serve on the Committee. I am grateful to those of you who have agreed to do so. Our very continuation depends upon you.

Help might not be far away, however! Before long we may be welcoming applications for membership from lady Retired Chartered Engineers. Every good wish in this possible new phase in your membership duties, Ernest! And our sincere thanks for all you do for us now.

Every good wish to your new President, and my thanks to you once again.

Lewis Bannister

President's address

As a result of Lewis's efforts and concern, we have just completed another excellent year which was marred by Lewis suffering a stroke, most regrettably just prior to the Annual Dinner. Nevertheless, we all enjoyed the fruits of his efforts that evening. On the few occasions that I visited Lewis in hospital, he was always cheerful and I could not help but admire his fortitude and positive attitude to his condition. This is reflected in the fact that he has only missed two ordinary meetings and one committee meeting. All the visits that he arranged for us were excellent but, with one exception, very poorly supported; a most regrettable state of affairs and a poor reward for his efforts on our behalf. Incidentally, the same could be said for the Outings with the Ladies. Lewis Bannister, we thank you.

Before I bore you with my c.v., I would like to add my thanks to Bob Carey, not only for being an excellent Treasurer and Committee Member, but also for the assistance he gave me whilst I was Secretary. Being a "new boy", I needed help or advice on many occasions and it was always readily available.

Until the age of twenty-eight approximately, my health could only be described as sub-standard. As a result, my Headmaster would only recommend me for an office job, against my request to go into engineering. Within a few days I was convinced that it was not going to be my life. I applied to the De Havilland Aircraft Company for an apprenticeship, but was told that they did not take boys over the age of fourteen and, as a consequence, I got a job with them as a Shop Boy. This resulted in their having a change of policy and within a few weeks I was an Indentured Apprentice, eventually working in the Experimental, helping to make parts for the prototype Mosquito.

It subsequently transpired that they also ran an Aeronautical Technical School for fee-paying entrants with a minimum age of eighteen. Winning a scholarship to this school, significantly up graded in-depth engineering training, and included a period at the Stag Lane factory of the De Havilland Engine Company. Here, unbeknown to me at the time, I was involved in the manufacture of turbine blades for the prototype Goblin Jet Engine.

Being in a Reserved Occupation, I endeavoured to relieve my conscience by joining an *active* Home Guard unit, London A.A., but the irony is that, on being called for a National Service medical, I was rejected on health grounds.

I spent a total of eleven years with De Havilland, my last responsibility being the production of wings for the Venom Naval Fighter which, at that time, was being assembled at Christchurch.

A change of employer saw me in the Planning Office of General Motors, Luton, where they were producing Vauxhall cars and Bedford trucks. During this time I was in contact with the man who had been my Section Leader in the D.O. at De Havilland. He eventually persuaded me to join him as his deputy, running a small company in Luton. They were making machines that would roll up a magazine, put a wrapper around it and seal it ready for posting. After a couple of years I was asked to set up a production facility in Worthing, to satisfy the demand. During this time I designed and produced a variant of the roll wrapping machine. In addition, I completed an experimental prototype machine for the automatic filling of envelopes (anything from a single sheet of paper to a thick magazine) on the very day that the company closure was announced.

As a fill-in, I had a short period as a Contract Draughtsman, being placed with Decca Radar at Tolworth but, eventually, in 1955 I joined the sales organisation of CVA in Brighton, where I spent a total of thirty-five years. CVA employed 2,500 people producing machines which were always in the forefront of technology. Initially they produced single spindle autos, dieing presses, very high precision lathes and Milwaukee Milling Machines under licence from the States.

As a Sales Engineer I was required to move to Surrey. In 1962 I was made Manager for the South of England, in 1964 Assistant Home Sales Manager and in 1965 Home Sales Manager. In 1966 CVA had developed Numerically Controlled machines to the extent that they decided to divisonalise the company, N.C. Machines, Special Purpose Machines, Conventional Machines. As a result I was transferred to Brighton as Manager N.C. Division, with responsibility for Sales, Applications Engineering, Customer Training and Service.

During the early sixties, numerically controlled machine tools were very much in the embryonic stages. To satisfy the thirst for knowledge of the subject, the British Numerical Control Society was formed. Evening lectures were organised, always playing to a full house. Around 1966-8 I was Chairman of the S.E. Region.

In 1970 the owner of CVA, a true entrepreneur, retired. From that time, until my retirement at the age of 65, the company had five different changes of ownership and six Managing Directors.

Around 1983 I became Sales Manager for Aerospace Products and, although I and my team were only involved with something like twenty different sites, it was a period of significant change in the manufacture of aircraft parts, from the smallest component to wing skins seventy feet in length. A most interesting and challenging period.

After eighteen months in retirement I was asked back to work on PR and Publicity, on a part-time basis, for a further eighteen months.

Stan Renew

A vote of thanks to the President for his presentation was given by Eric Roubaud

Combined Heat and Power Installations - Talk by R.G. Bailey, member, at the Durrington Community Centre on 5th October, 1994.

CHP is about fuel efficiency and the environment. For the purposes of this talk combined heat and power is the output of a gas turbine.

Before talking about gas turbines the differences compared to steam turbines should be considered. Both steam and gas turbines convert heat energy to mechanical [hence electrical] energy and at similar cycle efficiency [broadly 30% to 40%]. However the modern condensing steam turbine then rejects about 65% of its heat to the environment by way of warmed cooling water [a few degrees]. The gas turbine rejects the 65% of its heat in the form of hot gas to the environment at a temperature of 500^{O}C. This heat can be captured in a waste heat recovery boiler to produce steam which can then supply a condensing steam turbine to produce more power and thus give an overall thermal efficiency of 55%. This is termed Combined Cycle Power or CCP and is what the present "dash for gas" is all about in the UK today.

When some or all of the steam from a CCP steam turbine is taken further to supply heat at a lower temperature for industrial use or district heating then we have what is termed a Combined Heat and Power system or CHP which can give thermal efficiency in the 80-90% region.

Aluminium Bahrain

The story starts with the discovery of the first oil in the Middle East in Bahrain in 1932. There never was a lot of oil but a huge field of natural gas was discovered. This gas supplied all the country's fuel for power but this was only scratching the surface of its energy potential.

In the late 1960's someone had the idea of using this gas in a large gas turbine power station to supply electric power to an aluminium production plant. Aluminium is produced by passing a huge direct current through the molten aluminium ore. A typical "pot line" has 250 cells, or pots, connected in series with a current of 100,000 amps flowing and a volt drop on each cell of 4.00 volts. Hence one potline consumes 100 MW of power. The power needs to be maintained continuously since if it is off for more than say one hour the cells start to solidify, an irreversible condition which entails removal and reconstruction and can cost £30,000.00 per cell.

It was vital for the power station to be 100% reliable and in 1968/9 World Market the gas turbine with the longest accumulated operational hours was the G USA Frame 5 machine [rated at 15-18 MW].

19 of these turbines were ordered from John Brown Engineering on Clydebank who were an Associated Manufacturer for G USA. Two potlines were built and the plant started up in 1970. There were tremendous problems in keeping the whole plant operation going and in the power station the punishing duty on the turbines revealed numerous shortcomings. These were dealt with as they arose and information fed back to the designers and builders resulted in a continuous improvement of the machine which laid the foundation for the range of bigger and more reliable turbines which developed during the 1970's.

The ALBA project was a successful struggle and today it has quadrupled in size and boasts the largest potline in the world. It now has CCP with air cooled condensers but no CHP.

Dubai Aluminium

The DUBAL project was designed as a CHP operation and followed on the concept from ALBA but with a more complex sequence of fuel and heat utilisation.

The story again starts with the discovery of oil. Dubai's oil was found offshore in the lower Arabian Gulf in the 1970's. It was excellent quality light crude but had a lot of associated gas which had to be flared to waste.

To use this gas it was piped ashore to a gas treatment plant which condensed out the LPG and then passed the remaining natural gas, methane, to the DUBAL gas turbines to produce electrical power for aluminium production.

By this time G USA had developed its range of gas turbines from the Frame 5 up to the Frame 9 which was a 3000 rpm direct drive 85 MW machine. The DUBAL power station had 8 Frame 5 turbines and 5 Frame 9 turbines, again manufactured by John Brown on Clydebank. There were 3 potlines with an electrical load of 120 MW each.

In Dubai the need for water was paramount to all planning and so each gas turbine had a waste heat recovery boiler which supplied dry saturated steam to a large multi-stage flash sea water desalination plant. This is the only Combined Heat and Power installation of this type in the world.

The project was successfully completed by 1982 but with many problems left to overcome. The gas turbines proved quite reliable but the boilers suffered disastrous failures due to the severe cyclical stresses placed on them by the operational requirements of the aluminium process. The Sub-Contractor Foster-Wheeler UK had to carry out a rework programme on these boilers which imposed severe constraints on the plants overall operation for some years.

It had been apparent from the initial tests on the boilers that they were in fact able to deliver quite a lot more steam than the rated value. Since the steam was delivered to the desalination plant at 20 bar and was then dropped down to 2 bar before entering the brine heaters the idea of installing back pressure turbines to gain more power and utilise the extra steam seemed quite feasible. This project went ahead in 1987 with the insertion of two 35 MW steam turbines and the total capital costs had been recovered in fuel saved in less than 2 years.

The DUBAL plant continues to operate very successfully and has been expanded to four potlines. The metal produced is of the highest quality and sells at top premiums on the world market.

This is a unique example of a Combined Heat and Power system with an overall thermal efficiency around 80%. However this is not the end of the story. The final heat rejected from the desalination plant takes the form of warmed concentrated sea water and plans are in hand to pipe this liquid to solar evaporation ponds where it gives a substantial increment to the input of feedstock for a chemical industry based on the minerals available in the sea.

Reg Bailey

Recordings of Meetings

An audio tape cassette is made of all talks and addresses at each of our General Meetings, thanks to the good services of Eric Roubaud. These tapes are available from the Hon. Sec. but they only go back about two years as the cassettes are reused.

Presentation to Mrs Batchelor

During the meeting held on the 5th October,1994, at the Durrington Community Centre, the R.C.E.A. made a presentation to Mrs. Batchelor of a signed card and cash voucher, in appreciation of her assistance and understanding of the needs of our Association. She is retiring from running the centre which she has done for the last 10 years and we wish her all the best in her retirement.

Cooch Memorial Lecture -"The Wey & Arun Canal Reclamation" by J. Woods and P. Beresford at the Worthing Library Lecture Theatre on Friday, 25th November, 2.30 p.m.

This year we have a subject that will interest the ladies and, hopefully, tea (in the best Basildon Bond china) will be available after the lecture. We are all aware how people in the region of the Kennet and Avon Canal have a truly public utility available to them for their enjoyment, be it boating, walking along the tow path, or just seeing the boats glide by as we drive through the countryside.

Through the efforts of a dedicated group of volunteers, this is gradually becoming a reality for the people of Sussex and Surrey. From recommendations within our Association, there is every indication that this will be a most interesting afternoon, so let us have a good turn-out in support of the lecturers from the Wey and Arun Canal Trust.

Stan Renew

After the lecture the R.C.E.A.prize will be presented to Miss Samantha Smith who is studying for an M.Eng. at the University of Brighton.

Discussion Meeting - "Revolutions; past, present and future" - 8th February,1995

The subject will be "Revolutions". It was probably something like one hundred years after the event that the period in question became known as "The Industrial Revolution". What will the next revolution be called? Will it be electric, electronics, communications, nuclear or even r.p.m., nothing barred (except politics).

For any discussion afternoon to be a success, several short (or even very short) presentations are required, so please let me know what you have to offer.

Stan Renew Tel. 0273 561168

Membership

We are sad to have to report the death of **J.H. Houstoun.** The total number of members of the association, to date, is 105 including the following two new members:
K.R. Liversage who joined in April and **A.C. Randle** in September.

1994 **LIVERSAGE, K.R.** F.R.Ae.S., D.M.S. *"Isosceles", Tower House Gdns, Arundel, BN18 9RU (01903 884578)* British Airways - Chief Quality Engineer, De Havilland Hatfield - Flight Development Engineer, British Messier Gloucester - Stressman. *Interests:* Travel, Computers, Gardening, Reading, Cars, DIY, PROBUS.	1994 **RANDLE, A.C.,** O.B.E., F.I.C.E. *Meadow Oak, The Hawthorns, West Chiltington, Pulborough, RH20 2QH (01798 813826)* Local government engineering at Hinkley,Oxford, Richmond upon Thames and Director of Engineering for the London borough of Wandsworth. *Interests:* Golf, Theatre, Gardening, Music.