

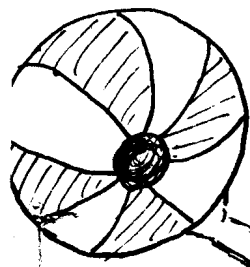
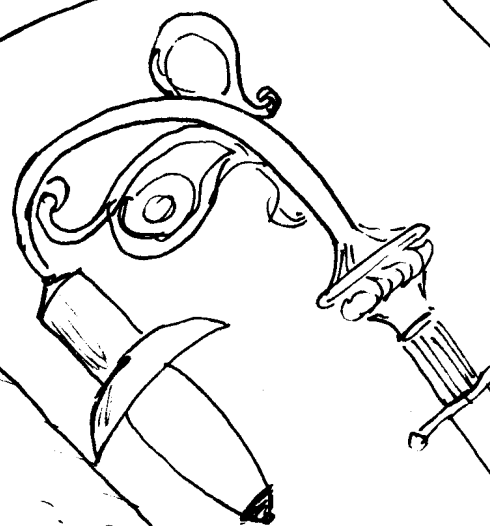
DS
BUSH

Telegraph



Handwritten scribbles and illegible text.

73



JUNE

| SUN | MON | TUE | WED | THU | FRI | SAT |
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BUSH TELEGRAPH

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Wood Lane's Club

Editor Peter Revell *Editorial Board*
Dave Castle
Denis Groombridge
Richard Hammond

cover : Creation by Peter Walton

vol. 19 no 5

EDITORIAL

To get under way, let me apologise, on behalf of the entire Editorial Board, for the late appearance of this Edition. Naturally we do everything possible to prevent this happening, but for reasons beyond our control it was not enough.

Unfortunately the July Edition will not be printed. With many of our usual contributors either on holiday or wilting under the sun (or perhaps being beaten down by the rain?), and the print room very much understaffed, it just cannot be done. Before all you imaginative people start sitting back - why not think about providing some material for the bumper August Edition? We can use lots of photographs, and written contributions too.

What has happened to the photographs for the B.T. Photographic Competition? Why not send your entry in now?

I will take this opportunity of expressing my thanks to Lord McFadzean for his letter appreciating the Profile printed in the Bush Telegraph last month, in particular the following:

"May the "Bush Telegraph" go from strength to strength"

Enjoy June and July, see you in August.

Bush Telegraph Opinion Poll

We would like to thank all the readers who completed their polls and gave in some valuable and interesting information, 27 replies in all were received and the replies were broken down into percentages as follows:-

Question 1 Do you enjoy reading the B.T.?
81% Yes, 7.5% No, 7.5% Indifferent, 4% Don't Know

Question 2 Is the space allocated to the Social Club.
About right 63%, Not enough 22%, Too much 3.5% Dont Know 11.5%

Question 3 Is a prize competition every month a good thing?
Yes 59%, No 11%, Indifferent 26% Dont Know 4%

Question 4 Articles that are enjoyed or disliked.
and 5

| | Enjoyed | Disliked | No Preference |
|---------------------|---------|----------|---------------|
| Humorous | 78% | 0% | 22% |
| Topical | 56% | 7.5% | 36.5% |
| Local Information | 67% | 3.5% | 19.5% |
| Social Club Items | 56% | 3.5% | 40.5% |
| Competitions | 37% | 11% | 52% |
| Puzzles or Problems | 52% | 15% | 33% |

Question 6 Willingness to contribute articles to the B.T.
Yes 59%, No 22% Don't Know 19%

There were some constructive comments received from readers like better proof reading, better standard of less funny articles? more competition and more photographs. These we will try and implement during the following months. One person wanted more opinion polls and another more porno or should I say wanted porno! However we were pleased at the number of readers who do actually enjoy the B.T. but it appears that perhaps more space could be given to the social club, here section secretaries could help in providing more regular material. One surprising fact was that not everybody liked a prize competition, also surprising was the number of people who would be willing to contribute - need I say anymore.

As a final comment to the person also wanted less sarcasm in the B.T. and also wanted to know what social club was, all I can say is the social club is only what you make it, if you don't put anything into it how can you expect to get anything from it?

THE EDITORIAL BOARD

Quiz.

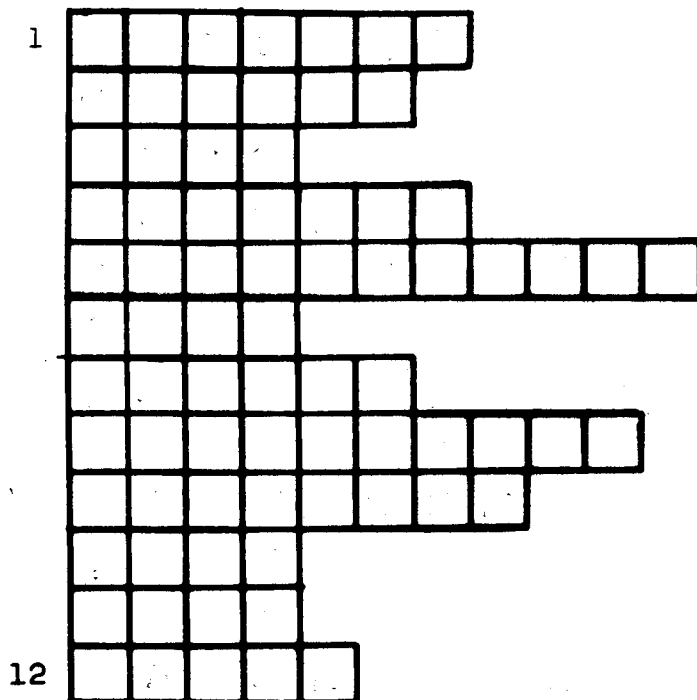
1. Country with International Motor Vehicle Mark IS
2. President of the USA, unaugurated 1929
3. Under which mountain range is the Simplon Tunnel?
4. Country with monetary unit of the Krone
5. Musical term for becoming gradually softer
6. Eighth book of the Old Testament
7. see 11
8. Name given to a short peice for performance between the acts of an Opera
9. The next Prime number after 17
10. Baghdad is the capital of this country
11. The two contenders for the title of the longest river in the World
12. Third letter of the greek alphabet

cut along here

Send to the Editor by 18th July

Name

Dept;



Spring Navigation Trial

On a rather damp Sunday afternoon, ten cars assembled behind the Packhorse Pub at Gerrards Cross for the start of the 1973 Nellie Trophy Rally - Messrs Green and Green perhaps more loosely assembled than the rest. Volumes of instructions were passed around by organisers Goff and Groombridge with rather disconcerting grins on their faces - they obviously knew what was in store for us!

The first section, through spot heights, brought the first signs of the deluge that was to dog most of the rally. However, everyone made the end of the stage at Burnham, albeit from different directions. After much fruitless searching around the town for transparent squares and triangles?, stage two required the interpretation of the efforts of poet-laureate Groombridge.

Having determined how a crow would fly $4\frac{1}{2}$ miles and how fast trees are allowed to run, most would be candidates for the East African Safari arrived at Fingest in torrential rain. However, spirits were not dampened and most tackled the intricacies of the dreaded 'straight line' section with enthusiasm. Arrival at Hambleden, more by luck than judgement, having charted unknown woods more like swamps looking for pipes which did not appear to have been made by anybody, was a relief for all. A slight relenting in the weather, allowed a pleasant walk around this most pictureque village looking for clues and much needed loos!

The final stage following 'tulips' brought the return of the rain gods and many flooded roads. However, the call of the Pegasus Inn was irresistible sooner or later (whatever happened to Peter Revell?), and a benevolent Derry - it was his local - bought drinks for everyone to celebrate their skill at completing the course. Many thanks go to the organisers for an excellent rally.

RESULTS

| <u>POSITION</u> | <u>DRIVER</u> | <u>NAVIGATOR</u> | <u>POINTS</u> |
|-----------------|-------------------|------------------|---------------|
| 1 | Annette Mattock | Graham Taylor | 80 |
| 2 | Denis Cooper | Viv Semmens | 85 |
| 3 | { Clive Robeson | Marion Robeson | 105 |
| 3 | { Richard Grigsby | Roy Spencer | 105 |
| 5 | J. Littleton | S. Gardner | 150 |
| 6 | Peter Revell | Lyn Revell | 180 |
| 7 | D. Robson | Mrs C. Robson | 225 |
| 8 | John Skelton | Jackie Dobbins | 295 |
| 9 | Richard Hammond | Shirley Hammond | 300 |
| 10 | David Green | Mr. Green | 310 |

Etc.

The present Minister of Transport recently gave some thought provoking statements at a transport conference, this was on the need for curbing the travels of the private motorist (us, again) which, although the volume of traffic on our roads is a serious problem in many ways, this must be the worst solution. Anyway the actual quotation was that curbs on "essential and anti-social journeys, by private cars" are one of the aims of the Governments transport policy. Well what scenes such a restriction conjures up and what constitutes such journeys? Is it anti-social to go to work? perhaps if you travel by yourself or is even such a journey essential? One can also imagine the police stopping motorists with the famed breathalyser in hand saying "Excuse me sir are you on an anti-social visit?" also court cases to decide whether going to the pub is an essential journey - surely it is not anti-social!

If private cars are restricted on our roads (which by the way we pay for) think how the lorries and heavy goods vehicles will increase together with their attendant noise, vibration and pollution. Making such cargoes go by rail would be a much better proposition as the railways affect very few people and are relatively pollution free.

To encourage people to use public transport systems the service would have to be improved, not only reduced fares; but improvements in railway station and bus stops, but we are still left roads but until people have their cars at home the roads will still be choked up.

In fact in 1970 of all journeys made by the public only 14% were by bus, 9% by rail and 77% by car which shows how much we all depend on our motors. With the worlds oil fastly dwindling and with all the pollution the burning of such causes something will have to be done in the next 5 years and unfortunately for all of us, whatever is done will not be popular.

To end with on a slightly humorous note, at a well known London University College, a final year degree student was finishing off in 3 hour chemistry practical examination. Having been most careful in keeping his answer paper clean from chemicals he was annoyed to find that, at the end of the examination, he had carelessly split some drops of water into his paper. Wishing to give a good impression and not waiting to appear a dirty worker he labeled a couple of the water marks with the word "Sweat". On receiving his exam paper back after marking the student was surprised to note that more of the offending stains had been labeled by the lecturer marking the paper with the legend "tears"!

Drinks all round

A very well known riverside tavern in West London is the Dove (Upper Mall Hammersmith), whilst its age is disputed between 18th or 16th Century it is a small cost "olde worlde" type inn. One approaches the Dove along a narrow alley-way surrounded with Georgian houses which adds to its appeal, infact the riverside walks either side was once called the best walk along Thameside. However postwar days have seen many changes, but there are still some fine houses with historical connections to be found. As one would expect inside the DOVE one finds an oak-beamed interior with two small bars, together with a vine covered verandah from which one has a fine Thameside view. The clientele has boasted such figures as Graham Green, Ernest Hemmingay and A.P. Herbert and is still claimed to be the rendezvous for personalities. A good selection of cold snacks is served at all times and Fullers is the draught beer.

Further out of town one finds another Fullers pub the PLOUGH, Tentelow Lane, Norwood Green, Originally an ancient inn that was reconstructed in the 1920's but the sense of antiquity is still present and the oak rough hewn beams are still plainly visible throughout. Norwood itself is a parish that was mentioned in the Domesday Book being part of the manor of Hayes. The Plough has a pleasant lounge bar, entered around the back of the building which in cold weather has a warming wood log fire, one unusual feature is it is the only pub I know where they give a clean glass for every drink one purchases, even if one takes an empty glass back to the bar for a refill.

Returning to Windsor again one finds the HART and GARTER right opposite the Castle. A chef and brewer owned pub/hotel establishment it is one of these places with countless steak type restaurants and numerous bars to suit most tastes. Originally called the White Hart it was renamed about 5 years ago and completely remodelled. The Garter part of the name was added on to commemorate an ancient inn that stood on an adjacent site which burnt down in 1681 and was used by Shakespeare as a setting for some of the scenes in The Merry Wives of Windsor. The present tavern provides a passable steak meal for a reasonable price in the choice of restaurants and a Beer Keller bar for lager enthusiasts complete with relevant live music. A doubles bar and trendy dive are also available for your entertainment, Watneys is the brew on sale.

bridge section

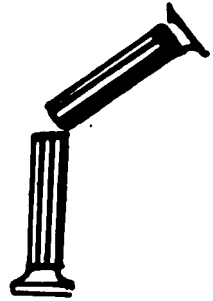
Bridge evenings are being held on alternate Monday's in the Cafeteria Canteen, starting at 17.45.

The next four evening are 11th and 25th June, and the 9th and 23rd July.

For further information contact R. Frazer Ex. 323.

The Page 8½ Column

a monthly miscellany



BLACK IS BOUNTIFUL

Our thanks to Mike Hagger for supplying this, from the Times, 3rd April, 1973.

“ The Zambia News Agency said the charges involved conspiracy to send a further 20,000 kwacha (£12,000) out of the country, and offering a bride of 250,000 kwacha to a Bank of Zambia official.”

BATH ARCHANGEL

Demolition of part of fine Georgian Houses in Bath to make way for a new shopping precinct is causing a storm in the City.

In order to disguise one corner of the precinct, where a new Marks and Spencer store is being built, the Corporation is building "St. Michael's Arch".

HOUSE RULE

Notice on the door of a Bristol hospital ward:
"Only two visitors allowed in each bed, please".



ANSWER.



ANTI FREEZE



ANTIQUE.

Answer to Mathematical Crossword

Our thanks go to the following for attempting this apparently very difficult crossword:

Anne Taylor and Mike Dennis
 Ron Hall
 Roger Millward
 Frank Walker

Unfortunately, out of the four answers received, only two were correct.

Anne Taylor and Mike Dennis could perhaps contact Maths Department for a few lessons in the use of Log. tables. With regard to the answer of 6 across, F. S. Walker has been Pepysing at the wrong Diary.

We have decided to split the prize of £1 between Ron Hall and Roger Millward - Congratulations to you both.

Now, all is revealed -----

| | | | | | | | |
|-----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| ¹ 1 | 0 | ² 6 | ³ 6 | | ⁴ 1 | 0 | ⁵ 0 |
| 9 | | ⁶ 1 | 6 | ⁷ 6 | 6 | | 0 |
| ⁸ 5 | ⁹ 2 | 1 | | ¹⁰ 2 | 7 | ¹¹ 2 | 7 |
| ¹² 3 | 0 | | ¹³ 3 | 3 | | 0 | |
| | 0 | | ¹⁴ 1 | 6 | | ¹⁵ 4 | ¹⁶ 9 |
| ¹⁷ 2 | 1 | ¹⁸ 1 | 4 | | ¹⁹ 3 | 6 | 3 |
| 5 | | ²⁰ 5 | 2 | ²¹ 5 | 2 | | 3 |
| ²² 4 | 0 | 0 | | ²³ 5 | 4 | 1 | 1 |

FOR SALE

Lockheed Brake Servo Unit
 Mini Radiator

Contact Fred Palmer on 279

"Is that an aircraft?"

"No, it's just an Illyushin"

History of Wood Lane

CHAPTER THREE - BITUMEN AND CABLES

Callender and Sons - V.B. Cables - "C.C.C.C." - Asdic - H.V. Cables -
The Grid System - O.T.D. - Testing Technique

Although the next logical step covers the arrival of Callender's at the site in 1931, the authors feel it is necessary to go back in time to the beginnings of the old Callender Company and trace through the developments in the cable world as they affected the Company. In this way, the reader will appreciate more fully the role initially played by the research side before it reached its present home at Wood Lane.

Callender and Sons, as the Company was originally known, had its origin in 1877, being formed by William Ormiston Callender and two of his sons, Thomas and William, with the original object of importing and refining Trinidad Lake bitumen for road-making and building purposes (8). It was not long before Mr. Tom Callender was at work on the Continent, visiting many different places, and at one time spending nearly a year in Roumania when the entire city of Jassy was re-paved. Another journey, this time to St. Petersburg in 1880, was instrumental in concentrating his interest on electrical work.

During his stay in the Russian capital a visit was made to the Opera House. A great impression was made on his mind owing to a part of the illumination being provided by an immense number of the new Jablochhoff candles, an electrical innovation that was to be seen at Covent Garden Opera House three years later when Callender's installed the necessary underground mains.

On his return from Russia Mr. Tom Callender travelled much throughout the Continent of Europe and later one of his journeys was to the U.S.A. The outward passage was made in the Cunard S.S. "Scythia" which was lighted by paraffin lamps, while the homeward journey was made in the Cunard S.S. "Servia", (then on her maiden voyage), the first large liner to be equipped with an effective electrical installation. Mr. Tom Callender was very interested in this development and upon his return pressed his firm to devote all possible attention to electrical matters.

W.O. Callender had earlier conceived the idea that the bitumen he imported ought to be a suitable material for insulating electrical conductors. (9) (10) At that time electrical engineers, mainly concerned with the electric telegraph, were seeking an economic and efficient substitute for rubber and gutta-percha (both of which had a limited life) and such materials as oil and wax, resin and asphalt, jute, hemp and cotton were all tried singly and in combination. Young William Callender, the chemist of the family, was given the task of developing the proposed material, i.e. bitumen. (9).

Callender's had a landing stage and $4\frac{1}{2}$ acres of land at Erith, on the River Thames, where shipments of bitumen were unloaded and where the refining was carried out; and here, in a hut on the marshes, William Callender pursued his experiments.

Since fluxing of the bitumen did not seem to him a very promising line as approach, his attention switched to a material known as "Elastikon", described as a waste product of a certain Liverpool firm (probably cotton-seed oil pitch). It was found that there was a possibility of combining bitumen and Elastikon" to form a product capable of being vulcanised. During 1881 a series of tests were carried out at Erith in conjunction with Sir William Kennard, and as a result of experimental work patents 4408-9 were granted to W. O. Callender on 11th October 1881, covering "Improvements in the manufacture of telegraph conductors and materials for covering and insulating wire or other conductors used for telegraphic, electric or other similar purposes". These related to insulating compositions made from bitumen, oil residues and waxes. (8), (9), (10).

The Callender Bitumen Telegraph and Waterproof Company was formed on the 12th April 1882, to exploit the development of the material as a dielectric. (8) Callender's had arrived in the cable industry.

Thomas Callender, the Manager of the new Company, pursued with enthusiasm the development of his brother's invention, and in a very short time vulcanised bitumen ("V.B.") cables were being installed in a number of localities, both in London and in the Provinces. (9) By 1896 the original Callender Company had so extended its business that it became necessary to enlarge and re-organize it, and in that year, on the 24th July, Callender's Cable and Construction Company Limited was formed, with a capital of £100,000 (8) Mr. Tom Callender was appointed Managing Director.*

Mr. James Callender, the third of the brothers, had early been associated with the Company at Erith Works. But ill-health made it desirable for him to travel to Australia, where he remained for 14 years and greatly benefited from the change of climate. He played a considerable part in the country's electrical progress and was one of the founders and one of the first presidents of the Australian Institute of Electrical Engineers. On his return to England in 1898, he took charge of contract work for the company.

In 1903, the Company was so well-established that it was capable of absorbing the Anchor Cable Company Limited of Leigh, Lancashire. Mr. James. Callender, in addition to his other duties, took over the Technical Management of Anchor Works, and devoted a great deal of his time to the conversion of the factory from paper-insulated to rubber-insulated cables.

This same year (1903) saw the retirement from active directorship of Mr. W. O. Callender, the founder of the business. Five years later he died, at the age of 81.

* It is worth noting here that the British Insulated Wire Company of Prescot was also formed during this period (in 1891) and it was here that the first paper-insulated cables were made in this country.

In 1904, Sir J. Fortescue Flannery, Bart., D.L., M. Inst, C.E., was appointed Chairman of the Board of Directors, an appointment he held for many years.

In 1914 came the First World War. It is common knowledge now, how the technical resources of the country were squandered, misapplied and often ignored in the early stages of the War. (11)

The professional soldier, by his very training, was reluctant to admit that civilian engineers had anything of value to contribute. But gradually a change of heart became apparent, and in 1915, Charles Merz and McLellan, of Newcastle, was appointed "Director of Experiment and Research" at the Admiralty. He immediately proposed the formation of specialist teams, composed basically of a scientist, an engineer and A Services' representative, to solve the various problems presented by the war. The engineer member of one such team, formed in 1917 to combat the submarine menace then assuming alarming proportions, was one P.V. Hunter, then in the employment of Merz and McLellan, where he had rapidly risen to a responsible position. The work of this team culminated in the successful development of the now famous "Asdic" equipment for submarine detection and, later, Hunter's major contribution to its effective introduction was recognised by the award of the C.B.E.

In June 1918, Thomas Callender was honoured by a Knighthood (8) and this well-deserved recognition gave the greatest pleasure to his many friends, including the Company's large staff in all parts of the world. No one can have failed to notice how continuous travel played a large part in Sir Tom's life and it was no more coincidence that after his visits to many parts of the globe business developments occurred which resulted in Callender's supplying cables and auxilliary equipment "all over the world".

Unfortunately, the happiness surrounding the bestowal of his Knighthood was marred by the death of his brother James, in October of the same year, which followed so soon after the successful completion of Picardy Works at Erith, the design and construction of which, for the manufacture of special trench cable, had been James Callender's sole responsibility.

The conclusion of the war gave vent to a flood of orders for power cables and plant, sources of supply of which had been stretched to the limit during hostilities, and Callender's found itself nearly overwhelmed (11). Seeking a Chief Engineer of ability, Sir Tom Callender approached P. V. Hunter whose acquaintance he had made earlier. They had met first in 1911, during the development of the Merz-Hunter split-conductor system of automatic protection, the experimental lengths of cable for which were made at Erith Works, and again in 1917, in connection with the supply of bitumen for the "Asdic" equipment. P.V.H. looking for a new world to conquer, decided at once to join Sir Tom and on 1st June 1919, begun his association with Callender's which was to last until his death 37 years later.

Hunter's objective after joining the Company was to build up a first rate engineering team, consisting of specialists in their particular fields, to which he could delegate a very high degree of responsibility and which would provide the background of expert knowledge and information required by the production engineers. This objective was not fully realised until some years later when difficulties encountered with 33 and 66 kV high voltage cables were to increase the emphasis on a more fundamental approach to cable problems

and were to result in the emergence of a research department.

It is perhaps fitting at this point to clarify the picture with respect to power cables in the period under review, i.e. in the 1920's. Prior to 1926 the supply of electricity was mainly local (12). Power stations were usually situated in the towns and cities they served, and distribution was largely by underground cables. Distances were relatively short and voltages in excess of 22 kV were seldom used before 1920.

Reliable paper insulated cables of the belted type were used for operation at 22 kV, with a maximum radial stress of approximately 20 kV/cm. The insulation thickness was largely determined by mechanical considerations and the potentialities and limitations of this type of insulation were not fully explored.

However, the growing demand for electrical power necessitated the use of higher voltages and by 1923 over 125 miles of 33 kV cable were installed by Callender's in this country (the first lengths were laid in Manchester about 1920-22).

It became necessary to utilise paper insulation as efficiently as possible to keep the cost of the cable to a minimum. Belted cables were made for 33 kV, using a higher maximum radial stress than previously, a value of 26 kV/cm being typical. However, although few solid type 33 kV belted cables are still in operation, the design was not satisfactory and failures occurred in service. The problem was not solved until core screening, on the basis of the Hochstadter patent of 1914, was introduced. (See chapter Four).

The establishment of the Grid system meant that transmission became mainly via overhead lines at 132 kV with secondary voltages of 66 kV and 33 kV, but some underground cables were required, for example, in urban centres, and their design and manufacture for voltages in excess of 33 kV presented a fresh set of problems to the cable industry. However, with the increased experience of screened cores, cables for use at higher operating voltages were developed. Single-core 66 kV cables were made and installed in appreciable lengths from 1929 onwards. Some troubles were experienced, but with improvements in materials and manufacturing processes it was found that solid type could be used for 66 kV.

Coupled with these developments in power cable manufacture were the problems associated with testing the quality of such cables. Within the Company the development of suitable testing techniques was the problem of the Outside Testing Department (O.T.D.) which was located at No. 1 Ormond Yard (close to the Great Ormond Street Hospital for Children). O.T.D. was an 'off-shoot' of the contracts department and, under the leadership of Mr. J. Urmston, was directly responsible to the Contracts Manager (initially Mr. Skacey, later Mr. C. J. Green). The Contracts Manager was responsible for work involved in outside construction, overhead lines and installation of cables, whilst Mr. Urmston was under him in charge of telephone cable installation and the O.T.D.

The work of the Outside Testing Department in the period around 1919-20 was mainly centred on the testing of telephone cables. During installation the various cable lengths forming part of the telephone line are "balanced", that is to say the characteristics of the various lengths are matched by jointing in such a manner that the best possible capacitance balance between circuits, or to earth, is obtained and cross-talk is eliminated.

One of the better known personalities who was associated with this type of work was Mr. A. S. Butler who later played a role in the move to Wood Lane.

As stated earlier O.T.D. was mainly concerned with telephone work in those early twenties, but testing of high voltage cables was also carried out. As these cables developed to higher voltages, so the testing equipment had to be improved accordingly.

Prior to 1916 a few tests (13) had been made in this country using high voltage direct current, the most interesting being those on the Metropolitan Electric Company's 100,000 Volt d.c. transmission cables at its Ironbridge Sub-Station. A special form of influence machine working under 200 lb/in² air pressure was built for these tests, and actually a voltage of 150,000 was obtained on the cable for a short time before the machine broke down. Later a Snook mechanical rectifier was tried, but this also failed.

Other than those unique types of test, the quality of cables was judged chiefly on the results of a.c. breakdown tests and measurement of dielectric losses by electro-static wattmeters.

In 1916, a very instructive paper (14) on d.c. testing of underground cables was read before the I.E.E. In it was described the "Delon" mechanical rectifier for producing high voltage direct current up to 130 kV and as a result of the paper a lengthy discussion arose over the advantages and disadvantages of testing with rectified, or what is more usually termed direct current. The "Delon" mechanical rectifier soon came into common use for testing super-tension cables after laying. Callender's had one located at Ormond Yard. However, it did not last very long, as a few years later the General Electric Company of America introduced the "Kenestron" valve - a two-electrode thermionic valve capable of withstanding a peak voltage between electrode of 110 kV. Again, Callender's bought and made use of this latest development and soon the "Delon" rectifier was no longer used.

Before the introduction of the Kenestron valve direct current testing was mostly confined to 22 kV and 33 kV cables, as in these cases it was impracticable to make a.c. tests owing to the size of the testing transformer required to give the necessary charging kVA.

With the introduction of the valve testing sets, the testing of 11 kV and 6.6 kV cables with direct current was favoured. This was partly due to engineers realising that the d.c. was as effective as the a.c. test for proving cables and joints after laying, and also to the quickness with which the d.c. test could be arranged and carried out. A further advantage of d.c. testing was that owing to the small power required a

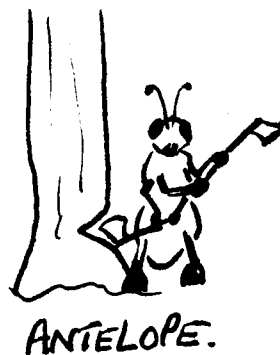
portable petrol driven generator plant could be used for supplying the energy to the testing set. This was particularly important on rural systems comprising sections of cable and overhead line. It naturally followed in these cases that overhead lines were tested with direct current as well as the cable sections and the d.c. test was found to be just as effective as the a.c. test in detecting faulty insulators and in locating overhanging tree branches.

One of the arguments used against d.c. testing was that in the event of a breakdown the fault resistance would be too high for a location to be made by the ordinary loop test. Actually, it was often possible to burn out the fault sufficiently for a good location test to be made, but in 1924 Mr. Urmston successfully tried locating a high resistance fault with the Murray loop test, using a high voltage d.c. testing set as the source of supply to the bridge.

This test was on one of the Charing Cross E.S. Company's 10,000 V mains from Ludgate Circus, and it took only seven hours with a test voltage of about 20 kV before the location was made. It was quickly realised that a great step forward had been made in the art of fault location.

By 1937 the H.T. Slide Wire Bridge had become an essential part of high voltage d.c. testing equipment, and locations could be made rapidly and accurately. By then there had also been the development of the Westinghouse Metal Rectifier for high voltage testing and the Gooding Flash-Meter for the location of intermittent flashing faults.

As will be realised from the above, Callender's played a leading role in the development of testing techniques. It was about the period of Urmston's work with the Murray loop test that the first graduates were brought into the Company at Ormond Yard.



the FILM column

FILM POLL 1973

Enclosed with this BT you should find a copy of Film Poll 1973. If you wish to register your vote for the films being considered for next season, fill in the questionnaire and return it to Carol Tilbury by Friday May 15th at the latest.

USA IN THE ROUND

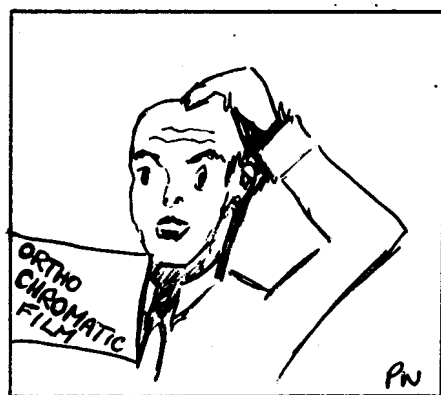
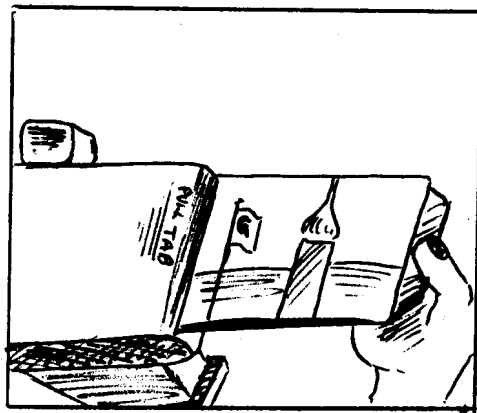
The latest addition to London Cinemas is an inflated dome in Battersea Park called the Traveldome. Inside, the US Travel Service are presenting scenes in the USA in Circle vision. In this process the audience stands in the centre and the picture is shown all round them on nine screens covering 360°. The Traveldome is open evening afternoon during the Summer, and the shows last about 20 minutes.

NATIONAL FILM THEATRE

The NFT programme for June includes a major season of Science Fiction Films from all over the world - in addition to the USA, countries represented include Britain, Germany, France USSR, Czechoslovakia, Denmark and Japan. There is a season of African Cinema, a week devoted to Switzerland, and virtually complete seasons of the films of Luis Bunuel and of Frank Cupra (but not including the original, 1938, version of LOST HORIZON).

FILM RECOMMENDATION

THE MAN WHO THOUGHT LIFE is the Danish contribution to the NFT's Science Fiction season. Showing at NFT 2 on Thursday 21st June.



Denis Groombridge, Arthur Boardman, or any member of the Photographic Section will be pleased to explain this to anyone who doesn't understand.

PHOTOGRAPHIC SECTION

At the latest Executive Council meeting, it was decided that, in future, sections would be able to hire out their equipment for use off the premises, for a small charge, but covered by a deposit which would be a substantial proportion of its value. The deposit is necessary, not merely to safeguard the club against loss of its equipment, but to keep the insurance premiums down.

This decision particularly affects the photographic section since it holds a number of items which are specialised and expensive enough for the average member not to possess, but useful enough for him or her to want to borrow from time to time.

It is proposed that all of the section's equipment may now be borrowed at a nominal charge of 10p per item. This charge, while in line with the motoring section's scale is subject to approval by the executive council. At the time of going to press the scale of deposits has not been worked out, since the value of some of the equipment is not known. The following is a list of the items which we hold to date.

1 Gnome enlarger + 2" or 4" lens
Set developing dishes 12" x 15"
2 Flashgms (mains or battery)
2 Flash controllers
1 tripod
1 14" x 10" dryer/glazer
1 broolly flash (flash diffuser)
Various photographic lamps
1 distribution beard
1 cassette loader
Multi-Unit Developing Tank
(Develops up to 3 films)

For any information contact

Arthur Boardman on 311.

Party Visit

FILM FESTIVALS AT SOUTHWARK

From mid June to mid September Sam Wanamaker's Globe Playhouse Trust is running two film festivals side-by-side at the Bankside Globe cinema in Southwark. The evenings are devoted to a Shakespeare Film Festival. As well as films of many of the plays there are musicals and other films more loosely based on Shakespeare, such as the Indian SHAKESPEARE WALLAH.

A Children's International Film Festival is running in the mornings at 10.30. Films range from DOUGAL and THE BLUE CAT to ANIMAL FARM with lots of other good things for the kids in between.

Full details of the programmes of both Festivals are on the notice board on the Fourth Floor. Admission to the Shakespeare Festival is 60p, (half price for children), and for the Childrens Festival 25p.

It is hoped to organise a party visit (at reduced prices) to one of the Shakespeare films. Anybody interested in participating should contact Eileen King in the Typing Pool (233).