



BUSH TELEGRAPH

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TELEGRAPH

the magazine of

R&EL

wood lane



Cover

Eye Strain

suggested by Ted Morrison ,
original prints by
Denis Groombridge

Editorial Board

- Ann Kirby
- Geoff Holder
- Ted Morrison
- David Green
- Peter Walters



Editorial

This month's editorial is a request , nay a plea , for assistance . In the words of a Beatles song , "Help , we need someone !" Whilst the editorial board of any magazine is necessarily small relative to the number of contributors , there is a lower limit below which production becomes very difficult indeed . This situation has now come to pass with the BT .

Ann Kirby having gone onto pastures new , has relinquished her board post . We will need someone to succeed her , and , perhaps , two other volunteers as well . With the loss of Ann , our formal contact with the Administrative side of BREL has been broken . It would be helpful if her successor were from Admin. or from one of the M.R. grades . A quick glance at the names of the Editorial Board will reveal that our base is rather small . Three of us are members of the Polymers Departments , and one from Analytical Services . Two of us have been with the BT since its inception . Are there any mathematicians , physicists , engineers , ...who would care to join us ?

There are no formal qualifications required for board membership , just a degree of enthusiasm in seeking out articles and information for the BT . In addition , the board arranges for articles to be typed , lays up the magazine and collates and staples the pages together after photocopying . To be frank , the work can be onerous and dispiriting at times , but we think that it is worthwhile overall . Lastly , but certainly not least , we would like to thank Ann for her invaluable contribution to bringing out the BT over a number of years . We wish her every success and happiness in her new position .

PERSONNEL NEWS

STARTERS Welcome to :-

Sean Kinsella , who joins the Administration Department in the stores .

Keith Kondakor , Paul Wyndham , Paul Merckx and John Williams , who all join as student apprentices .

Michiella Parrit , who joins Engineering Development .

Kevin Dowling , who joins as a Technician Apprentice .

Jeff King , who joins Communications Systems .

LEAVERS Farewell to :-

Joanna Samson , who leaves after 2 years service to take up full-time education at Leicester University .

Raj Dave , who leaves after 11 years service to take up alternative employment .

Alex Charalambous , who leaves after 5 years service to take up alternative employment .

Ann Kirby , who leaves after 5 years service to take up alternative employment .

TRANSFERS

Pravin Panchal transfers from Physics to Administration as a Student Apprentice .

BEST WISHES TO :-

Christine Finney, who leaves to take maternity leave .

RETIREMENTS

Very best wishes go to Doreen Williams of Analytical Services , who retires after 13 years service with the company .

OBITUARY

Jerry Counsell

To the old Wood Lane hand, the name Jerry Counsell will immediately produce a succession of images: of a familiar figure in ankle-length coat negotiating the traffic on his scooter; or bursting into the lab. to announce "It's a great day for research"; or, in more reflective mood, eyeing critically with side-long glance the results produced by his slide-rule, his calculator, or latterly his computer programme. For Jerry was quite the scientist of popular fiction, a truly individual character always willing to get involved in anybody's problem. He was a physicist who, taking dielectrics in every shape and form from oils to powders to polymers as his subject, was always ready to adopt new tools. In the same way, when dissatisfied with his handwriting many years ago, he set to and rebuilt it in the form of his clear italic script that now seems so characteristic of him, firmly signed JAHC.

Jerry's distinctive personality could be encountered in many phases of Wood Lane's social activities: as secretary of the Chess Club when that was still in being; representing his colleagues on the Staff Association; more recently, as a genealogist pursuing his West-Country forebears; and always keen to play the jazz he loved on clarinet or saxophone, improvising brilliantly and with great versatility, whether in a lunchtime duo, or with a group supplied by Jerry for a convivial evening. He was so much a part of the Wood Lane scene that his sudden illness and death this summer is still difficult to comprehend for his many friends and colleagues.

A donation will be made to cancer research in Jerry's memory: Guy Secrett is ready to receive any contributions from friends who may have missed the collection.

CHILDRENS CHRISTMAS PARTY

This year's party will be held on Saturday , 17th December , starting at 3 o'clock and finishing at 6 o'clock .

Members children , grand children , nieces and nephews , aged between four and twelve years are eligible to come .

Please return all entry forms to P.T.J.Walton by 28th October .

Boy	Age	Girl	Age

Members Name - - - - -

CHRISTMAS/NEW YEAR HOLIDAY 1983/84

The site will be closed for the above holiday from the evening of Thursday, 22nd December, 1983 until the morning of Tuesday, 3rd January, 1984. The details are as follow:-

Friday,	23rd December	Nominated Day
Saturday,	24th December	
Sunday,	25th December	
Monday,	26th December	Boxing Day
Tuesday,	27th December	Bank Holiday
Wednesday,	28th December	Nominated Day
Thursday,	29th December	Nominated Day
Friday,	30th December	Nominated Day
Saturday,	31st December	
Sunday,	1st January	
Monday,	2nd January	Bank Holiday

LETTERS TO THE EDITOR

The 1983-4 programme of the Film Society has provoked widespread comment . One view is summarised in the letter , below , from Mike Denton . An alternative view is provided by Sasha O'Bow-Hove , who has replied on behalf of the Film Society .

Dear Film Society, (via BT)

Regarding the films for the forthcoming season - whatever happened to films which provide pleasure and entertainment, rather than make me want to commit suicide ?

Mike Denton

Dear Sir ,

I would like to point out that a Film Society by its definition does not attempt to imitate a commercial cinema . Instead it gives its members the opportunity to view films that may not be widely known or distributed . Even so the Film Committee makes every attempt to put together a balanced interesting programme , as far as finances and availability allow. This coming season has grouped together some outstanding films , comprising one comedy , one thriller , two comedy-dramas and three serious dramas . They will give many people pleasure and entertainment (even the 'heavier' films). I am surprised that there is nothing in our selection that appeals to Mr. Denton . He might be interested to know that six of the seven films have won numerous international awards . However , it may be that this committee is wrong in being uncommercial . If anyone feels as Mr. Denton does during the season I would be obliged if you would communicate with us . The normal channels are always open :- film reaction index , Film Society A.G.M. , replies to Film Poll requests for additional films to consider , or by direct approach to the committee . On a practical note , there is always room on the committee for another hard-working , dedicated member .

Sasha O'Bow-Hove
Chairman
BICC Film Society

Dear Sirs,

"Do drop in if you are passing by" is an oft-used phrase by those about to retire, addressed to colleagues in general. It must be very infrequently that such invitations are acted upon and even more rarely are they taken literally. The exception to the rule was this evening when Joe Lou landed Gabrielle three fields from my house. My wife and I jumped into the car and quickly covered the half mile to the stubble-field where Gabrielle was resting quite near the lane. It was a most pleasant and unexpected surprise to meet Guy Secrett, and* (I can't remember the name of the fair-haired van-driver or the BICC member of the fair sex with them so please insert with editorial tact!) Not often does one have the chance to hear Wood Lane news by balloon telegraph.

The evening was clear with the moon rising, the very strong wind of the day had fallen to a smart breeze and the sight of the majestic procession of some 40 balloons in their gay colours was a magnificent sight. They came over at all heights. The peace of the evening was accentuated rather than marred by the bursts of noise from the burners. What a strange co-incidence that the one to land nearest my home was from BICC.

Yours sincerely,

John Watson
("Doc")

*Editors's Note:

Dave Green and Yvonne Ferrier

TRUE OR FALSE ?

The only use for the
Monthly Report is to discover
what you wrote last month
so you can write this
month's ,

Anon-Wood Lane

LETTER FROM AUSTRALIA

Geoff and Patricia Layzell-Ward, who are well known to many longer-serving members of the Wood Lane Staff, emigrated to Australia recently. The article below is their first for us (the first of many we hope!). Taken with Ann and Vic Denholm's 'Letter from New Zealand', receipt of which is always eagerly awaited, we hope that our readers will gain an insight into life "down under".

Just a brief description of the journey to Australia to start. We left Heathrow teatime by Singapore Airlines: the uniforms of the Singaporean girls are very attractive. Our first stop was in the evening at Zurich where we couldn't see much as it was both dark and snowing. Our next stop was still in the dark at Dubai. As we were going to be there for a couple of hours we disembarked and explored the airport. The most interesting sight was dawn over the desert which you wouldn't believe if it were a Turner painting. We then had the long daylight flight to Singapore, where we landed at Changi - a name that is remembered from the war.

We spent five days in Singapore. Patricia spent most of them visiting libraries and talking to librarians, whereas I toured the bookshops and shopping centres. The shopping centres because of the shortage of land are four and five storeys high (and more, though I didn't get to one) with 10 ft corridors with shops either side. We visited the zoo and the botanical gardens, which was very reminiscent of Kew despite the different plants. They were very proud of their orchids which you could buy either as plants or as flowers. The ethnic dance theatre gave displays of the traditional dances of the various races making up the Singaporean population and the audience was invited on stage to be photographed with a large snake draped round the neck! Associated with this was a government sponsored shopping centre having local (i.e. SE Asian) crafts on sale. We bought a set of three Selangor pewter pussy cats about 2" long (one curled up asleep, one lying alertly looking forward and the third on its haunches front paws claws extended about to pounce). One of the local librarians, previously known to Patricia, took us to lunch at the Ming Court, noted for its Chinese cuisine, and we had about 12 different sorts of Dim Sum, ordered in Mandarin which made us feel it was totally genuine! Part of the package was a tour of the city including a visit to two Buddhist temples to a semi-precious stone factory and to an alligator farm (the latter were trying to persuade various countries to allow import of their skins but I wasn't hopeful for them). One facet of the Singaporean way of life was their housing - very expensive and in skyscraper blocks - there was no report of significant tower syndrome, presumably because everyone felt it was that or nothing. Singapore claims to have the highest per capita income of any country in Asia, even including Japan, presumably Arabia doesn't count as Asia!

We left Singapore in the evening and landed at Perth at 2 am for quarantine and customs. The quarantine was interesting - two men walked to the back of the plane and then walked along each aisle squirting an aerosol in the air and then we sat there for 5 minutes waiting for all the insects to die! The only plants or animals allowed in are Singapore orchids. (Our two cats followed us out and were due to spend 90 days, but it was cut to 60 days because the UK hasn't had rabies for some time). We left the airport about 4 am and a friend took us to our hotel.

Our stay in the hotel lasted a week and corresponded with the visit to Fremantle of the US fleet and of the USS Enterprise in particular. There were a large number of sailors in our hotel and everywhere we went they seemed to be there. After a week we got a flat (which in W.A. is called 'a unit') for about 6 weeks before we bought a house (actually a bungalow) further down the street, in South Perth.

Being in South Perth we go to Perth City by ferry across part of the Swan river called Perth Water, about 1 mile. The ferry channel is marked by posts in the river bed each inhabited by a shag hanging itself out to dry. When we arrived the maximum temperature was between 25°C and 36°C (97°F) - the latter is somewhat warm. We are told that during January the temperature goes over 110°F for 3-4 days - needless to say everyone flops: fortunately it didn't happen this summer. On the subject of the weather, Australia is now experiencing its winter and all during May the weathermen were apologising for the paucity of rain - there was only 25.8 mm in the month. So far, to the 21st there has been 154 mm in June in Perth, but considerably less in "the wheat belt".

Our bungalow has a terrace at the front, sitting and dining room, two bedrooms, bathroom, lavatory off laundry room, kitchen and what was once the back terrace has been converted to a family room and 'sleep-out'. The garden has several palm trees, wattles, lemon tree, mandarin, Kumquat, and swimming pool.

Across the road is Perth zoo, which contains some very attractive plants as well as the animals, which do not include platypuses or Koalas. The latter were described by a federal politician as 'flea-ridden, piddling, scratching nuisances' which caused a lot of comment! Koalas can be seen at a state park 70 km to the north of Perth.

We were both intrigued to read of Vic Denholm being able to see the Victorian bush fires as we couldn't, presumably because we were further away.

Perth is said to be the most isolated city in the world - the nearest is Adelaide at 1350 miles as the crow flies! WA has a population of 1.2 million in an area bigger than west Europe, but of course most of that area is desert. This isolation does lead to a slight case of 'them and us', with a feeling that the eastern states do not have much consideration for WA.

The summer weather is very nice. Most men wear shorts and short sleeved shirts. The postmen and bus drivers were all wearing shorts up to May. I was wearing shorts until the end of March and on warmer days in April.

Geoff and Patricia Layzell Ward

1983 NAVIGATION TRIAL

There must be an untapped market for arranging spectator participation in Navigation Trials..... if only it were practical to provide appropriate viewpoints. Ideally from a helicopter.

The thirteen teams at this years' event were each given the same set of clues, they set off at discrete time intervals. If only we (the organisers) could have watched as they progressed in various directions (and listened in to the decision making).

The best we could do was to be present at the stage end positions and watch as familiar faces trooped around, apparently in circles, looking for clues. If we were fortunate we also spotted familiar cars careering around on route, seemingly heading for different places.

At the end of the day we turned up at the planned spot, 'The Peacock' at Henton near Chinnor - several cars had been there since opening time 15 minutes earlier. Most arrived within the next hour. Two appeared nearer to closing time and one - well he must have got lost in a Laplace Transform.

Full results as follows:

<u>Driver</u>	<u>Navigator</u>	<u>Penalty Points</u>	<u>Position</u>
Dave Firth	Viv Semmens	8	1
Rose	Guy Secrett	30	2
Ian Manning	Mary	47	3
John Wilson	Val	59	4
Rob Corne	Pauline	62	5
Ian Fordham	Pauline	67	6
Denis Groombridge	Paula	92	7
Pete Walters	Jan	96	8
Lynne	Yvonne Ferrier	116	9
Lincoln Tingle	Martin	146	10
Paul Barker	Steve	175	11
Martin Littleboy	Deb	194	12
Gordon Thackray	Liz	DNF	13

Guy Secrett and Rose being the highest placed BREL entrants (well done) have therefore, by tradition, elected themselves to organise the next event.

Dennis Cooper and Sue

Now for a competitor's opinion

VIRGIN NAVIGATOR LEARNS THE HARD WAY

Captains Log; Stardate: 21/08/83
Location: The Squirrel, Penn Street

- 14.00 Eagerly waiting for D.C. to shift himself and hand our orders for the day. Only one couple didn't make it, Steve and Jo from Polymers (poor old Steve).
- 14.23 Orders received, final checks completed.
- 14.30 Having charted Stage 1, set off at full speed.
- 14.35 Solved clue No. 2. Whoops! what happened to clue No. 1?
- 14.35-
15.15 Pottered around Stage 1, typical cruising speed 10 mph much to the annoyance of other road users, but did manage to solve most of clues on way.
- 15.15 Arrived at Ashley Green with the theory: If it is a single track road with potholes, it must be the right way.
- 15.15-
16.00 Group of us at Ashley Green searching for clues approached by a local telling us "The telephone number you're all looking for is on that noticeboard over there". Helpful chap!
- 16.00-
16.50 Stage 2 uneventful. Didn't get lost, solved most of clues, arrived at Wendover thinking WHAT A DODDLE.
- 17.30 Solved end of stage clues, only stage 3 left to do, bags of time left, stopped for tea.
- 17.32 Discovered to our horror, the existance of..... STAGE 4!! Aborted tea and hurried on.
- 17.45 "I still can't make any sense out of this route diagram".
- 17.50 "Haven't seen any clues yet".
- 17.51 "No potholes either".
- 18.25 Following what we think is Stage 3 but later turns out to be Stage 4 in reverse, we arrive at end of Stage 3, somewhat confused.
- 19.00 Tired, hungry and lost again it's no longer a picnic and we consider giving up but decide to press on to complete the mileage.
- 19.25 With dusk approaching, fresh hope emerges in the shape of three other competitors and a clue that makes sense. We are on the right road after all and speed towards the finish.

- 19.50 After disagreement with navigator we arrive at the pub (the wrong pub) amid shouts of "told you so!"
- 20.00 Parched and famished, finally reach destination for long overdue refreshment.
- 20.45 Further refreshment received in the news that many people had done even worse than we had (they must have been really lost) and in fact we had gained a respectable 5th place. With useful experience gained, now looking forward to competing in the next "Spring Navigation Trial", whenever it may be held.

Rob Corne

BREL TECHNICAL SOCIETY

Many people will recall a series of internal Staff Lectures explaining the work of particular sections or departments. A group of volunteers has decided that it was time to revive the idea, but on a broader basis, so that in addition to talks by Wood Lane staff on their own work, we would have the opportunity of hearing from other parts of the BICC Group, and from the technical community outside.

We are planning a varied programme of future meetings, including presentations on:

BICC's role in cable television;

Balfour Beatty's activities, probably with an accompanying film;

home computers, from one of the manufacturers;

and, of course, Wood Lane projects.

The general aim is to provide a lively forum for discussion, and we are hoping that other enthusiasts will join us in organising the Technical Society and its future programme.

Tony Bhattacharya

Chris Melbourne

Guy Secrett

Ian Wilson

It is hoped that a report of the first meeting of the Society will appear in the next edition of the BT. At the meeting, Guy de Hollain gave a talk on the subject of 'Electron Beam Irradiation of Polymers'.

TEMPUS FUGIT

Stands the yard clock still at three to ten?
No, alas. At last it's gone!

HISTORY OF WOOD LANE

CHAPTER FOUR - THE SEEDS OF RESEARCH ARE SOWN

Early days at O.T.D. and Erith - 33 and 66 kV
Problems - Screening - Static Tensioning -
Oval Conductors - Difficulties and Diversions
at Ormond Yard

It is difficult to realise in this scientific age that in those days (the 1920's) industry generally was most definitely not "research-minded". The vast sums spent nowadays on research and all it implies would not have been condoned by the shareholders, who were inclined to the short-term view. Anything remotely savouring of the abstract, no matter what its practical potentialities, was anathema.

It is the more remarkable then that the seeds of research in the Company should germinate in this stony soil. That they did and came to fruition is largely due to the far-sightedness of Mr. Urmston and the backing he received at top level in the person of Mr. P.V. Hunter.

The majority of university graduates were Arts men, whose main outlet was the field of commerce. The few science graduates were mainly absorbed in the universities and in the teaching profession, and industry had little to offer them. However, Mr. Urmston appointed three scientists to the staff at Ormond Yard, namely Mr. F.S. Smith and Mr. K.S. Brazier (directly from London University) and Dr. L.G. Brazier (from the R.A.E. Farnborough). These three were among the first, if not the very first, graduates to be employed by Callender's and the year 1924 thus assumes some historical importance for the Company.

Initial work carried out by these three graduates was mainly centred on telecommunication instruments for measuring the properties of telephone cables in the field. For example, part of Mr. Smith's work involved the preparation of the jointing schedules for the "balancing" of telephone cables, referred to in the previous chapter.

The Technical Director at Erith Works at that time was Mr. J.F. Watson, or "Long John" Watson as he was better known, and in 1923-4 he started building up the Technical Department at the factory. He took into his employment Mr. S.W. Melsom, who, in the course of his work at the E.R.A., had recently published, in conjunction with Mr. H.C. Booth, a now-famous paper on the current-carrying ratings of power cables.¹⁵ Thus began the development parallel to that of O.T.D. at Ormond Yard, of a Research Department at Erith, which continued under Mr. Melsom's guidance for several years - in fact until the episode of the 66 kV failures, which will be discussed in more detail later. However, a close link never existed between the Research Department at the factory and O.T.D. at Ormond Yard, for the former was responsible direct to Sir Tom Callender, whilst the latter answered to the Contracts Manager, Mr. Green.

By 1925 serious trouble was being experienced with 33 kV belted cables which had been laid by the Company only a year or two previously. The problems associated with these failures were directly the concern of Mr. Hunter in his capacity as Chief Engineer. Work towards their solution, at his instigation, formed the first major research programme on power cables to be undertaken by the O.T.D. and so represents yet another milestone in the development of the Research Organisation.

The failures of the 33 kV cables⁹ should not have come as a surprise for during the development period preceding the first World War disturbing evidence had come to light of disruptive phenomena exhibited in cables for operation above the 25 kV range, which had not previously been encountered, or had been disregarded as a minor importance.

Unfortunately, so urgent was the demand for higher voltages following the war that substantial orders for three-core cables designed to operate at 33 kV and at the hitherto accepted "safe" maximum stress of 26 kV/cm, were confidently accepted and carried out. Moreover, the arbitrary limit of 33 kV was viewed in some quarters as unnecessarily cautious, and a number of companies put in hand the manufacture of experimental three-core 66 kV cables of the belted type. These were put into service in 1923-24, but after a few months proved to be far from reliable. In fact, it had now become evident that the warnings of inherent instability of this type of cable were only too well founded. A series of breakdowns drew attention to the need for a more conservative approach until the source of the trouble had been located and the danger eliminated. The cause of the deterioration, though it was eventually determined by a series of investigations extending over a number of years, was not at first apparent. The early theory as to the cause of these failures, and which was for a time widely accepted, was that breakdown was due to a component of the voltage which, as a result of the distorted field associated with three-phase transmission acted intermittently in a direction tangential to the paper insulation layers. However, as time passed, it seemed likely that this was a secondary and not a primary effect, more particularly since breakdown almost invariably occurred between phases and not as a fault to earth, and was characterised by severe burning of the central filler.

These two facts, taken in conjunction with the curious relative immunity of lightly loaded cables of small sectional area, suggested that the problem was one of high current loading rather than excessive voltage; in other words, the sources of the trouble lay not so much in tangential stresses as in the mechanical effects of thermal expansion.

Confirmatory tests showed that in the case of three-core cable with small conductors, expansion of the copper, due to the load, was readily taken up by a minute radial expansion of the strand; whereas in the case of cables with conductors of relatively large section, these acted substantially as though they were solid bars and expansion due to heavy loading could only find relief through a widening of the coring-up helix, with the result that a partially vacuous space developed in the crutch between the three cores. Discharges initiated at this point caused rapid deterioration due to burning; and inadequate heat dissipation led to thermal instability, charring of the weaker portions of the insulation and early breakdown between phases.

It was abundantly clear that the predisposing cause was the lack of homogeneity in the dielectric. The core insulation and belt and the fillers all varied in construction, tension and dielectric strength; and of these, the relatively loose fillers, situated as they were within the electric field, constituted the gravest danger.

The remedy was found in core screening on the basis of the Hochstadter patent of 1914, as mentioned previously. Two types of cable were produced for 33 kV use; the H type with individual cores screened with a metallised paper or metal tape, and the H.S.L. type with each insulated core separately lead sheathed. The advantage obtained by this modification in structure was that the metal covering round each core was bonded to the lead sheath producing an earth potential, so that the stress lines instead of being intermittently tangential now became purely radial, and the general breakdown strength of the cable as a whole was greatly enhanced.

Moreover, Hochstadter, though his attention had primarily been directed towards the question of stress distribution, had accidentally found the solution of the second and perhaps even more important problem, that of separation of the cores on load; for, since the outer surfaces of all three cores were now at earth potential the space between them - hitherto a danger area - was now free from stress and therefore innocuous.

The screening of individual cores, as mentioned, was the solution to the problem so far as new production was concerned. But what of the cables already in service? Replacement as a whole would have been an expensive undertaking, and attention was turned to finding a method of reducing the thermal expansion or of making it ineffective. Work began at Ormond Yard on a system of tensioning of the cable.¹⁶ Experiments demonstrated the great force which could be exerted due to heating of the cores under load, amounting to as much as 170 kg per core for a 3-core cable, for a temperature rise of 25°C. Theoretical considerations gave a figure of 600 kg per core, however, and it was clear that a large part of the force was in fact being relieved in the cable construction. The magnitude of the remaining force was clearly such that its possible effect on the cable could not be ignored.

Further experiment showed that deformation of the cable under load gave rise to a large increase in power factor. Application of a temporary tension of suitable magnitude resulted in a large reduction.

In early work tension was applied by means of springs, but this method was not satisfactory as the springs tended to be released by the expansion of the conductor as the cable heated under load. This movement was inevitable in any arrangement using springs, and this led to the proposal by Dr. Brazier to use a constant stretch, or constant strain system, of tensioning. The method involved, known as "static tensioning", consisted of applying a force to the ends of the cable sufficient to extend it, within its elastic limit, by an amount equal to the extension which would normally occur in the free state over the given temperature rise, say 50°C, and anchoring the cable in this position. Any subsequent expansion due to heating would merely serve to reduce the tension (up to the given temperature) and no disruptive forces would occur within the cable.

The practical difficulties of applying the method in the field were considerable, particularly in regard to the joints which had to be specially designed and were anchored to enormous concrete blocks. But this method was successfully applied in many cases and proved a complete answer to the problems arising in existing cables of the belted type. However, it was at best a palliative and the real solution lay with screened cables.

Attempts to make cables for use at still higher voltages (up to 66 kV) resulted in a different kind of problem.⁹ Failures in these high voltage single-conductor cables were clearly distinct from the three-core instability which had

been largely cured by the introduction of core-screening, and a disturbing feature was that though entirely satisfactory when tested before leaving the factory they tended to break down after a relatively short period in service. The breakdowns were characterised by extensive tracking and a waxy deposit associated with the track marks.

The mechanism of breakdown when eventually determined proved to derive from the behaviour of the cable under the influence of repeated heating cycles. Expansion of the compound forced it to migrate outwards through and past the paper layers, finding eventual relief in distension of the lead sheath beyond its elastic limit to accommodate the increased volume. On cooling the contracting compound, lacking any appreciable restoring force, was unable wholly to find its way back through the paper layers, and partly vacuous spaces were formed in the dielectric. Since the cable cooled from the outside inwards, these voids tended to form in the area of greater stress near the conductor, and breakdown of the vacuous spaces by disruptive discharge led to progressive deterioration, spreading further and further outwards until eventual failure occurred.

Two possibilities presented themselves, either a means could be provided of accommodating the increased volume of compound without permitting the irreversible migration which resulted in void formation, or a compensating mechanism could be provided which would enable the compound to flow freely with the heating and cooling fluctuations within the cable.

The first method was adopted by the Callender Company when in 1930, and partly as a result of researches carried out at Ormond Yard, the oval conductor cable was introduced. In this type, while the lead sheath retained its circular shape, the conductor and insulation were in the form of an oval, so that the effect of expansion was to increase the minor and reduce the major axis, rendering the insulated core more nearly circular and thus accommodating the increased volume without any distension of the sheath. On cooling the core reverted substantially to its elliptical form and since no migration had taken place, the danger of void formulation was largely eliminated.

The alternative method - ~~that of compensation~~ - had for some years been the subject of attention based as it was on a principle which had been tried out a generation earlier.⁹ It led directly to the general adoption of the oil-filled cable and a rapid increase in permissible voltages up to 132 kV and in some cases 220 kV. (See Chapter Five).

In the preceding pages several references have been made to "Ormond Yard" without actually describing the size and scope of the premises. Initially, when telephone work predominated, these premises consisted of No. 1, Ormond Yard, a corner house on two floors, in a mews which had originally housed Georgian stables. As more and more interest in high voltage work became apparent during the 1920's it became obvious that the existing premises were inadequate for the testing equipment required. In November 1927, therefore, negotiations were put in hand for the leasing of space in a furniture depository owned by G. Bailey and Sons on the other side of Ormond Yard. This was a four-floor rectangular building with brick walls and steel window frames and with concrete floors laid on steel joists. Callender's gradually took more and more space in this building and eventually occupied the whole of the 1st, 2nd and 3rd floors, each with an area of 4200 ft² and also 1000 ft² on the ground floor. The flat roof of this building was used for storage space and a goods lift 15 ft square was available.

The building boasted stone stairs, unbalustraded, and there were no toilet facilities available except that in No. 1, Ormond Yard! In these surroundings worked about 25 staff and 15 to 20 hourly paid workers - the nucleus of today's research organisation. Apart from testing equipment these entire premises contained offices for the senior staff, a general office, a telephone switchboard, a storeroom and a blueprint room. During this period (1928-31) various personalities who became well-known at Wood Lane joined Callender's at Ormond Yard. These were Messrs. Condon, Davis, Bradbery, Hall, Hartshorn and Tempest. The sometimes laborious task of compiling this History was frequently enlivened by their personal recollection (and not always printable anecdotes) about those early days.

Probably the highlight of this period was the troupe of "Power's Dancing Elephants" who used to play cricket in the yard! During the circus season the elephants were stabled on the ground floor of the depository, i.e. underneath the Research Department! One employee, whose name is apparently cloaked in secrecy, had an accident on his bicycle on his way to work one morning, damaging a wheel. He completed his journey to work carrying the bicycle. On arrival he parked it in its usual place. Later, and very indignantly, he complained to the elephant trainer that the elephants had damaged his bicycle. He claimed compensation - and got it!

There were still stables in Ormond Yard and an opportunist with a small cart and a ready market had contracted to remove the manure at weekly intervals. Imagine his chagrin when he turned up as usual with his little cart and found the result of a week's board and lodging by a troupe of elephants! The story has it, however, that he was held to his contract!

In addition to this form of diversion, correspondence of the following nature would sometimes flow between Callender's and its neighbours:

"- to draw attention again to the very bad smells in the neighbourhood of our entrance door resulting from crates of fish and refuse that you keep at that point. We now have a large number of staff and employees continually using this entrance and these smells constitute an intolerable nuisance. I have previously written to you on this matter but have not had your reply. I must ask you to give this your serious attention".

If the fish and the elephants were there at the same time the atmosphere must have been "electric" to say the least!

Yet a further incident concerned a night watchman on his very first night's duty. He heard a strange noise coming from one of the rooms. Being a conscientious night watchman and not having the key on him he broke in with an axe! The cause of the noise is not recalled, but was quite inconsequential.

By 1930 it became obvious that the existing premises at Ormond Yard were too limited for the type of work in hand. Mr. Hunter, realising that an expansion of Research and O.T.D. was essential if the department was to continue its useful work, persuaded the Board of Directors that larger premises were imperative, and that such ideal premises actually existed in the then disused Wood Lane Power Station.

In these circumstances approaches were made to the London Power Company and the Wood Lane site was taken on a twenty-one year lease, effective as from October 1931. The first "resident" at Wood Lane in charge of the adaptation of the buildings, etc., was Mr. A.S. Butler, who recalled in our interview with him that he first saw the establishment while negotiations were being commenced on (of all dates) the 5th November, 1930.

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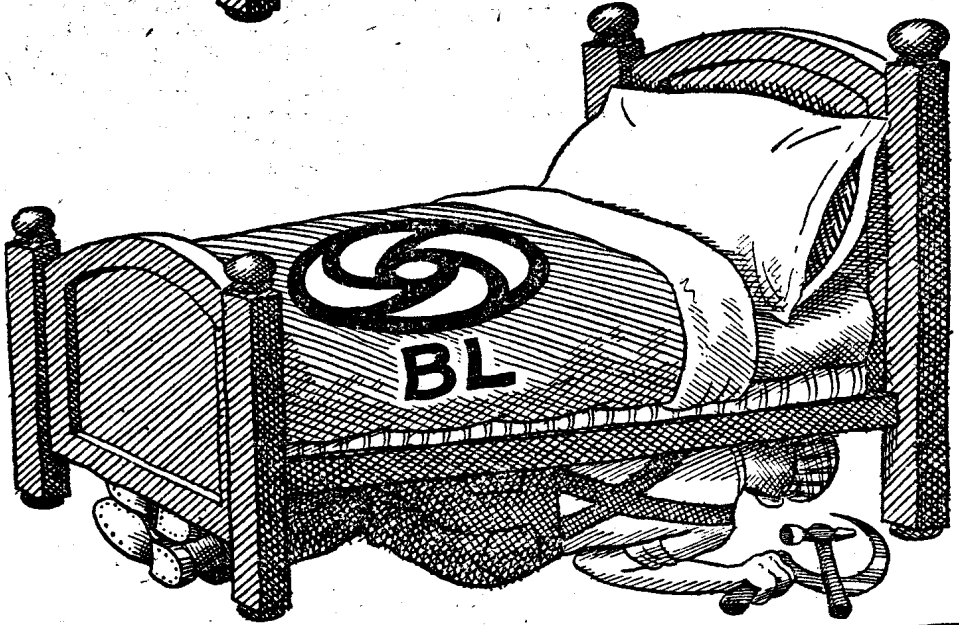
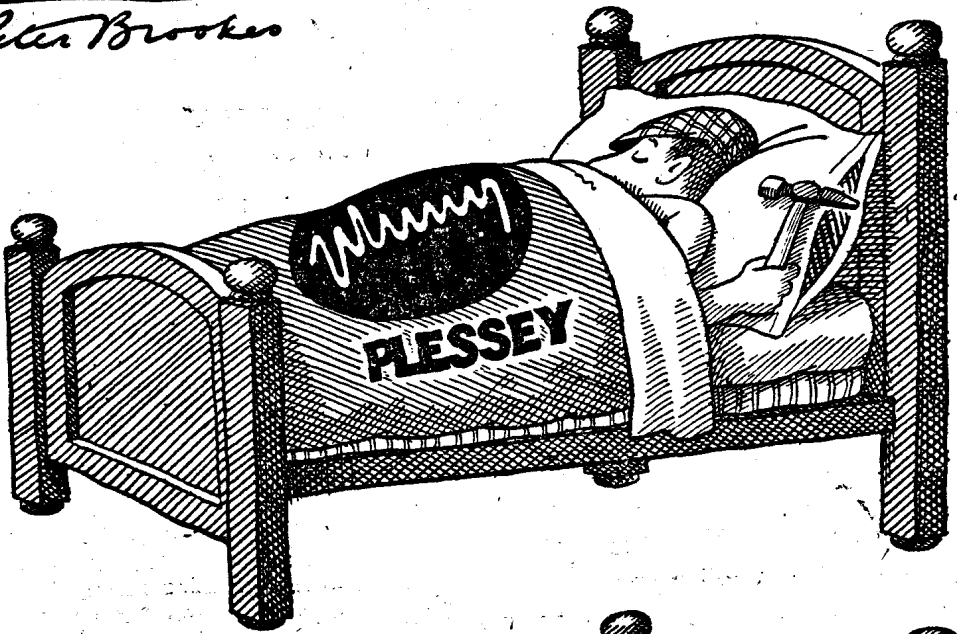
Editors' Note:

We apologise for the lack of photographs illustrating Chapter Four of the History. We hope to publish them with the next edition of the B.T.

WINE TASTING

The 1983 Wine Tasting will be held on Friday , November 11th .
Further details will be available soon , contact Denis Groombridge
or David Goff .

Peter Brookes



Hot-beds

BICC VIEW "We're all right , Jack . We make the beds ."

(With apologies to 'THE TIMES' , 15/8/83, and thanks to Ray Slaughter.)

NOT ...

THE BREL FILM SOCIETY LIST

(See July-Aug BT , p.25)

Oct 19th: The Divorce of Maria Braun

An interesting piece from the celebrated German director Frankfurt Fussbinder. The story concerns Maria, happily married to Knut. One day her happiness is shattered when Knut, tired of Maria's long periods of silence decides to divorce her.

Also "B.T.": a short documentary about twenty-four hours in the news-room of the Bush Telegraph.

Nov 15th: ETC

The not long awaited sequel to the hugely successful ET.

Dec 13th: The Cockle Fishers

The story of the oppression of traditional Welsh cockle fishermen (and women) by the tyrannical English overlords. Awarded a special prize at the Cannes Film Festival for the most soporific film of the year. (Welsh, with French sub-titles, 3 hours and 14 mins duration)

Also: Biggles Flies Undone; an adventure story sadly lacking the zip of earlier films in this well-known series.

Jan 11th: Twelve and a Half

One of Guiseppo Fellati's lesser-known comedy masterpieces, which tells the story of two brothers' love for the same woman. She dies of anorexia nervosa brought on by her grief at the death of her favourite ferret. The two brothers fight a duel over who is to bury her. Both die of their wounds. Filmed in the beautiful backstreets of Dulwich. "A very atmospheric film" (Meteorology Today) "The scenery is breathtaking" (Cobble Streets Fanciers' Association).

Feb 15th: Rocky 10

Latest in the Rocky series. Will youthful octogenarian ex-boxer recapture the world heavyweight title? (Starring Silvester Stallion as Rocky and Bo Derrik as 10)

Also Gabrielle in Soho; a film for all followers of the BREL balloon.

March 14th: War, Peace and the Great Revolution

A hitherto little shown silent version of the great Russian director Ivan Kameravitch. First screened at the Istanbul Film Festival in 1907 then lost for many years until re-discovered in a junk shop in Shepherds Bush. Complete with new original sound track specially written for the film's re-release at the Grantham Film Festival in 1982.

Robert Wilson-Thomas

SECTION REPORTS

Horticultural Section

1983 HORTICULTURAL SHOW

On Monday 5th September, the Horticultural Section, in conjunction with the Home Made Wine and Beer Section, held the first show at Wood Lane for many years. Exhibit classes were divided into four sections, Vegetables, Fruit, Flowers and Home Made Wines and Beers. Thirteen exhibitors staged a total of seventy three entries. A good number of entries over a wide range of classes were received in both the Vegetable and Fruit Sections, but entries of Flowers and Wines were disappointly few.

Following judging, the show was opened for general viewing and during the early evening exhibitors, their friends, and guests enjoyed a cheese supper, washed down with both commercial and home made wines.

During a short ceremony, Horticultural Section Secretary Frank Walker presented prizes to the most successful exhibitors.

Three exhibits were rated particularly highly by the Horticultural Exhibit Judge and deserve special mention. In the vegetable section it was a close decision between Wilf Walker's tomatoes and John Vernon shallots for the Best of Section Award, with the tomatoes just winning after lengthy deliberation by the judge. In the fruit section however John's entry of a melon in the any other fruit class was a clear Best of Section winner. This excellent exhibit also won the Best of Show Award - The Brazier Bowl - and was awarded a Middlesex Guild of Judges Certificate of Merit by our visiting judge, Denis Willis.

The organising committee would like to take this opportunity to thank our judges, Mr. Willis and Ted Cooke (Home made wine and beer) for their help and enthusiasm. Thanks also go to the Athletic and Social Club for their financial support, and to Pan Britannica Industries for their sponsorship in the form of prizes and literature.

Many people who did not exhibit produce in the show showed a good deal of interest during the lunch time staging of exhibits, and during the open viewing session. We hope that many of them will be encouraged to enter in future shows, particularly as they now realise that the standard of entries is well within the scope of the average gardner.

1983 HORTICULTURAL SHOW PRIZE WINNERS

Best Exhibit - Vegetables	W. Walker (Tomatoes)
Best Exhibit - Fruit	J. Vernon (Melon, in Any Other Fruit)
Best Exhibit - Flowers	D. Goff (Asters)
Highest Total Points Section A (Veg.)	R. Fraser
Highest Total Points Section B (Fruit)	D. Goff
Highest Total Points Section C (Flowers)	D. Goff
Highest Total Points in Sections A + B + C	R. Fraser
Best Overall Horticultural Exhibit, Awarded the Brazier Bowl	J. Vernon
Best Wine	A. Platt

PHOTOGRAPHIC SECTION

Discount Film

Now in stock :-New Kodak 'VR' and Fuji high resolution films .

Kodak VR 100	36 exp.	£2.25
" VR 200	"	£2.40
" VR 400	"	£2.60
" VR 1000	24 exp.	£2.40
Fuji HR 100	36 exp.	£1.75
" HR 400	"	£2.15
Ilfocolor 100	36 exp.	£1.25

NEW EQUIPMENT FOR HIRE

Cosina CT1G Manual SLR camera . K mount 50 mm F2 lens ,
Shutter speeds 1 - 1000 sec. + B ,
Full aperture LED metering .
Hire Charge 50p per week .

YOU ARE INVITED

To join the magazine circulation scheme (for a small monthly subscription) .
For further details contact Ian Fordham (337) or Rob Corne (340) .

THE FILM COLUMN

The full programme for the 1983-4 season is now arranged . This year's selection of feature films is complemented by outstanding animated films from all over the world . They are well worth seeing for their artistic merit , so don't be late ! Normal starting time of 6.30 pm as in the past .

1983

October 26th

LA CAGE AUX FOLLES (AA)

Directed by Edouard Molinaro and starring Ugo Tognazzi and Michel Serrault . Golden Globes award for best Foreign Film 1980 (Cannes) .

A hilarious situation comedy that only the French would have dared to put on . It's hard enough to impress future in-laws , but how does one manage if one's the 'gay' manager of a disreputable club ! See the film and find out ! A breathtaking film and absolutely non-vulgar .

DISCUSS YOUR POINTS OF VIEW OVER FOOD AND WINE AT THE ACCOMPANYING SOIRÉE

November 16th

(1) KALEIDOSCOPE (Czech)

Directed by J.Brdecka , this "song in praise of glass" tells the story of a very hungry dragon .

(2) LES ASTRONAUTES (French)

Directed by W.Borowczyk , the story of the "rise and fall " of a very odd astronaut .

FEATURE FILM

BLEAK MOMENTS (AA)

Mike Leigh's first feature film , starring Ann Raitt . Golden Leopard Award 1972 (Locarno) . The film centres around a somewhat shy but intelligent middle-class girl who is barely surviving suburban loneliness . The film is an odd and moving tragic-comedy about those who really do live lives of quiet desperation .

December 7th

(1) LABYRINTH (Polish)

Directed by Jan Lenica , the story of an innocent individual who wanders by chance into an eerie city . One of the greatest and most disturbing animated shorts ever made . Best Experimental Film 1963 (Oberhausen) .

FEATURE FILM

CAT PEOPLE (X)

Directed by Paul Schrader and starring Natassia Kinski and Malcolm McDowell . A remake of the 1942 Tourneur classic . Are there members of an ancient tribe who are transformed into black leopards if they make love to anyone outside their own family ? Come and find out for yourselves !

1984

January 18th

(1) THE HANGMAN (USA)

Co-directed by Paul Julian and Les Goldman , the story of a hangman who comes to subtract submission of the city to his criminal law . A haunting and unforgettable short which received over eight international awards including the Golden Luther Rose at Oberhausen and the Silver Medal at San Francisco.

(2) SUBSTITUTE (Yugoslavia)

Directed by Dusan Vinkotic , in this world of substitutes there is a balloon for everything , even for living things . Academy Award for Best Cartoon 1961 , Golden Gate Award for Best Animated Film San Francisco . and several others .

FEATURE FILM THE MARRIAGE OF EVA BRAUN (AA)

Directed by Rainer Werner Fassbinder , and starring Hanna Schygulla and Klaus Lowitsch . Best Film 1980 , British Circle Film Awards .

Maria and Hermann Braun are married in a hasty ceremony during the Second World War . With Hermann reported missing at the end of the War , Maria finally starts a new life with an American soldier . However , Hermann reappears , the soldier is killed . Maria then forms an association with a wealthy businessman while Hermann is in jail . On his release, instead of waiting for her to pick him up

February 8th

(1) LOVE AND FILM (Yugoslavia)

Directed by Ivo Vrbanic , a very funny cartoon on the way love is portrayed on different nationality screens .

(2) AN AWARD FOR MR.ROSSI (Italy)

Directed by Bruno Bozzetto , a sudden passion for movie making changes Mr.Rossi's life . Everything around him becomes an object to be filmed .

FEATURE FILM BAD TIMING (K)

Directed by Nicholas Roeg and starring Art Garfunkel and Theresa Russell . Best Direction 1980 , British Film Critics Circle Award .

It's a disillusioned film about the destructive nature of love . TIME OUT wrote that the director Nicholas Roeg was the man whose 'Bad Timing' , about the intimate warfare between a free-spirited waif and a university psychiatrist , caused a real-life psychiatrist , R.D.Laing , to go bananas the first time he saw it .

February 29th

(1) A (Polish)

Directed by Jan Lenica , a bitter , pessimistic cartoon , showing man's utter helplessness in the presence of forces stronger than himself . A man sits in his room when his home is invaded by the letter 'A' .

FEATURE FILM THE TIN DRUM (X)

Directed by Volcker Schlöndorff, and starring Dair Bennet and Mario Adorf . Shared Golden Palm 1979 (Cannes), Oscar for Best Foreign Language Film 1979 . At the age of 3 , Oskar decides to opt out of life in the Germany of the 1930's . He wills himself not to grow old , thus avoiding coming to terms with the world he has come to despise . Instead he beats his tin drum . A stirring indictment of life in those times .

March 21st

(1) THE LITTLE ISLAND (British)

Directed by Richard Williams , the story concerns the "impossibility of communication , with the trouble caused by people with tired ideas trying to convince each other".British Academy Award 1958

First Prize , Venice Shorts and Documentary Festival
1958 , Cannes Film Festival 1958 .

FEATURE FILM

LENNY(X)

Directed by Bob Fosse , and starring Dustin Hoffman
and Valerie Perrine . Best Actress Award for Valerie
Perrine at Cannes , 1975 .

A screen biography of the sensational , troubled
and brief life of the comedian Lenny Bruce . He
was detested by Middle-America as the arch-priest
of subversion and obscenity, but was hailed by many
as "the conscience of America" . In some ways the
obituary of an era .

PROGRAMME PRICES

For the first show (inc. Soirée)	90p	(Guests £1.20)
For subsequent shows	60p	(Guests 70p)
Season Tickets	£3.00	(Guests £3.50)

HAVE YOU SEEN (?) COLUMN

In view of the length of the previous section , this
will be deferred to to next issue of the BT .

LATE NEWS

BICC A v BICC B
Hammersmith Lunchtime 5-a-Side League

Oct. 6th

In a closely fought game BICC B gained revenge for their early
season defeat and beat BICC A 1-0 . 'A' had many chances
throughout the game , but managed to shoot wide or were foiled
by Chris Kavanagh , the 'B' goalkeeper . 'B's goal came in the
second half . Vince Allard was caught in possession on the edge
of his own goal area by Steve Bishopp , Steve's strong tackle
caused the ball to sneak into 'A's goal wide of 'keeper Dave
Green .

BICC FILM SOCIETY

WEDNESDAY OCTOBER 26th 1983

LA CAGE AUX FOLLES

(BIRDS OF A FEATHER) AA



followed by

A SOIREE

MARCELLO DANON presents
UGO TOGNAZZI · MICHEL SERRAULT
"LA CAGE AUX FOLLES"

Based upon the play by JEAN POIRET
A film by EDOUARD MOLINARO

Screenplay and adaptation by FRANCIS VEBER,
EDOUARD MOLINARO, MARCELLO DANON and JEAN POIRET
with CLAIRE MAURIER · REMI LAURENT

BENNY LUKE · CARMEN SCARPITTA · LUISA MANERI
and with the participation of MICHEL GALABRU

Music by ENNIO MORRICONE A French-Italian co-production
LES PRODUCTIONS ARTISTES ASSOCIES
DA MA PRODUZIONE SPA

 **United Artists**
A Transamerica Company

Films are shown in the Main Hall of the McFadzean Laboratory,
BICC Research and Engineering Ltd,
38 Ariel Way, Wood Lane, London W 12.

Wednesdays, starting at 6.30 p.m.