NEWSLETTER

RETIRED CHARTERED ENGINEERS ASSOCIATION
WORTHING

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

FORTHCOMING EVENTS

2nd Sept	Wednesday	Coffee - at Albion Inn, 110 Church Road, Hove
8th Sept	Tuesday	**Annual General Meeting**, 2.30 p.m. at Field Place Invitation and documents are on pages 12 to 16
17th Sept	Thursday	Coffee - at Spotted Cow, Angmering
22nd Sept	Tuesday	Committee meeting, 2.15 p.m. Field Place
24th Sept	Thursday	Coffee - with Ladies at Beach Hotel, Worthing
28th Sept	Monday	Copy date for next Newsletter
6th Oct	Tuesday	**Talk** - "Electrical Privatisation" by Dr Jackson, Guest 2.30 p.m. Field Place
7th Oct	Wednesday	Coffee - at Albion Inn, 110 Church Road, Hove
15th Oct	Thursday	Coffee - at Spotted Cow, Angmering
15th Oct	Thursday	**Annual Dinner** at Beach Hotel, Worthing see page 3 for details and application form
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.

Spring Break to France **17th - 21st May 1999 -** see page 6

We welcome the following new member to the Association:

1998 **GREGORY, Eur.Ing. B.A.,** B.Sc.(Eng.), F.I.E.E. *117 Woodland Avenue, Hove, BN3 6BJ* *(01273 709531)* Research Engineer, Bruce Peebles, Edinburgh, 1959-67. Lecturing etc Dept. of Elec. Eng., University of Brighton, 1967-98 *Interests:* DIY, Gardening, Woodcarving, Horse riding	1998 **GLOSSOP, R.H.,** F.I.E.E. *33 Glen Rise, Withdean, Brighton, BN1 5LN* *(01273 506357)* 1939-36 Metropolitan Vickers, Manchester. 1946-56 Kennedy & Donkin. 1956-82 owner and M.D. of 6 companies concerned with supply, sevicing, hire and export of power and hand tools, plant and equipment. *Interests:* Golf, Gardening, Dining out, Motoring, World travel, R.N.L.B.

1998 **MATHIAS, G.E.,** M.I.E.E. *16 Tamarisk Way, East Preston, Littlehampton, BN16 2TF* *(01903 859191)* British Telecom 1964-96, Youth in training to senior manager, Transmission, Digital switching, System security and Network integrity, mostly in London headquarters. *Interests:* Gardening, Computers, Radio amateur (lapsed)	1998 **MATTHEWS, D.,** F.I.Gas.E., M.I.Mgt., D.M.S. *9 Larchfield Close, Aldwick, Bognor Regis, PO21 4RB* *(01243 263898)* 1958-64 Research, development and production with various chemical companies. 1964-94 British Gas, development of computer models for analysis of gas networks, short and long term plannimg, budgetry control for engineering dept., recruitment of graduates. Engineering planning manager, Eastern Region. *Interests:* Music, School Governership, Theatre, Gardening.

Annual Subscriptions

At the May committee meeting it was decided to raise the annual subscription to £12 (rule 4) and members are reminded that annual subscriptions fall due on 1st October to the Hon. Treasurer, D.R. Collard.

Programme of events **1998/99** Prepared by the Vice President S.M. Butler

1998

06 Oct **Talk** Electrical Privatisation by Dr Jackson, guest

15 Oct **Annual Dinner** Beach Hotel, Worthing

10 Nov **Visit** LEC refrigeration, Bognor

27 Nov **Cooch Memorial Lecture** Power frequency fields and people by Dr. D. Renew, National Grid

08 Dec **Talk** Digital Television by M.S. Leak, member

1999

05 Jan **Talk** Code Breaking by J.Steel, guest

12 Jan **Visit** Pirelli, Eastleigh

09 Feb **Talk** Explosion protection in motorway tunnels by D. Shepherd, guest

11 Feb **Lunch** Northbrook College, Worthing

09 Mar **Talk** Aircraft Systems by J. Apted, member

16 Mar **Visit** Daewoo Technical Centre, Worthing

17-21May **Spring Break** Rouen, Claude Monet's garden at Giverny, Clos de Coudray, Jardin des plantes

08 Jun **Outing** Fishbourne Roman Palace

13 Jul **Outing** Singleton open air museum

10 Aug **Outing** Tangmere Aviation Museum, optional lunch

07 Sep **Annual General Meeting**

Newsletters: 13th Oct 98, 31st Dec 98, 31st Mar 99, 17th Aug 99
Committee meetings: 22nd Sept 98, 19th Jan 99, 23rd Mar 99, 25th May 99, 3rd Aug 99

Annual Dinner - 15th October, 1998

The Annual Dinner will be held at the Beach Hotel, Worthing on Thursday, 15th October, 7 for 7.30 p.m. Dress - dinner jacket or lounge suit. Cost, £20 each, including wine with the meal. The menu will be:

Chef's mixed Hors d'oerves

Roast turkey with chipolatas, stuffing, cranberry sauce and a selection of vegetables

Profiteroles with chocolate or Fresh fruit salad with cream or Cheese and biscuits

Coffee and mints

After dinner, Jane and Colin Marettt will entertain us with a magnum of melodic miscellany with songs from the Music Halls, poems, monologues, Broadway hits and contemporary & traditional folk songs

Reply Slip below for return **not later than 3rd October.**

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To: D.R. Collard, 9 Meadway, Rustington, Littlehampton, BN16 2DD

Please reserve.....places for me at the **Annual Dinner on 15th October, 1998** at the

Beach Hotel, Worthing. 7 for 7.30 p.m.

My guests will be I/we would like to sit with

....

..... who have agreed to make a reciprocal request

I enclose my cheque for £.....(£20 per person) payable to R.C.E.A.

Please note, no tickets will be issued

NAME .....(Block capitals) Phone No.....

Applications by 3rd October, 1998

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Spring Break to Yorkshire Dales May, 1998

Monday, 4th May saw twenty-six of us - engineers, wives and friends - taking off in a northerly direction. Many members had (unfortunately) been on a similar tour with Woods and we were not disappointed in all they told us about it.

Our lunch stop was at the lovely old town of Stamford, Lincs. Even to approach Stamford is a pleasure, with all the soft warm stone of the buildings. The scenery en route was magnificent - lambs abiding in the fields - and, as we were in the coach, it was HOT! Arriving at the Hanover International Hotel and Club, it seemed rather stark and barn-like from the outside, but the warmth and efficiency we encountered throughout the holiday was without parallel. Unpacked, washed and ready for the first meal we did not have to cook, we were ready for a good time.

Tuesday - a lovely breakfast, of course, and the men defying the normal home regime. ("One egg or two, sir?" "Oh, two please ..."). We drove through the Dales, the Steins, the lovely area of Pately Bridge, to Harrogate. Sadly, it was drizzly rain when we made a stop at Grassington for coffee, which some of us found difficult to locate before 11 a.m., but we should like to come back again. At Harrogate there must always be a queue at Betty's. But, following the initiative taken by a colleague and his wife, we picked up a beribboned box of lunch snack, which we ate in the gardens opposite and, after exploring this classic town, returned for coffee and cake. Shown to the downstairs restaurant was a privilege indeed, for we were able to feast our eyes on the Spindler marquetries. (We sat adoring one of Fountains Abbey). Evidently Frederick Belmont, founder of Betty's, came across this art form when on the maiden voyage of the Queen Mary in 1936 and commissioned the firm (from Alsace Lorraine) to undertake the interior work for his new restaurant in York!

After lunch to Harewood House, where we could have spent a whole day midst the Robert Adam interior, the Chippendale furniture and - somehow- - a certain "homeliness" within. Much has been written about the marriage of Princess Mary, the Princess Royal, but, in a video, screened by the present Viscount, he said that his mother had enterred fully into the life of Yorkshire and always liked to describe herself as a Yorkshire woman! Home via Ilkley and Otley, plus a little diversion which did not produce the "pub" in Emmerdale. Ah, well, perhaps a pre-dinner swim tomorrow ....

On **Wednesday** to Skipton on Market Day. To see the church, the castle, walk and, perhaps, some coffee and curd cake for those who know the specialities of the area. We did as much as we could in the time to "storm" the castle in the morning. With such strength and magnificence of 900 years, it would have taken some storming. The church seemed to be built into the same structure. They were preparing for "Songs of Praise", to be recorded and put out on 17th May, which was lucky for us all, and those of you who have been before, to recall our visit from the comfort of our armchairs.

Lunch was taken on a leisurely boat trip down the Leeds/Liverpool canal. It was so peaceful, with bluebells still in bloom. Then, as in Venice, we were deposited back to our hotel by the skipper. "A period of horizontal?", ventured one brave member. "Not a chance. This is just a comfort stop - we're off to the Caves". So, refreshed, we set off through the Ribble Valley to White Scar Cavern, England's largest caves.

Some of us opted out to walk the ridge with the lambs and to "take tea" at the café. Ninety-two steps (we were told) over one kilometre of metal grid above a raging torrent, but stalactites a-plenty and a splendid undeground waterfall were promised. Damp they returned, but with their ardour intact; it had been well worth it - they said. (A nice warm swim for me, I thought, in that hotel pool!).

Thursday in York. To take our pick - Yorvik Viking Centre, Railway Museum, after the pre-booked guide to the Minster itself. And we were so lucky in that person. As well as describing the main interests of the structure, she showed us areas we might not otherwise have discovered; e.g. the corner where, upon opening small doors, were contained the names of all the nurses who served in the First World War and, casually among them, one Edith Cavell; a simulation of where stood the Minster relative to the constellations; and the history of the Bosses redesigned after the fire. The Easter Garden was, of course, still there; and the large wooden Cross in the heart of the Cathedral, draped with a symbolic white cloth, is ever a reminder that Christ has Risen. Our guide then walked us along the narrow roads to "The Shambles", explaining as we went. We thanked her warmly, of course, and repaired to one of the lunch stops she recommended - a number of us to The Earl Grey Tea House, right there. All then proceeded along their chosen routes until our return to the coach and home, always through the magnificence of the Yorkshire countryside.

Before our last day we have to say something about the hotel, which served us well. The bar area, with comfortable chairs nearby so arrranged that we could enjoy many and varied conversations. Similarly at dinner, with homely dining tables of eight - ten on one - it was like having a dinner party each evening and not having to slave over a hot stove! (Greatly appreciated by all the wives!).

Friday Sadly, the day comes to leave our hotel, with that lovely view of the canal and of fields, horses and dogs - where some of us strolled in the mornings. But we were promised a scenic drive via Keighley and Bradford, to spend an hour at Holmfirth (the town of "The Last of the Summer Wine").

It was a real bit of fun. The sun shone again for our return and we walked the cobbled streets with a local guide, who amused us with tales of cameramen who laughed so much that filming was impossible.

A lunch stop at Melton Mowbray and we sped for home with no traffic hold-ups and those welcome taxis awaiting us. Special thanks must go to Dave, our driver, who fitted in so well, and no "chat" or "musack" on board, which we appreciated.

Finally, to David, our President, and Pam, and all the committee who made the holiday possible, our warmest thanks; it certainly was worth the supplement. Everybody contributed and it was all great fun. Is it to be Rouen in 1999? If so, "Vive l'année prochaine!"

Peggy and Lewis Bannister

Spring Break to France, 17th - 21st May, 1999 -Book the date in your diaries!

Day One

An early departure for the ferry to France and then to Rouen, staying in an hotel close to the River Seine.

Day Two

A morning in Rouen with a guided walking tour, visiting the Cathedral and the old craft section of the town. After lunch, travel to the Jardins d'Angelique, offering a lovely display in the grounds of a Norman Manor house.

Day Three

A journey to Giverny, to visit Monet's house and gardens. There will be time for lunch at Giverny before a leisurely return along the Seine, stopping at Les Andelys.

Day Four

Travel north to the Clos du Coudray, offering a fine collection of over 6,000 plant species, as well as riverside gardens, rockeries and exotic plants. On return there will be time to explore Rouen further, or visit the Jardin des Plantes, with its 19th century orangery, containing a collection of medicinal plants and rare trees.

Day Five

Return home via Honfleur, stopping en route for a Calvados tasting. Time to have lunch and investigate Honfleur before returning to the ferry.

The cost will be just under £300, full details and booking forms will be included in the October newsletter.

Cooch Memorial Lecture on 28 November 1997

The following is an edited version of a talk given by Professor Richard Grimsdale at the North West Group of the Britich Computer Society at the Museum of Science and Industry, Manchester, on 13 December 1994, and which formed the basis of his presentation.

In 1950 when I graduated in Electrical Engineering at Manchester, FC Williams and Tom Kilburn had already demonstrated a working prototype of an electronic digital computer. I became a research student and was sent to Cambridge to attend the first Summer School in programming the EDSAC 1. That was my first experience of computers.

On my return Tom asked me to write test programs (spelled programmes in those days) for the Mark 1 computer which was then being installed by Ferranti in its own new building on the university campus. At first the test programs frequently reported faults, but after a time it seemed that the machine had learnt "to do" them. In reality inherent errors in the machine, mainly caused by incorrect wirin', were being corrected as I went along by the commissioning engineers. There were virtually no circuit diagrams then, so the test programs proved to be useful for locating the various parts of the machine-you just unplugged a valve and observed where the program reported an error. The Mark 1 had 4000 valves, used cathode ray tube storage andconsumed 27 kilowatts.

About one year later 1 was about to build a small valve-based computer when transistors started to become available in the UK. This presented an excellent opportunity to investigate the possibility of bluilding a transistor-based computer.

The point contact transistor had been announced by Bardeen and Brattain in 1948, but there had been reports of attempts to control the current flow in a crystal and cat's whisker before the war. There was some limited success, but the polycrystalline materials used, like galena,were not very suitable.

I obtained my first samples of point contact transistors early in 1953. These were the LS737 crystal triodes manufactured in Somerset by STC. 1 was fortunate in obtaining a good supply of them - perhaps 80% of the total output. They were supplied in boxes of 10, and I can remember being very pleased when 1 received 70 in one day!

There were other sources: the GET2 from GEC and the 0C511 from Mullards. It was necessary to test the transistors on arrival: in the earlier batches, up to half did not work at all, while many of those that did work had very varied characteristics.

The point contact transistor has a special property. In those days we referred to the alpha current gain, which was the ratio of IC (collector current) to IE (emitter current). The emitter was used as the input electrode and the collector as the output. The third electrode was the base, which was connected to +2 volts through a resistance.

Raising the emitter above the base turned on the transistor: assuming a typical alpha value2 of 3, with 1 mA injected into the emitter, the resulting current into the base was 2mA. This current flowing in the base resistance caused the base to fall with respect to the emitter, and the cumulative positive feedback effect turned the transistor on hard. The collector accordingly rose from its negative off value nearly to ground. A single transistor could thus operate as a two-state device.

Unfortunately transistors could be rather reluctant to turn off, as they exhibited charge storage, and it was necessary to clear the charge to make them turn off. The turn on could be accelerated by increasing the emitter current, but this had an adverse effect on the turn off time, so a compromise was necessary. Typically a transistor would turn on in just under one microsecond and turn off in two microseconds. The clock frequency was accordingly chosen as 125 kilocycles per second.

Little was known about how the transistor actually worked, but it was thought that there was a multiple junction. The LS737 transistor was constructed from a small piece of single crystal n-type germanium mounted on a metal contact forming the base and two wire electrodes (emitter and collector) touching the surface.

To make this work as a transistor it was necessary to "form" it, by charging a 0.1 microfarad condenser to about 20 volts, and discharging it between the collector and base. Germanium was obtained from flue dust and there was some concern at the time that, should these newfangled devices catch on, there would be a scarcity.

An important consideration in the design of the transistor computer was the choice of memory. The Mark I used cathode ray tube memory, but this did not seem suitable for a transistor computer, because the high voltages involved would be hazardous to transistors and also because of its large physical size.

I managed to acquire a magnetic drum which had been manufactured by Ferranti. This took the form of a bronze wheel 11.5" in diameter rotating on a vertical axis at just under 2500 rpm. The wheel was 4" high, and it had a nickel plated recording surface. It was a precision device with an eccentricity of about a thousandth of an inch, which resulted in a two-to-one amplitude variation in the read-out signal.

The head was positioned with a screw adjustment. The head was wound in until a "ping" was heard and then withdrawn slightly. The major timing waveforms were derived from tracks on the drum. The clock was produced by a track with 3072 pulses around the circumference. This corresponded to 64 words of 48 bits.

Creating the clock track in the first instance was quite tricky. A single pulse was recorded by discharging a capacitor through the head when the drum was stationary. Then, with the drum rotating, an oscillator was tuned to produce a signal corresponding to 64 pulses per revolution. This waveform was then divided by 64, and the resulting waveform was locked to the output from the track with the single pulse per revolution. It was then

possible to record a track with 64 pulses per revolution, and the process was repeated until the clock track with 3072 pulses was obtained.

Like the Mark I computer, the transistor computer used serial arithmetic for reasons of economy. Several working registers were required, and whereas transistor shift registers could have been used, the cost would have been prohibitive. So it was decided that regenerative tracks would be used for the registers.

A read head was mounted a short-distance from a write head, in the direction of motion. The output from the read head was fed to the write head through appropriate gating circuits to form the regenerative track. For a single register the spacing was only about half an inch, but negligible head-to-head feedback was experienced.

The problem with the magnetic drum store was access time which was, on average, half the time of revolution. A one-plus-one address code was used, with each instruction containing an operand address and the address of the next instruction. By careful placement of operands and instructions around the circumference, it was possible to reduce the average access time.

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The first operational computer had 92 transistors, and executed its first program in November 1953. lt has since been recognised as the first transistor computer3. About six point-contact diodes were used with each transistor.

Shortly afterwards the machine was extended with a multiplier and eight B-registers (or index registers). This machine had 250 transistors and 1357 point contact diodes, and consumed 150 watts. The operation time for the division subroutine was about a second, and that for square root 1.3 seconds. The mean time between failures was about 90 miniites: these were almost always due to memory problems. The transistor machine was comparatively small, and was constructed with tag strips mounted on a Post Office rack, in contrast to the Mark I computer which occupied a large room.

In constructing the transistor computer I was ably supported by Doug Webb, a Canadian and a Bugatti enthusiast, whom I was very pleased to meet again in 1992. Ben Delaney, a technician, did much of the construction.

Two young engineers, John Bailey and Peter Cloot, came to work with me from Metropolitan-Vickers Electrical Company. This proved to be a very effective form of academic-industrial collaboration as John Bailey later returned to Metrovick to construct the MV950, a commercial version of the transistor computer.

The company produced six of these machines for its internal use, and they were employed extensively in engineering and research departments for everyday design calculations. The machine was a close replica of the university machine and also used a drum store. It is believed the MV950 was the first transistor computer to become commercially available.

Metrovick merged with BTH (British Thomson-Houston) and other companies to form Associated Electrical Industries (AEI). I was retained as a consultant and helped with the design of the 1010 computer. John Gladman was the Chief Engineer of the Computer Department and was supported by John Bailey and Ron Foulkes. The 1010 was quite an impressive machine for its time and was one of the first to be used for what was called Data Processing. The company secured an order for a twin 1010 installation for stores management at RAF Hendon, a major system for its time.

I joined AEI in 1960, in the first instance to develop transistor versions of electromechanical instrumentation, but after one year I became one of the founder members of AEI Automation Ltd. This company was set up to sell computer systems for industrial monitoring and control applications, considered to be a growth industry. We based our systems on the 1040, an industrial version of the 1010 with the incorporation of an interrupt. Ferranti was also ver active and successful in this field with the Argus computer.

One of the most interesting and successful installations we supplied was the Alarm Analysis System for Oldbury nuclear power station near Bristol. It had two reactors each with about 1500 alarm annunciators - little lights on the wall. When a fault occurred, 100 or more of these would light and a bell would ring. The operator had to react quickly to determine what had caused the fault, and if the problem could not be resolved he would be obliged to shut down the reactor, which was very expensive.

The Alarm Analysis System was an expert system which determined the relationship between the alarms that were lit and established the prime cause, the extent of the problem and any dangerous conditions. It also advised the operator on the best course of action. The results were displayed on a cathode ray tube system designed by Harold Hankins.

The contract specified that spares should be available for 30 years, a period that has only just come to an end. The system is of course no longer in use, but it did give valuable service over many years.

Returning to developments at Manchester University, reasonably fast junction transistors had become available by the late fifties, and these formed the basis of the Atlas computer. This machine was an outstanding technical success. It had many innovative features including paging and a fast carry propagate adder. This latter

used the junction transistor as a switch, exploiting the low impedance between the emitter and collector of a saturated transistor.

The late Keith Bowden and I had thej'ob of developing the read only memory for the Atlas. This made use of transformer coupling, with the primary formed by a pair of wires connected as a terminated transmission line and driven by a transistor. The secondary was a loop of wire feeding into a transistor amplifier. To store a "one", the primary and secondary were coupled by a small ferrite rod approximately lmm in diameter and 6mm long. A copper rod was substituted to store a "zero".

The store was constructed using a mesh, about 4 feet by 8 feet, woven from enamelled covered wire. The mesh was mounted on two sides of a paxolin sheet covered with plasticine. For every digital cell a return magnetic path was formed using another ferrite rod. A small jig was used to load the ferrite rods into the mesh, and this required that the mesh had to be uniform. The mesh was made by a wire weaving company in Warrington, and early samples exhibited some non-uniformities which were caused by tea breaks! The memory had a capacity of 8K words of 52 bits and an access time of 100 nanoseconds.

Dave Lewis

Recent problems in water supply in relation to regulation -Talk by H. Speight, guest, at Durrington C.C on 10th December,1998

The man stood at the pearly gate, his face was worn and old to meet at last the man of faith entering the fold. “What have you done”, St. Peter said “to gain admission here?” “Oh I have been a water engineer, for year, on year, on year”. The gates swung open swiftly as St. Peter touched the bell, “Come in”, he said “ and take a harp, you’ve had your share of hell!”

When Alan gave me the title of our joint talk it struck me that that the problems were perhaps my share of hell until I took early retirement 14 years ago. I have been dabbling with this, that and the other usually to be with water ever since. Alan has touched on the physical problems, although many of them come within the realm of analysis and disease and I want to talk just a little bit about Cryptosporidium in a moment. One of the interesting things of course is to be able to say Cryptosporidium; I find if you are talking about it repeatedly it quickly degenerates and incidentally within the trade it is now known within all the technical publications as “crypto” and I think that’s why, because people are stumbling over the “sporidium” part. This afternoon I want to talk about regulation of the water industry.

Now where you might ask does the problem arise with that; but there are a number of problems I want to highlight. But really the problems started with privatisation of the industry in 1989. I had come out long before it had got to the realm of golden handshakes and share allocations and so on. It was a whole new culture, the previous culture of public service for the sake of public service had gone and the new driving force was that of the profit motive, but the profit motive that was being curtailed because the water industry is a monopoly. That’s not strictly true as there are limited opportunities for buying your water if you have a factory and it only applies to large users at the moment of buying water from some friendly supplier on the other side of the border. But such opportunities are so infinitesimal in regard to the overall quantity of water being taken that they can be disregarded. This is my problem this afternoon having had to skate very lightly and quickly over the situation. I will not turn you into experts on regulation, but please help yourself to an OFWAT pamphlet. (Harry had brought along a range of different pamphlets from OFWAT for members to peruse and take) They make interesting reading and they will be even more interesting in the light of what I am going to say.

So let’s start at the point where the industry has been privatised and there are three regulators; OFWAT, The Environment Agency and the Drinking Water Inspectorate. I don’t want to spend too long on these last two this afternoon; I want to concentrate on the OFWAT side.

You know the rhyme, Big fleas have little fleas upon their backs to bite em, and little fleas have lesser fleas and so on ad infinitum. That may sound a little bit disparaging about regulation but that is the principle upon which it works. Biting the Water Companies, restraining their ability to make too much money at the shareholders expense, to bring in an element of the customer having a share of things as well. The acronym OFWAT stands for the Office of Water Services. Alan referred to me as working for OFWAT. I work for OFWAT but not in the usual sense because the OFWAT machine is a Civil Service machine and as Civil Servants they do all the hard work. To put a good public face on things there are what are called the OFWAT Public Service Committees. The one on which I serve is the one for the South which is basically the Southern Water Authority Region It is supposed to be an interface with the public to express and know how the public think and how the public react and we are supposed to champion their causes. I say suppose, not in a niggling sense, because it’s difficult to find out how the public think. If we got a beer allowance we could probably do a little bit better in the sense of talking to ones companions and constituents at the bar. But we are appointed for our expertise in a variety of fields. We are appointed but we are not paid, we simply get expenses. As far as I know I am the only poacher turned gamekeeper in the whole set up in England.

I am the only former water engineer who was daft enough to go back and sit on the other side of the fence. But I had my coat tails pulled some 6 or 7 years ago and I have enjoyed it very much indeed. One of the difficulties with a consumer orientated committee is that they visualise that everything should be done for the customers benefit and it has been a 3 or 4 year uphill struggle for me to keep saying to the Committee, that the thing doesn't work in that way. You have to regard the Water Companies as providing a service which is vital, a life support service and you have to give them some rein in terms of what they can charge for doing it. Eventually I think I have succeeded and I like to feel that the Southern Customer Service Committee is a bit more broad minded and a bit more au fait with things because they have had a technical chap on their number. They are all excellent people, most of them are from Citizens Advice Bureaus and Customer Consultation in various ways and each brings their own expertise. I have learnt a great deal about the fact that water charges are to some people a real financial burden. Something which I didn't see in my working years in the Water Industry because I was remote from it. But when you begin to get the situations which come up before the Committee and hear real life cases you begin to think it was fine when it was a service when those who couldn't pay their debts might be swallowed up within the rates overall. But now when you have got the commercial approach the Companies are saying, if you don't pay you are going to be cut off. Customer Service Committees and OFWAT are saying that's quite wrong. In Scotland you cannot legally be cut off if you cannot pay. I don't know what there is about the Scots character that demonstrates, but that's a fact. So OFWAT has its own technical staff and it also has something like 12 or 14 people, ten times over around the country, simply advising, putting their point of view from the customers perspective and trying to keep the show on the ground.

The Environment Agency does just that, it looks after the environment. The Agency is a mix of what used to be the old National Rivers Authority , the Waste Disposal Authorities, the Local Authorities and that dealing with Factory Emissions and that sort of thing. It is now a single body looking after the interests of the environment.

The DWI Drinking Water Inspectorate fits in very nicely with Alan's reference to water quality. A number of standards are set, some set in the European Union, and some by individual National Governments. Our standards are a real mix up. Some relate purely to the appearance of water, is it turpid has it got a smell ? Which may not do the slightest harm, but if you have a glass of water you want it to look attractive, so a number of the standards relate to aesthetic appearance. A number relate to chemical constituents, and a number are related to bacteriology. Now clearly anything that is going to make you ill shouldn't be in the public water supply. Attention to Cryptosporidium has increased over the last 4 to 5 years. It's the old story once you have an analytical technique from which you can identify something (you had it before, but you didn't know it was there) you can set standards, and set policemen looking over your shoulder to make sure that you keep to those standards. Cryptosporidium has been very difficult to identify. Thames Utilities one of the arms of Thames Water has developed a test which received publicity earlier this year which will enable the presence of Cryptosporidium to be identified within three hours; that is moving some! Because previously it was a matter of three or more days before you even knew you had a outbreak, meantime people were running to the toilet. For the symptoms of infection lasts for best part of a fortnight; and includes going to the toilet, stomach pains, a typical prolonged diarrhea attack. Most folk shrug it off, although they don't feel very happy for the experience. But for old folk, or folk with an immune deficiency, or for babies then it can be fatal! So it is something that has come onto the scene, but amongst all the standards for the health quality of the water; there is no mention of Cryptosporidium. It will have to come in but at the moment it is possible for the water companies to say " We are not obliged to take these organisms out of the water, because there is no standard for it". Clearly the Companies image is such that they are not going to allow it to be besmirched by saying that they are not going to do anything about it; you had better tell your doctor that you have "got the runs" and hope that you will be better in a fortnight.

In a way you can say that OFWAT is a response to the problem of privatisation, because OFWAT's role is an economic one in relation to prices, in relation to standards of service, and in terms of helping to settle complaints. The Environment Agencies role is that of looking after basically the abstraction and the return of water as sewage effluent. The Drinking Water Inspectorate is straightforward. Something like 3 million tests are taken throughout England and Wales each year on water quality and the results for 1996 were 99.7% compliance. Those are the three agencies that are involved in regulation

I want now to look at the way in which OFWAT looks at prices. The starting point of OFWAT's approach is that financial regulation is on what is called the "price cap" basis. In other words it isn't the profits which are controlled; it is the prices which the companies can charge. The theory is that if the upper limit of those prices is set correctly then the companies can fund themselves, in terms of what they need for running the new capital works, what they need for the shareholders and the prices which the customer is paying will not be exorbitant. The basic formula is RPI plus or minus K, which was formulated in 1989 when Government was setting the figures at the inception of privatisation. Few people would disagree that a Company should have the ability to increase their charges by the RPI from year to year. The K factor was all nice and simple in the early days and represented the task which the companies faced (and the K factor for each company may be different) and their perceived abilities to make economies; hence the plus or minus. The current figures relate to a five year period, and Southern Water has a K (which is now the resultant of more than one term) of plus 4%. The Portsmouth Water Company - which

is a Water Only Company - have a K factor of minus 1.8%. The K is perceived as it were by the OFWAT machine and the Civil Service as a means of applying a stimulus to a Company. Southern have a great deal of expenditure on sea outfalls and works to connect to sea outfalls. On the otherhand Portsmouth as a Water Only Company have a very cheap source of water and by giving them a K of minus 1.8, which with an RPI of about 2.7%; means that they can only put up their prices by 0.9% in the current year. Southern with a K factor of 4% can increase their prices by 6.7%.

That begs the question of what the starting point is for fixing these prices. In 1989 when the Government determined to remove the Water Industry from the public sector borrowing requirement, a regulatory capital value was fixed for each Company. The approach is if that Company had to seek to raise that value on the money market , what would they be paying for it in terms of the rate of return? This is then worked out with the result that each Company gets a figure for its total expenditure and the succesive five year period reviews, take into account inflation, the cost that the company has to bear or the stimulus put on the Company to make improvements and to generate efficiencies.

What starts off nice and simple, begins to become rather more complicated. In 1994 at the last periodic review K was defined as consisting of two elements, an negative X element which was the postulated value for the ability a Company to make efficiency gains and a positive Q element to reflect an improvement in quality standards. The quality standard is partly due to the European Union requirement for higher qualities of discharge to sea waters and estuaries, and the increased quality of drinking water. So that for each Company, OFWAT comes up with a figure anticipating future efficiency gains and that is the minus element and those Companies facing capital expenditure that is no way avoiding because they have to meet legislative requirements they get a plus integer of Q. Thus Southern at plus 4% and the Cambridge Water Only Company at minus 2.%, illustrates the range of Company K factors; for the K's of the remaining Companies lie somewhere between these two extremes. Southern is the highest plus figure because of its sewage disposal problems to the sea.

Another five year periodic review is about to begin in 1999. Now additional elements are being proposed for the K factor expression. To the minus X, the postulated figure for future efficiency gains, and the plus Q, the need to respond to legislative quality requirements is added a plus or minus P element to reflect the need for Companies to maintain security of water supply. What the last two or three years have shown is that droughts do occur and there is growing scientific evidence that the climate is changing.

The ability of water companies to maintain the security of supply for their customers is going to be eroded if we get a drier climate or a climate which produces torrents of rain in the winter, which runs off quickly rather than percolating through to underground water sources.

A further element S is proposed to reflect an enhanced level of service. OFT tends to say that although the X figure is the stimulus to improve the level of service; anyone can keep within the prescribed limits if the standard of service is allowed to drop.

So OFWAT has a series of criteria against which it monitors Companies. But these criteria tend not to be the kind of standards of service which a water engineer would regard. For example, one such criteria is "how many times within a Water Company is an incoming customer phone call answered within 30 seconds?" That's fine and something nice and simple to be monitored, but what a customer wants is not only the phone answered, but an answer to the question which he is posing. The Companies say that a case can be made where customers are saying yes we are prepared for a better level of service, but the service is OK now, but we want something better. OFWAT in putting out consultation documents is showing these extra elements as plus or minus because no one has made up their minds on how this is going to go. Po is one such element. When setting these figures in the charges which are running at present the feeling was that the stimulus to efficiency would produce savings, something like 70% of which would be passed back to customers; but not passed during the five years that they were being made but in the following five years.

But the Director of OFWAT is saying wouldn't it be nice to have a smashing reduction to start this new review off, to bring prices down by something like 10%. It's what the customers want, it's what everybody wants. But pause a moment; we will have this 10% cut and then with the application of these other factors look forward to prices remaining in real terms; stable. In other words still keeping place with inflation. Now that sounds fine if your only role is that of regulating charges so that customers don't pay through the nose. If your role is to see that the environment is to be maintained, if your role is to ensure that the abstractions of water don't lead to ponds and marshes and wild life habitats drying up and the returns of effluent whether to rivers or to the sea don't lead to harmful environmental effects, you throw up your hands and say look Po is a nonsense. This is what the Environment Agency is saying and as an observer and like Alan a writer, I write commentaries on the current scene, this is manna from heaven the way in which people are falling out. If you have got a monthly article to write then the good Lord in sending these controversies is doing you a power of good. So the environmentalists are saying that the environment has suffered quite a lot in the past because of the depravations of the Water Industry , abstractions have been made that really shouldn't have been permitted. All I can say on that is having been involved in that situation for very many years we didn't know as much in those days as we know now about the effect which abstraction has, or about the ability of the environment to replace what is taken out for water supply.

The Environment Agency is saying this is prejudging the whole purpose of the periodic review we believe that properly explained customers will say yes we are prepared that costs should go up a certain amount to make good some of the depravations of the past. This is going to be very controversial the Director is being accused of prejudging the outcome of the review some 18 months before he announces the actual K figure, which he denies strenuously !

Some of the pamphlets refer to how OFWAT can help a customer if they have a complaint against a Water Company. I find this very interesting for OFTWAT's role in protecting the interests of customers is very different from that which took place before privatisation. In those days the customer really didn't know what went on in the Water Industry or indeed what they wanted. In contrast the Industry did; and whether the customers liked it or not they got it! We have the situation now where part of the regulatory process is not only to ensure that the customer does not pay through the nose, but the get standards of service which don't suggest that the Companies are lowering their standards to make bigger profits.

What has happened is that each of the Customer Services Committees has a panel which checks on the way in which the permanent staff have dealt with complaints coming into the office, which gives advice to the permanent staff on particularly tricky complaints and which provides vast source of amusement for those of us on the panel to understand how human nature can be so foolish in so many areas both on the professional Civil Service side and on the Companies side in reacting in arbitrary manners and in the public side in what they do.

At our last meeting we were looking at the situation in which a lady had complained that her bathroom had been flooded because the toilet cistern had overflowed, ruining her carpets and going through into the room below. The Company weren't prepared to pay her any compensation. It wasn't quite true the Company were prepared to pay her, for calling in a plumber to repair the ball valve. What had been happening, the Company had been repairing a main in the street outside and were prepared to concede that some of the grit disturbed during that process had got lodged in the ball valve. But as the Company pointed out, "But Madam if somebody hadn't put a crown corked bottle top in the overflow to stop the cold draught effect, you wouldn't have had any flooding!"

Another incident from a different Company also within this Region was where the Company were adamant that the meter reading of this particular house was what the lady had to pay on. The lady concerned had an incontinent parent living with her and was particularly careful about her consumption and could visualise the dials of the meter flying round. What had happened was there were two adjacent houses and for some unaccountable reason the Company had got the two service pipes crossed when they were first connected. So the lady was paying for her neighbours water bill; which was considerably more than she had expected from her use of water. For something like 18 months the Company were adamant that she should pay the bill. Eventually because of the intervention of the OFWAT Committee the Company agreed that they had been in the wrong and the issue was resolved.

Dave Lewis

RETIRED CHARTERED ENGINEERS' ASSOCIATION

(WORTHING)

47 th Annual General Meeting

Dear Member,

The 1998 A.G.M. will be held at Field Place on Tuesday, 9th September, commencing at 2.30 p.m.

S. Oliver. Hon. Secretary

AGENDA

1. Apologies for absence.

2. Minutes of the Annual General Meeting held on 10th September, 1997 (see page 13).

3. Matters arising from the Minutes.

4. Treasurer's Report for 1997/98 and presentation of accounts for year ending 31st July, 1998.

5. Secretary's Report for 1997/98.

6. Rule change proposed by the committee.

First sentence of rule 4 to read "There shall be an entrance fee."

7. Retiring President's Address.

8. Induction of President Elect: S.M. Butler

9. Election of Officers and Committee for the Year 1998/99.

The Committee wishes to nominate :

Vice President	vacant
Hon Secretary	S. Oliver
Asst. Hon. Sec	R.G. Bailey
Hon. Treasurer	D.R. Collard
Asst. Hon. Treasurer	R.P. Marshall
Committee members	M.S. Leak
	H.A. Rummeli
Auditor	A.G. Standbridge
Membership Sec.	S.R. Renew

10. President's Address.

11. Vote of thanks

12 A.O.B.

MINUTES OF 46TH ANNUAL GENERAL MEETING, HELD AT DURRINGTON COMMUNITY CENTRE ON WEDNESDAY, 10TH SEPTEMBER, 1997, AT 2.30 p.m.

1. The president, K.J. Wheeler, opened the meeting in the presence of 31 members. He reminded the meeting that a principal objective of the Association was "to maintain links with development in technology".

2. Apologies for absence: Messrs Forster, Morley, Lear, Middlemass, Newberry, Harvey, Thomas, Lambert.

3. The minutes of AGM No.45, held on 11th September, 1996 were approved.

4. Matters arising from above meeting. None recorded.

5. The Treasurer's report was adopted unanimously. Proposed by L.C. Taverner and seconded by R.P. Marshall.

6. The Secretary, commenting on his report, advised that the membership now numbered 101.

7. The retiring President, K.J. Wheeler, reviewed the year's activities and, with reference to his opening comments, was pleased to say that the lectures and visits during the year had been excellent. The social programme had gone well and he particularly thanked John Fowler for his work in organising the Spring Break to Monschau.

8. The retiring President then introduced the new President, D.M. Lewis.

9. The following were proposed, seconded and carried unanimously as Officers for the year 1997/98 :-

President	D.L. Lewis
Vice President	No Nomination
Hon Secretary	S. Oliver
Asst. Hon. Sec	R.G. Bailey
Hon. Treasurer	D.R. Collard
Asst. Hon. Treasurer	J.L. Wigley
Committee members	R.P. Marshall
	E.T. Besley
	No Nomination
Auditor	A.G. Standbridge

10. The new President then explained the reasons for putting forward the Discussion Paper (page 14 of AGM documents). The fourth point, which referred to the admission of Professional Engineers who were not "Chartered", was discussed to some extent. The general feeling of the meeting towards the paper as a whole was noncommittal and no definite proposals were put forward. The President emphasised that this is a discussion paper which had been sent to all members.

11. The new President, D.M. Lewis, then gave a brief outline of his career which has been spent within the Electricity Supply Industry. He gave very informative details of how the Regional Electricity Supply Companies have developed through technological advances,

particularly the impact of the revolution in Information Technology with which he had been directly involved during his career with SEEBOARD.

12. D.J. Fuller thanked The New President for his interesting discourse.

13. Any other business.

(a) A member suggested that a letter of appreciation be sent to H.J. Tuffen for his TV presentation.

(b) B. Haynes queried the need for meetings to start at 1400hrs instead of 1430, as hitherto.

(c) The President reminded members that 50 plus are needed to ensure the success of the Annual Dinner.

(d) S.R. Renew suggested that the Spring Break holiday price be increased by a few pounds to avoid the need for using Association funds.

(e) E.T. Besley drew members' attention to magazines which can be taken away by anyone interested.

The meeting ended at 1637 hrs. RGB. 11/9/97.

Coffee Morning Collections

A total of £121.16 has been handed over to St. Barnabas Hospice from the collections made at the local coffee monrings and meetings at Field Place, and this has been gratefully acknowledged. Our thanks are due to John Wigley for all his good work in boosting these collections.

D. R. Collard

Hon. Treasurer's Report for the year ending 31st July, 1998

Totals of subscriptions and entrance fees are similar to last year, but this income has had to be supplemented by a withdrawal of £140 from the National Savings Investment Account, as expenditure was considerably in excess of income. There has also been a reduction in the Current Account balance and total assets have fallen by £238.57 over the year. This would have been even greater if all officers had claimed for all their expenses incurred on the Associations's behalf. The increases in subscriptions to £12 and entrance fees to £10 should redress the balance for the next year or so.

I should like to thank the Hon. Auditor, John Standbridge, for his valued assistance, also the Committee and all the members for their assistance and support during the year.

D. R. Collard, Hon Treasurer

RETIRED CHARTERED ENGINEERS' ASSOCIATION
Balance Sheet for the year ending 31st July,1998

1996/97	Receipts	1997/98	Payments	1997/98	1996/97
£		£		£	£
812.00	Subscriptions	804.00	Cooch lecture	20.00	27.90
30.00	Entrance fees	50.00	Student prize	75.00	75.00
100.00	Donations	0.00	Hire of rooms	218.83	115.17
860.00	Annual Dinner	1040.00	Annual Dinner	1049.49	854.80
0.00	Luncheon	506.00	Luncheon	549.50	0.00
0.00	Teas	28.10	Teas	50.86	0.00
465.00	Outings	414.00	Outings	454.80	400.10
36.70	Interest NSB	27.46	Corporation Tax	9.46	10.53
3.53	Interest Lloyds A/C	4.68	Typing, printing	446.72	450.50
			Postage	89.60	108.00
			Stationery	17.54	18.07
			Telephone	5.52	9.32
			Name badges	99.65	0.00
			Spring break	0.00	37.19
			Publicity	10.29	0.00
			Talks-expenses	8.50	0.00
			Insignia	7.05	288.75
2307.23		**2874.24**		**3112.81**	**2395.33**
200.00	Transfer NSB to Lloyds	140.00			
2507.23	Total receipts	**3014.24**			
	Total payments	3112.81			
	Balance	**-98.57**			

Summary

Brought forward from 1997	689.53
Deficit for year 1997/98	-98.57
	590.96
Less transfer to Lloyds A/C	140.00
	450.96

Assets

Balance current A/C Lloyds Bank	61.73
NSB Investment A/C	389.23
	450.96

D.R. Collard Hon. Treasurer

Auditor's Report

I have examined the accounts as presented to me by the Hon. Treasurer and, in my opinion, they represent a true and faithful picture of the financial affairs of the association for the year ending 31st July, 1998.

A.G. Standbridge Hon. Auditor

Hon. Secretary's Report for the Year 1997/98

A summary of the years events is given below;

Title	Speaker		Date	Attendance
"Reflections on the Thames Barrier"	G.M. Richards	guest	8 Oct 97	30
"Anatomical Topography"	Dr.G. Awcock	guest	5 Nov 97	38
Cooch Lecture "The digital computer - the early days"	Prof. R. Grimsdale	guest	28 Nov 97	42
"Recent problems in water supply"	A.C. Twort H. Speight	member guest	10 Dec 97	37
" An engineer's view of the jumbo jet"	K.J. Wheeler	member	6 Jan 98	32
"It's all about time"	R.W.V. Norton	member	10 Feb 98	42
"History of Ricardo"	Dr. French	guest	10 Mar 98	36

The RCEA prize was awarded to Jonathon Holt after the Cooch lecture

Southern Water, Hardham	Visit	12 Nov 97	17
Worthing Telephone Exchange	Visit	13 Jan 98	18
Smith Kline Beecham	Visit	17 Mar 98	15
Ordnance Survey, Southampton	Outing	12 May 98	11
Nuclear power station, Dungeness	Outing	9 Jun 98	10
Bluebell railway and Sheffield Park	Outing	11 Aug 98	22
Lunch at Charmandean Centre	Lunch	30 Apr 98	47
Spring Break to Yorkshire Dales	Holiday	4 - 8 May 98	26
Annual Dinner	Dinner	16 Oct 97	50
A.G.M.	Meeting	10 Sep 97	29
Committee	Meetings	5 during session	7,8,9,6,8

Membership

To date we have 107 members. During the association year we are sad to report the deaths of 2 members (W.H. Blundstone, J.T. Milway), there were 4 resignations (G.R. Carr, L.R. Gambles, C.E. Taylor, J.L. Wigley) and 12 new members have joined (D.W Badby, B.B. Bartlett, J.A. Fricker, R.H. Glossop, B.A. Gregory, J.B. Holmes, G.F.Kendall, G.E.Mathias, D. Matthews, H.A. Rummeli, H. Speight and P.J. Studd). Two members qualified for Life Membership (J.L. Gurney, S.J. Little) bringing the total number of life members to 7.

S. Oliver, Hon. Secretary