NEWSLETTER

RETIRED CHARTERED ENGINEERS ASSOCIATION
WORTHING

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

FORTHCOMING EVENTS

28th Dec	Thursday	Coffee - with Partners at Beach Hotel, Worthing
3rd Jan	Wednesday	Coffee - at Albion Inn, 110 Church Road, Hove
9th Jan	Tuesday	**Talk -** "Bridges 2000" by A.S. Whitaker, member, at 2.30 p.m. Chichester room, Field Place
16th Jan	Tuesday	**Visit -** C.A.E. Flight Simulation, Burgess Hill (see page 2)
18th Jan	Thursday	Coffee - at The Spotted Cow, Angmering
25th Jan	Thursday	Coffee - with Partners at Beach Hotel, Worthing
7th Feb	Wednesday	Coffee - at Albion Inn, 110 Church Road, Hove
13th Feb	Tuesday	**Talk -** "How we supplied the Troops in the First World War" by R.A.A. Newman, member, at 2.30 p.m. Chichester room, Field Place
15th Feb	Thursday	Coffee - at The Spotted Cow, Angmering
20h Feb	Tuesday	**Visit -** Spheric Engineering, Crawley. (see page 4)
22th Feb	Thursday	Coffee - with Partners at Beach Hotel, Worthing
6th Mar	Tuesday	**Talk -** "Electromagnetic launching of spacecraft" by Dr. Edwards, University of Sussex, in the Barn, Field Place at 2.30 p.m.
7tht Mar	Wednesday	Coffee - at Albion Inn, 110 Church Road, Hove
8th Mar	Wednesday	Copy date for next Newsletter
15th Mar	Thursday	Coffee - at The Spotted Cow, Angmering
15th Mar	Thursday	**Lunch** at Northbrook College catering school 12 for 12.30 p.m. (see page 4)
29th Mar	Thursday	Coffee - with Partners at Beach Hotel, Worthing
Every	Monday	Coffee at **Denton Lounge, Worthing Pier**

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

Membership

We welcome the following new members:

2000 **PRITCHARD, R.H.** M.Phil.,M.I.Mech.E.,M.I.Prod.E *91 Martyns Way, Bexhill on Sea. TN40 2SH* *(01424 216654)* Production Eng. AEC Ltd Lecturing at Acton T.C., Willesden C. of T. & Kingston C. of T./Univ. *Interests:* Gardening, Local Industry,Badminton, Tennis	2000 **WORT, R.P.** F.I.Mech.E., F.I.E.E. *Sylvan Glen, Longlands, Worthing.* *BN14 9NS* *(01903 217747)* 1957-91 CEGB & National Power at : Portsmouth, Marchwood, Poole & Eggborough, N. Yorkshire. 1991-99 Eng.Consultant on power station projects with P.B. Power (formerly Kennedy & Donkin) *Interests:* DIY, Walking, Foreign Travel, Motoring
2000 **PARMENTER, A.D.** M.I.Mech.E. *29Pangdene Close, Burgess Hill.* *RH15 9US* *(01444 250908)* 1958-63 General Radiological , designer 1963-69 Electronic Associates, mech. design d.o. manager 1969-71 Eurotherm, sen. design eng. 1971-78 Rendar Instruments, chief eng. 1978-96 Eurotherm Drives, head of mech. design *Interests:* Cabinet making, DIY, Trad. Jazz	

Will new members please check the above data and inform the Hon. Sec. of any errors or omissions so that the information can be incorporated correctly into next session's handbook.

Handbook Errata

The address for B.T. Teague should read: 52 Sea Lane, Goring by Sea, Worthing BN12 4PY.

Bridges 2000 - talk by A.S. Whitaker, member, in the Chichester room at Field Place, on 9th January, 2001 at 2.30 p.m.

The Government had requested all bridge owners to inspect, assess and strengthen if necessary, for the vehicular use of 40 ton loads in line with EEC requirements. The outline of work involved leads to a resume of bridges from early times and capsulates on the experience gained through various authorities to the present time. This has been well grounded by a technical group of the I.Struct.E. in an attempt to assist staff engaged in the checking of bridges and then deciding if and how to strengthen them bearing in mind the funds available. Finally, it ends with some of the problems involved in the Millennium footbridges, et al.

Visit to C.A.E. flight simulation, Burgess Hill on Tuesday, 16th January, 2001 at 2.00 p.m.

This company is one of the principal designers and builders of flight simulation equipment for military use in the world. Easy to get to from the A23, the factory is located in Innovation Drive on the Victoria Industrial Estate. See map below.

Please return the reply slip, on page 9, to Ken Wheeler, 14 Musgrave Avenue, East Grinstead RH19 4BS by 11th January 2001.

THE INSTITUTION OF ELECTRICAL ENGINEERS **FARADAY LECTURE 2001**

Beyond the Square Window, Sussex Presentation, Tuesday 30th January, The Hawth, Crawley.

Digital technology and its convergence with a range of communications tools is much in the news; but what will it mean to the end user? What will the box in the corner of the room look like? Will it even be a box in the corner of the room? What will people be able to access and how?

The IEE Faraday Lecture for 2001, presented by the Independent Television Commission (ITC), looks at these and other hot topics surrounding the digital 'explosion'. As well as thinking of the hardware in a different way, it considers the huge creative possibilities that digital is opening up from virtual studios to virtual people, from the ability of all of us to become 'broadcasters' to tapping into the vast reservoir of information available to the world.

The Sussex presentation will be in the Hawth, Crawley on Tuesday, the 30th January, with performances at 10.30 a.m., 2 pm and 7 pm. For FREE lecture tickets complete the **lecture slip** and send with a SAE to Mrs C Picton at IEE Stevenage. The evening lecture will be followed by a dinner at the Hawth for members and their guests. Tickets for the dinner are £20 each, inclusive of pre-dinner drink and table wine. To obtain tickets for the dinner please complete the **dinner slip** on page 11 and forward to B A Gregory (Branch Secretary) with a SAE and a cheque for an appropriate amount. Diners will receive the necessary lecture tickets with their dinner tickets.

How we supplied the Troops in the First World War - Talk by R.A.A. Newman, member, in the Chichester room at Field Place, on 13th February, 2001.

This is a story of achievement by the Royal Engineers, who established a port, shipyard and factory facility at Richborough, after Dover and Folkestone became clogged with refugees and wounded returning from the Western Front.

From a green field site in 1915 to a port complex employing some 20,000 people by 1918, came the first roll-on roll-off cross-channel train ferry, a shipyard producing the first all-welded barges for cross-channel towing, the first elementary aircraft carrier experiments and 1500 kits for pill boxes manufactured and shipped to France.

The facilities came into use again in World War II in the rescue from Dunkirk and the construction of invasion barges.

Visit to Spheric engineering, Fleming Way, Crawley on Tuesday, 20th February, 2001 at 2.00 p.m.

Those who came to this year's AGM will recall the small phial of 1.5mm diameter tungsten carbide balls which are made to un-believable degrees of roundness. Spheric make balls in many materials and sizes for a host of applications. Activities at Spheric are commercially secure and members are asked to take note of the confidential nature of what you will see during the visit. A local map is attached; there appears to be ample car parking space around the back of the premises.

Members only, no guests permitted

Please return the reply slip, on page 9, to Ken Wheeler, 14 Musgrave Avenue, East Grinstead, RH19 4BS by 16th February, 2001.

Electromagnetic launching of spacecraft. Talk by Dr. Edwards, University of Sussex, in the Chichester room at Field Place, on 6th March, 2001 at 2.30 p.m.

Remember Eric Laithwaite and his linear induction motor at the Cooch Lecture a few years ago? Eric told me something about its application to launching space vehicles before he died and now we all have the chance to learn about it in a lecture to be given by Dr.Denis Edwards of the School of Engineering and Information Technology at the University of Sussex who is intimately connected with its developmemt. This talk is supported by, video projector and player, visual aids.

Lunch at Northbrook College, Worthing - Thursday, 15th March, 2001 at 12.00 for 12.30.

The college is situated on the Littlehampton Road at the roundabout with Goring Street, which leads from Goring-by-Sea railway station.

The cost of the lunch is £8 per person for the three course meal and coffee. Drinks are available at extra cost. After lunch, Professor Alan Turner of the University of Sussex will be talking about the School of Engineering.

The numbers are limited to 50 persons. Please return the reply slip, on page 11, with payment, to Ken Wheeler, by Monday 5th March, 2000.

Report of No Bangs on the Briny **part 2 -** talk by K.J. Wheeler, member, in the Chichester room at Field Place, on 10th October, 2000 at 2.30 p.m.

Around 1980 the demand for Intrinsically Safe had peaked. North Sea oil development in the early 1970's created a demand for the protection of electrical equipment from flammable atmospheres brought about by the oil production process; most of the external parts of the platform being designated as Zone 1 areas and Norcon were poised to take advantage of this producing a competitively unmatched range of flameproof enclosures with external control features and enclosed electrical apparatus. Designers and manufacturers of hazardous area apparatus were and are required to supply equipment carrying certification from an appropriate National body and in the case of the UK it is BASEEFA, who licence the manufacturer, issue certificates against each build and regularly inspect the maker to ensure conformity to the standard, certification and the ISO quality standard. Serious non-conformities could result in the licence being withdrawn.

Diagram 1 shows tables where zone 1, the gas groups IIB and IIC with a temperature classification T6 apply to Norcon products.

Diagram 2 illustrates the principles of a flameproof enclosure where the gap between the lid and the body has dimensions and geometry such that a stream of hot gas resulting from an internal spark induced ignition from gas which has entered the enclosure passes along a flamepath (transmission path) to the outside flammable atmosphere and is cooled to a level below that necessary to cause an explosion. The gap between the lid and body must not exceed 0.2 mm (8 thou). An enclosure must be capable of withstanding the pressure of an internal ignition, have a correctly designed flamepath and be fitted with various components passing through the enclosure walls in themselves having flameproof certification. The principles followed in the design of the enclosures were the same as used for the IS valves.

A modular format to allow the same assemblies or similar principles to be used on a widening range of products as time progresses using few complex components rather than many simple ones thereby reducing assembly time and the need for adjustments during assembly. Robust construction to maintain tolerances and the avoidance of exotic materials coupled to mechanical arrangements to allow for as few adjustments as necessary to fulfil the function of the device and Diagram 3 shows how modular principles were applied to the range of IIB cast iron enclosures with other features applying to the items passing through the lid and body.

Diagram 4 shows the fundamental distinction between a IIB and IIC enclosure flamepath arrangements. IIB enclosures are permitted by the standard to employ flat lids whereas the practical solution for the IIC case is a screwed spigot .

Diagrams 5 and 6 show the arrangement for each case.

Diagrams 7 and 8 depict typical IIB and IIC enclosures.

Diagram 9 illustrates the enclosure itself which is an **approved certified component** which when embodying internal apparatus requires an **apparatus certificate** for particular builds and Norcon have some 200 such certificates. To be viable, enclosures require external controls and windows in the walls of the body or lid together with cable entry glands.

Diagram 10 shows a shaft assembly capable of transmitting linear, linear spring return or rotary motion and the shaft assembly in Diagram 11 is used where continuous rotary motion is required and physical contact of surfaces along the flamepath must be avoided to prevent wear.

Circular windows over a range of diameters make use of a polymid material called Trogamid. These windows are machined directly from bar stock and then polished and are depicted in Diagram 12. Windows using glass are also used.

The remaining diagrams 13 to 15 illustrate testing arrangements.
Pressure testing is routinely carried out on periodic samples of cast enclosures in cast iron, aluminium and stainless according to the requirements of the certification and on all steel fabricated enclosures without exception. The test fluid is water and pressures can be around 28 bar resulting in a lid separation force of 20 tons for the Full Module. Any deformations during test must be elastic with the structure returning to its original shape after testing. Temperature testing is necessary to establish the outside soak temperature in response to an internal heat load. Results determine the temperature classification for the enclosure containing apparatus whose dissipation does not exceed the test heat load. The example of a 65 degree surface at 20 degrees ambient is matched to 85 degrees T6 rating which is based on a 40 degrees ambient. Testing for transmission is conducted by the certifying authority on a sample before the issue of a certificate. On this occasion, the internal pressure and pressure rise data is established together with a demonstration of no transmission.

Ken Wheeler

Report of **Annual Dinner** – Thursday 18th October, 2000

Fifty three members and their guests had a most enjoyable evening at our Annual Dinner held at The Beach Hotel, Worthing. This was presided over by our President Mr. Ken Wheeler, who made a speech of welcome to our guests. The reply to the toast of The Ladies was given by Mrs Veronica Dadds, the wife of one of our newer members. In her speech, Veronica expressed the opinion that the Beach Hotel Coffee Morning would be much improved if more of the men were, on occasion, to converse with the ladies.

The duties of Master of Ceremonies were performed with aplomb by Ron. Marshall, thus giving the evening a sense of occasion. Hopefully, we will continue to have an M.C. at or annual dinners in the future.

For the first time since 1994, entertainment was in the form of a pianist providing background music, all present took the opportunity to mingle and chat, thereby rounding off what can only be described as a very successful evening.

To assist members with their forward planning and with a view to avoiding a clash of dates, **ADVANCED NOTICE** is given that our celebratory 50th Annual Dinner will be on Wednesday 21st November 2001.

Stan Renew

Report of Visit to H.P.C. Engineering, Victoria Gardens, Burgess Hill, on Tuesday, 7th November, 2000 at 2.00 p.m.

Twelve Members attended this meeting at one of the premier precision manufacturing companies in the UK, offering a subcontract CNC machining service. We were met by Colin Smith, theProduction Manager and subsequently by Ken Holt, the Chief Engineer, where over coffee in the boardroom we were given an introductory talk about the history of the company and the activities of the division we were visiting that day. Annual turnover of the group exceeds £28 million and employs over 200 people. The CNC workshop is a multi-million investment in machine tools of the most advanced kind including: 25 horizontal machining centres, 7 vertical machining centres and items such as CNC lathes, 2 Zeiss co-ordinate measuring machines in temperature controlled areas, in-house tool making and 6 CAD/CAM stations with direct numerical control (DNC) links to the shop floor. Our tour of the shop floor included seeing many operations in progress where they work to tolerances measured in microns (0.00004inch). I noticed one operation where holes were placed to within 2 micron of true indicated position.

Ken Holt said that they were a volume business, producing components mainly in steel, cast iron and aluminium with 100% accuracy in terms of quality and dimension. Automotive pumps, gearboxes and wave guides cut from solid blocks of aluminium being typical items that we were shown.

Following a visit to the engineering offices to witness a Microsoft based CAD demonstration on CAD/CAM station we returned to the boardroom to deal with any questions we had, over afternoon tea and cakes. The President expressed our thanks and the visit ended around 4.45 pm.

Ken Wheeler

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To: K.J. Wheeler, 14 Musgrave Avenue, East Grinstead, RH19 4BS Tel: 01342 321291
I wish to participate in the visit to **C.A.E. Flight Simulation** on Tues, 16th Jan 2001 at 2.00 p.m.

Full Name .....(Block capitals)

Address .....

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Phone No.....

Applications by 11th January, 2001

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To: K.J. Wheeler, 14 Musgrave Avenue, East Grinstead, RH19 4BS Tel: 01342 321291
I wish to participate in the visit to **Spheric engineering** on Tues, 20th Feb, 2001 at 2.00 p.m.

Full Name .....(Block capitals)

Address .....

.....

Phone No.....

Applications by 16th February, 2001

To: K.J. Wheeler, 14 Musgrave Avenue, East Grinstead, RH19 4BS Tel: 01342 321291

I wish to participate in the Lunch at **Northbrook college** on Thursday, 15th March 2001 at 12 for 12.30 p.m.

Full Name .....(Block capitals)

Address .....

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Phone No.....

My patrner will be.....

I enclose a cheque for.....(£8 per person)

Applications by 5th March, 2001

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Faraday **LECTURE** ticket slip.
(Send to Mrs C Picton, IEE Faraday Officer, Michael Faraday House, Six Hills Way, Stevenage, Herts, GS1 2AY) together with a **Stamped Self Addressed Envelope** - no envelope no tickets!

Please send me

……. Tickets for the 10.30 a.m. lecture; ……tickets for the 2 pm lecture,

……. Tickets for the 7 pm lecture

Faraday **DINNER** (and evening lecture) tickets slip.

(Send to B A Gregory at 117 Woodland Avenue, Hove, BN3 6BJ together with a **Stamped Self Addressed Envelope**)

Please send me ……tickets for the lecture and dinner at £20 each (cheques made payable to **Friends of IEE Sussex**).

My guests will be, …….

Name, ……..

Special dietary requirements (e.g. vegetarian) ……

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