

**BUSH
TELEGRAPH**

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TELEGRAPH

the magazine of

R&EL

wood lane



Cover

"FLEDGLINGS, FEATHERS
AND FOOD"

by Stephan Grey-Wilson

Editorial Board

David Green
Denis Groombridge
Mike Hagger
Richard Hammond
Geoff Holder
Ann Kirby
Ted Morrison



Editorial

In the balmy, good old days, from Supermac through to the swinging sixties, establishments such as ours were liberally stocked with ancillary staff who provided services of all types. Many older readers will remember with affection the "Heavy Gang", who lurked in corners ready to pounce on any previously immovable object at a moments notice. Today it takes a little longer to have something moved, and this is not the only example of poorer services. The standard of toilet cleanliness has never been the same since contractors took over. Repairs to equipment and installation of new plant can take a dispiriting length of time. Routine maintenance of much laboratory apparatus has disappeared completely.

It may be tempting to conclude that our colleagues in the Works Engineering Department are less productive than before. This is unlikely. In reality the Department has been squeezed - on one side by budgetary considerations which reduced numbers, and on the other by difficulties in obtaining skilled staff in certain key areas. The result is a large backlog of pink forms, each representing a job to be done.

Aside from any hazards which may be created by delays there is a longer-term danger. We could find ourselves in a vicious circle in which the delays create an attitude of mind whereby staff are reluctant to ask for the services in future on the grounds that they will not be forthcoming anyway. Eventually certain services are withdrawn and laboratory standards decline further.

We hope this will not happen. If there is a serious imbalance between the requirement and provision of services it should be dealt with as soon as possible. Experimental work is the primary function of R&EL. It must be maintained and serviced properly.

Personnel News

Starters

Welcome to:

S. Saha who joins us as an Assistant Technical Officer in the Communications Department.

Leavers

Farewell to:

Susan Goddard of the Personnel Department who leaves after 5 months service to take up alternative employment.

Charles Largie of the Physics Department who leaves after 8 years service to take up alternative employment.

Philomena Dzonu of Product Engineering (Alperton) who leaves after 4½ years service to take up alternative employment.

Jackie Copas of the Chemistry Department who leaves after 15 months service.

Transfers

George Price of the Corrosion Department has transferred to the Chemistry Department.

Chris White of the Chemistry Department has transferred to the Communications Department.

Retirements

Best wishes for a long and happy retirement to Mr. E. Russell who retired this month after eleven years service in the General Office.

Letters to the Editor

Dear Sirs, and Madam,

I have been asked to forward the attached letters.

Michael Fox

Rat-Catching

From The Editor of the Times

Sir, Your answer to the cat problem is a gross underestimate. Clearly you are unaware of the rules of the relevant Trades Union, the Territorial Organisation of Mouse Catchers and Allied Trades. These lay down the following minimum times for the various operations:

Killing one rat	6 minutes
Eating said rat	5
Drinking to wash down rather dry rat	2
Washing after meal	10
Basking in sun (if any), contemplating own name (vide T.S. Eliot), sleeping, etc.	25
Stretching after refreshing sleep	<u>2</u>
Total	<u>50 minutes</u>

Thus each cat is not ready to catch another rat until the period allowed in the problem is up, and 100 cats would thus be required. This is, however, only the minimum number; if an average group of cats is considered it is necessary to correct for the following factors:

2% of cats are Persians and still on strike.

20% of cats are kittens in training and are not allowed by the Union to attack a live rat.

15% are tomcats with better things on their minds.

To compensate for these a further 59 cats are required. One more (no doubt black) may be added for luck. Hence a total of 160 cats is required.

Yours faithfully,

WILLIAM REES-MOGG

Tybalt,

Gray's Inn Road

February 21.

From The Kyle of Lochalsh

Sir, All the cats in these parts are Scottish wildcats (Felis silvestris) and are consequently on strike at all times.

Yours faithfully,

KYLE

The House,

Lochalsh,

Wester Ross

February 22.

CORRECTION

In our item about Mr. DeVillle (January's issue) we incorrectly stated that R&EL is part of BICC Cables Ltd. This arrangement ceased in the middle of 1978, and since then we have been part of "Group Services", which includes activities such as corporate planning, management services and other departments which serve the whole of BICC.

Diary of Events

Date	Event	For Information
Thurs. 22nd March	Executive Council Meeting	Pete Walton
Sat. 24th March)	Hot Air Ballooning	Roger Millward
Sun. 25th March)	Chiltern Region/99 Meet	
Wed. 4th April	Badminton vs St Pauls Mixed (Away)	Vic Banks
Fri. 6th April	Last Day for Contributions to B.T.	Editorial Board
Wed. 18th April	Bridge. Annual Pairs Competition	Roy Fraser
Fri. 20th April	Publication Day B.T.	Editorial Board
Fri. 20th April	Sea Angling Trip Hayling Island	Andy Platt
Fri. 18th May	Sea Angling Trip. Brighton	Andy Platt
Regular Events		
Tuesdays	Badminton	Vic Banks
Thursdays	Badminton	Vic Banks
	Air Pistol Shooting	Denis Groombridge
	Slimming - 1 pm	Yvonne Ferrier or Lindsey Buchan
Weekends	Hot-Air Ballooning	Roger Millward or Denis Groombridge



Site Entrance

With the erection of the lamp, the 'Keep Left' signs and the Company sign, the new site entrance is now complete. Attention will now focus on the efforts of Hammersmith Council to develop the surrounding land and improve the access road (see below).

Development of Access Road and Adjoining Land

The Company have recently held a meeting with representatives of the Hammersmith Borough Council concerning their plans for development of the access road and adjoining property. The development involves the construction of offices, warehouses and possibly a public house, with the present access road being adopted by the Council and widened to 3 lanes; one lane for incoming traffic and two for outgoing.

This is basically the extent of the definite proposals, although it is understood that the Borough Council intends that a start, probably on the road, should be made in the very near future.

Further meetings are to be arranged from which it is hoped that more detailed information will be available, particularly concerning the effect the development will have on the staff at BREL. Obviously the access to the site will be affected, but at present the Borough Council has given no indication of their contingency plans for allowing traffic in and out of BREL during the development period. As and when more definite plans are known staff will be notified either through the pages of this magazine or by other notices depending on publication schedule of the BT.

n.b. Many people have expressed interest in the fate of the chimney on the old Adair site. As far as we know it is to be demolished by controlled explosion, probably during a weekend. As soon as we know the exact date we will inform you.

NEXT ISSUE

We shall aim to publish the April BT on our usual date, the 20th. However, the Easter holidays, which occur just prior to publication, will distort our routine. Will contributors please help by submitting copy to the Editorial Board as early as possible, and in any case no later than Friday 6 April.

The History of Electric Wires and Cables

PART 14. FIBRE AND COMPOUND INSULATION

By R.M. Black

Jute fibre insulated cables also played an important part during the early years of the electric lighting era. The principal manufacturers in the United States were Samuel Morse and David Brooks, while on the Continent, Dr. Francois Borel and William Siemens were the pioneers, followed rather later in the United Kingdom by the Fowler Waring Company and by Callenders. David Brooks' jute lapping had been used as early as 1875 for the insulation of telegraph cables which were subsequently drawn into an iron tube filled with a low viscosity oil. About 1887 Brooks adapted this method to the production of a low voltage distribution system for electric lighting. The cable (Fig. 1) consisted of a stranded conductor with a triple insulating covering of jute. This was made up of a lapping of jute strings, then four hessian tapes and finally a jute braid over all.

To overcome problems arising from leakage of the low viscosity oil at the pipe joints, the conductors after insulation were impregnated on site in a portable tar boiler (Fig. 2) with an impregnant consisting 50:50 resin: resin oil (or London Kidney oil). At normal temperatures this had the consistency of thick treacle but in the tar boiler at a temperature of 360°F in which the cores were immersed until all bubbling ceased, the viscosity was sufficiently low to enable reasonable impregnation of the jute to take place.

A novel feature of Brooks' telegraph conductor system had been the provision at intervals along the route of elevated reservoirs designed to maintain the oil in the pipe at a constant pressure. The idea behind this practice was that expansion and contraction of the compound or even the possibility of leakage, would be compensated for by the pressure-feed from the reservoir. The rather high viscosity of the lighting cable impregnant tended to restrict its flow in the pipes and although the dielectric was very satisfactory the system as a whole failed to gain acceptance for power distribution.

The English licensees, Johnson and Phillips put down a few trial installations, one of which was brought to light during the last war by a bomb which exploded in their factory at Charlton.

There is only one large scale installation on record, this was laid by Johnson and Phillips for the City of Worcester in 1894. The construction of the cable was two 0.10 sq. in. conductors and two pilot wires insulated with a serving of jute followed by four hessian tapes and a jute braid which were laid up together and impregnated with rosin oil at 360°F. They were then pulled into a 2-inch iron pipe which was then filled with

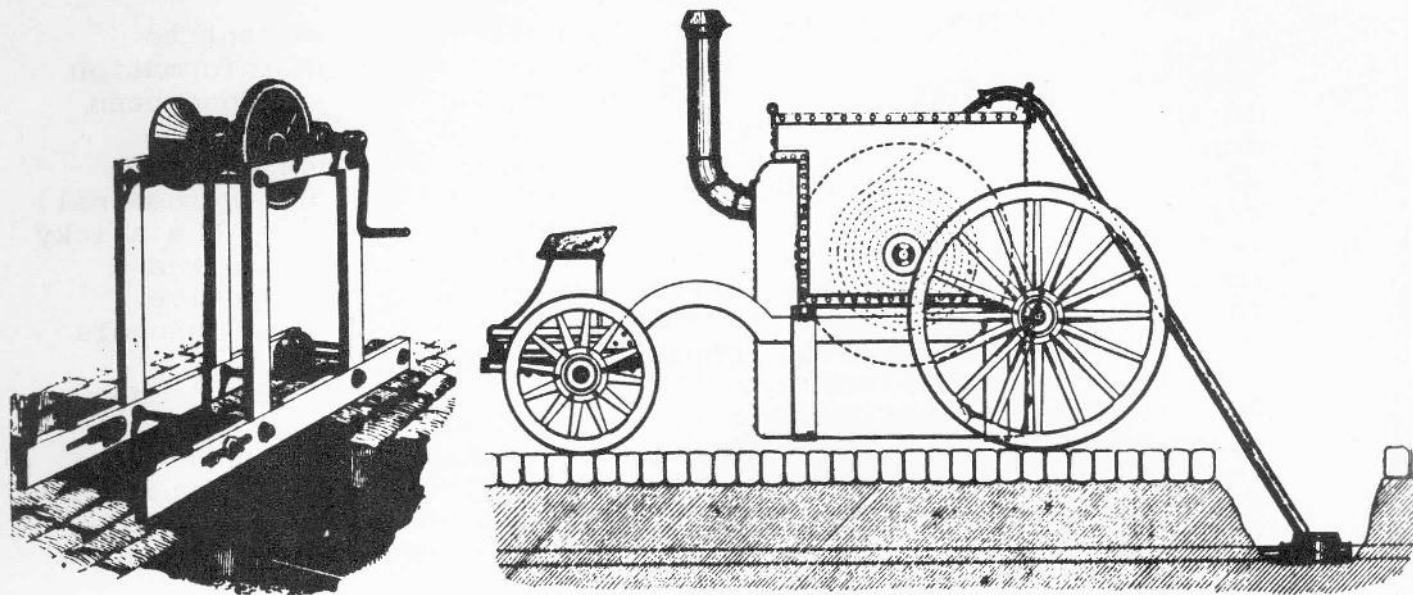


FIG. 2 : Boiler used to impregnate Brooks' jute cables on site before drawing into iron pipes. (from "ELECTRICIAN")

the viscous oil. The generating station was some two miles from the sub-station in the city and duplicate mains, with a third pipe as a stand-by, were laid down. A two storey brick tower was erected at the highest point of the route to house the pressure reservoir.

The system operated satisfactorily at 2,400 volts for over 40 years; but leakage was always a problem and eventually became so serious that over five gallons a week were lost. At this stage the Brooks' system was abandoned and replaced by lead sheathed cables.

The Brooks' system was the fore-runner of the Oilostatic and oil-filled cable systems introduced so successfully for high-voltage operation more than thirty years later.

It may be of interest to note that in 1953 the Okonite Callender Cable Company were in a legal suit with the General Cable Corporation on the infringement of a patent which dealt with cables in pipes under a high pressure medium. In order to establish the validity of the (Sonnenfeld) patent the sample of the Brooks' System in the Hunter-Hazell Collection in the Science Museum was borrowed and, after the case had been in court for three days the action was settled out-of-court. According to Doc Wiseman writing at the time, "at the time of settlement the case was most interesting. Mr. McGrath of General Cable was on the stand for two and one-half days, that is up to lunch time on the third day. Our lawyer was able to point out some very damaging evidence relating the Fischer-Atkinson patent to Sonnenfeld. The lawyers on both sides finally decided to get together, resulting in the settlement of the suit. As a part of the settlement, the Sonnenfeld patent has been assigned to us, that is, we are the owners of it, and therefore, there will be no further question as to who controls the pipe type of Oil-filled Cable."

Berthoud-Borel

In 1937 a three foot sample of cable was sent to Erith Works from the Greenock Corporation with the information that the cable had been laid about the year 1885 and had been in the ground since that date. The name of the actual manufacturers was not known, but the cable was thought to be of Swiss origin. The cable proved to be a 12/0.063 in (nominal) copper wires insulated with jute fibre impregnated with a sticky resinous mixture containing about 50% resin. The core was contained in a double lead sheath separated by an adhesive tar compound. The inner sheath had six evenly spaced channels separated by ribs running longitudinally on its outside surface. It transpired that the cable (Fig. 3) had been made by the Swiss firm of Berthoud-Borel, and was similar to that which had been used for lighting of Lausanne in 1882 and Greenock in 1884. (According to 'Lumiere Electrique', 1887 p.374). The cables were apparently insulated with cotton or fibre, impregnated with linseed oil with a high percentage addition of rosin. The compound between the sheaths was either 'brai gras' a rosin/rosin oil compound or coal tar residue. The cables were impregnated in a manner similar to that used with the Brooks' System; namely by soaking in the impregnant at 180°C until all bubbling had ceased. Berthoud-Borel exhibited their cables at the Paris Exhibition of 1881.

A similar cable was used in arc light circuits at Eastbourne. This had been supplied by the Silvertown Company although they did not manufacture it themselves but obtained it from Berthoud-Borel.

Fowler-Waring Company

R.S. Fowler of Pittsburgh USA became quite well known as the result of his development of a so-called 'anti-induction' cable of concentric design. In 1887 John Fowler of Leeds acquired an interest in Waring's type of cable and formed the Fowler-Waring Company to produce similar cables in this country. After an experimental period of manufacture in Leeds, the new Company set up a factory at North Woolwich where they proceeded to manufacture cables which achieved widespread popularity. In 1890 they were successful in obtaining the important contract for the electrification of the City and South London Railway. The consulting Engineer to the railway was in fact Sir John Fowler!, which could possibly account for the success in obtaining the contract. In the Chairman's Annual speech at the AGM of the Fowler-Waring Company he remarked:

"It is satisfactory that only our cables are employed in the new City and South London Railway, which is the first electric railway in the country".

These cables consisted of a copper core of 61/14 B.W.G. wires insulated with the Fowler-Waring patent insulating material (jute) and lead sheathed.

In the original Waring patent a description is given of the insulating compositions used for these wires and cables:

"The distillates and residuums obtained after extracting illuminating oils from petroleum and other mineral oils are employed for insulation; the use of pure paraffin is, however, excepted. With the distillates, which are fluid when cold, may be combined asphalt, pitch, gum, clay, chalk, pulp or other material for giving substance. Two or more of the heavier products, arising from the redistillation of petroleum, may be used together in some cases."

The patent then goes on to describe the insulating of the conductors:

"Wires, intended specially for use in cables for telephonic, telegraphic, lighting, power transmitting and other purposes, are enveloped in an arming or shield of fibrous material, preferably cotton threads wound or braided around them. The wound wire is then dried by artificial heat in a double walled receptacle, or it is exposed to heat in an insulating-medium, to saturate, coat and dry the arming. A complete cable may also be subjected to dry heat in a closed chamber, in order to expel all moisture. In some cases, the covered wire heated to 212°F, is conveyed directly into an insulating bath, or into apparatus for enveloping it in lead or the like, or into both in succession."....

The Exeter cables, a sample of which we have in the museum, are characteristic of the type, and were concentrics insulated with lappings of jute over which a jute braiding was applied, which gave a very fine coaxial form to the cable. Similar lappings and braiding were applied over the outer conductor ring of wires, and the whole was impregnated in heavy petroleum residue which produced a dielectric of very high specific resistance and comparatively low permittivity.

A length of Foster-Waring cable, the conductor of which was made up of six 8-gauge wires round a jute dummy and which was used on the original Grosvenor Gallery to Deptford route of the London Electric Supply Company, is shown in Fig. 4. It was withdrawn in the following year due to its susceptibility to catch fire.

Callender Company

In the 1890s the Callender Company also adopted jute impregnated with mineral wax or rosin oil/rosin as an alternative to their vulcanised bitumen. A specimen from West Ealing which was installed in 1895 was still working up to 1961 when it was recovered. Another, better known installation was the 2000 volt concentric installed in Gibraltar in 1897.

Compound Insulation

An examination of the patent literature of the decade 1880 to 1890 gives the impression that at one time or another claims have been made for the use of nearly every conceivable mixture of gums, resins, waxes, bitumenous and albuminous substances and compounds, both with one another

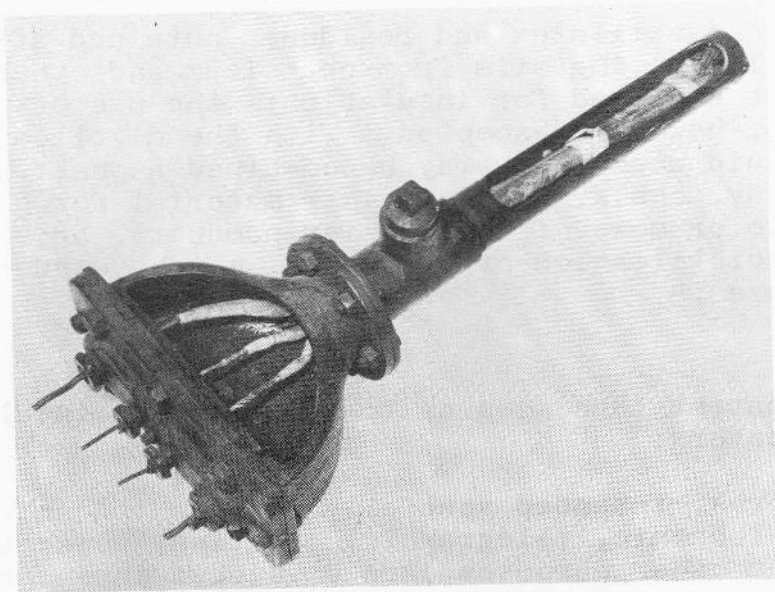


FIG. 1 : Brooks' oil-filled systems

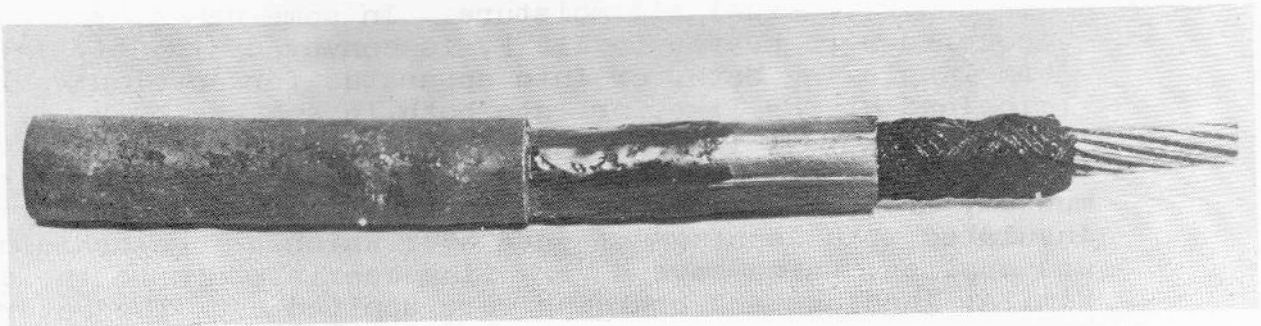


FIG. 3 : Berthoud-Borel jute insulated double-lead-sheathed cable.

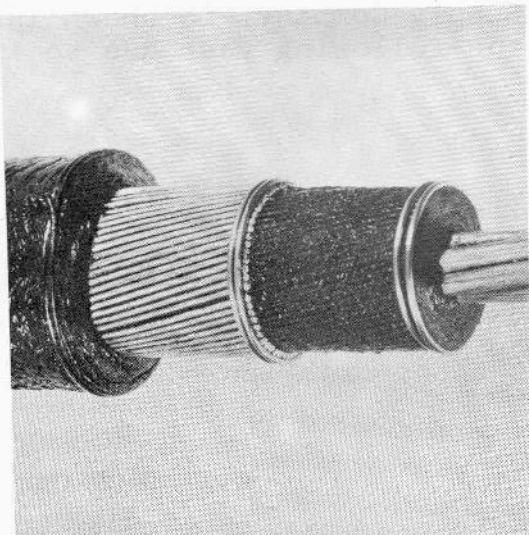


FIG. 4 : Fowler-Waring fibre-insulated and braided concentric (1889)

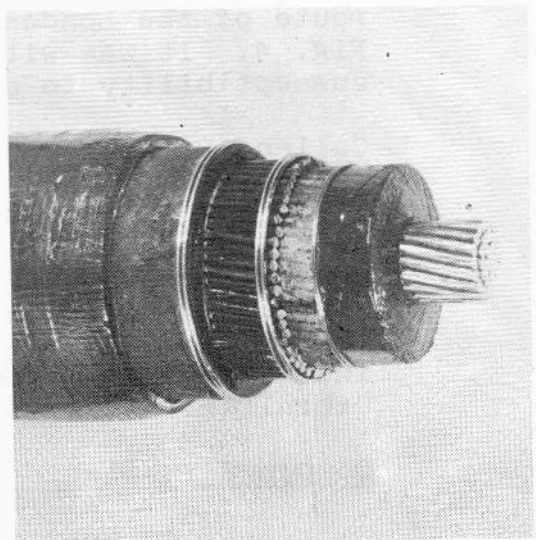


FIG. 5 : Siemen's non-hygroscopic cable

and with such materials as paper, jute, spun and powdered glass and sand, and gypsum for the insulation of electrical conductors. One such (P.M. Justice Patent No. 9,665 of 1888) makes a claim for a compound consisting of:

"a mixture of paper or fibrous pulp and an albuminous substance such as blood, to which may be added resinous, oily or fatty matters, wax, gums, paraffin, casein, gelatine, glue, starch, dextrin, sodium or potassium silicate, lime and metallic salts or oxides, according to the nature of the composition desired."

Some compounds remained in use longer than others and, for example, Okonite and kerite, both types of vulcanised rubber, became very popular in the United States. One of the principal features in the manufacture of Okonite cables was the method of applying the compound as an insulating covering for the conductor. The strip of uncured Okonite was laid on a strip of tin foil and both were folded around the wire in such a manner that there was only one longitudinal seam. The tin foil was left as an outer covering of the cable core until after the Okonite had been vulcanised.

On the Continent, the Siemens Company produced a cable insulated with a special compound known as the non-hygroscopic, or 'N-H' cable (Fig. 5). This compound was made up of a mixture of oxidised oil, Ozokerite wax,* a powdered silicate filler and colouring matter. It was originally applied to the conductor in the form of a thick helical tape without gap or overlay. The flow properties were such that after some time the tapes were intended to coalesce to a homogeneous insulation wall, completely impervious to moisture. It is said that the cable was generally referred to by the more descriptive term 'putty cable', due to the texture of its dielectric and handling properties.

There was not a very large demand for this type of cable, although a number of installations have been identified, and an experimental length, capable of withstanding 10 kV, was inserted in the Deptford main in 1896 (the Brush Road to Rotherhithe New Road section).

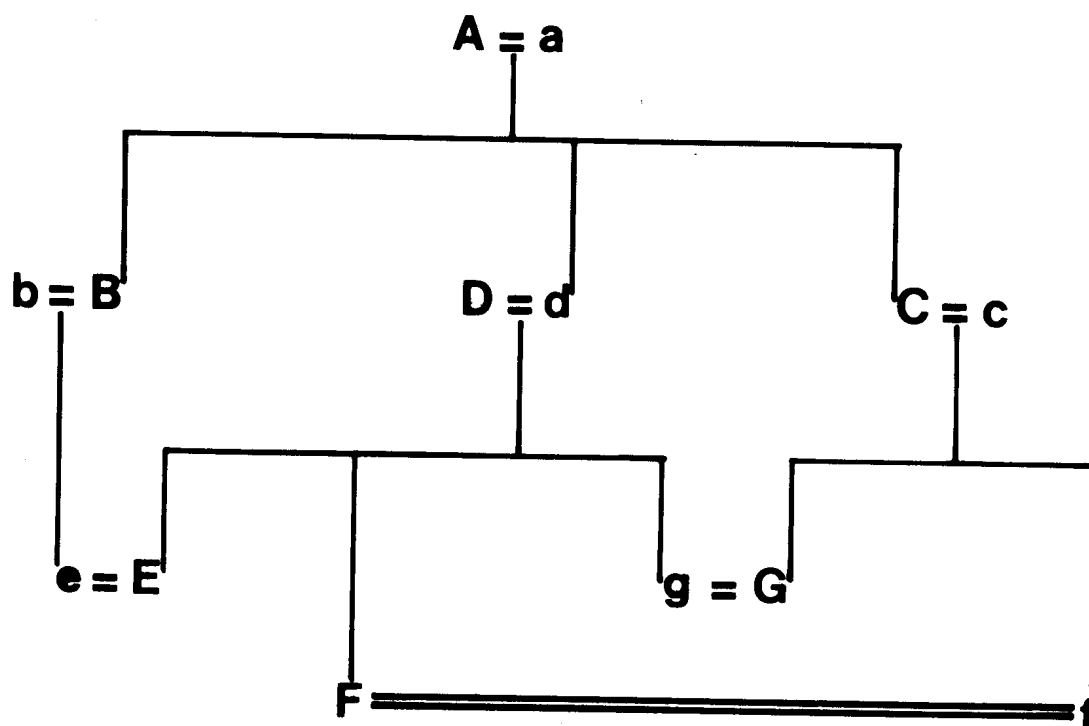
(to be continued)

*Ozokerite wax is an interesting natural product found in Galicia and Moldavia in Austria and also in Utah in the United States. It is somewhat similar to paraffin wax, although with a higher melting point. Its use as an insulating material was first proposed in 1869 by Augustus Matthiessen. In 1872 Henry Highton proposed treating gutta percha or rubber insulated cables with a solution of Ozokerite wax to fill up the minute pores and improve the insulation.

Competition Answer

"The Genealogists' Dinner Party"

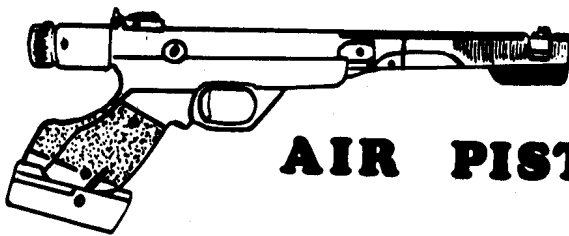
This problem was adapted from an original by Lewis Carroll in which only the "four" males were invited to a party. Carroll constructed the following family tree in which the host is 'E' and his wife 'e'. If all males are represented by upper case letters and their wives by the lower case equivalents it can be seen that 'C' satisfies all requirements with respect to male guests.



If one takes the "four" female guests and examines the same family tree it is apparent that 'c' satisfies all except the mother-in-law's sister. This deficiency is easily remedied by making 'b' and 'c' sisters, which leaves a total of four people at the party, Mr and Mrs Secretary and their mutual aunt and uncle.

Only two answers were received, and both left the host and his wife with 50% too much washing-up. Molly Nalon invited Mr Secretary's parents-in-law as well as auntie and uncle, whilst Ray Slaughter's guest list was confined to both sets of parents. Ray did however identify the requirement that three sets of cousins had to marry in the Secretary's generation. Thank you for trying folks, but it's consolation prizes only this time. A plastic pot is on its way to each entrant!

Section Reports



AIR PISTOL SHOOTING



Member of

Shooting Averages as on 6.3.79.

Name	Average	Highest Score	Position	Name	Average	Highest Score	Position
Joe Lou	44.0	50	1	Graham Taylor	33.0	41	5
Denis Groombridge	40.5	47	2	Roger Roberts	30.0	41	6
Bob Maidlow	38.0	48	3	Pat Donovan	29.5	44	7
Peter Walters	34.5	46	4	Janet Walters	28.5	37	8

Attendance at shooting evenings has improved along with the state of the weather during the past month. It may be our fate to continue with a 'hard-core' of enthusiasts but it would be nice to see a few new faces occasionally, or even a few of our former regular members.

Shooting averages, quoted above, are based on scores achieved on two consecutive weeks, two cards per week being counted. Thus, shooters not attending three weeks in succession will not appear in the averages. The averaging process used also accounts for some of the more spectacular changes in position in the lower part of the list (i.e. averages below 35). Highest scores are those achieved during any of the shooting sessions.

"POT WHITE 79" SNOOKER TOURNAMENT

At the time of writing (12th March) only 7 Group matches have been played out of a total of 60, which bodes ill for the 1980 tournament. (The 1979 tournament won't be finished in time for it to start!)

Please try to arrange to play your matches as soon as possible, especially those in Group 1, which hasn't seen a single stroke played yet. The table is available at lunch-time (book in advance, start at 12.30, 12.50 or 13.10 hours) or on club nights, when the cupboard key is available from the Bar. If you wish to play on another evening, get in touch with me beforehand to get the key.

G.F. Holder

HOT AIR BALLOONING

The only flight since the last reported was made on the 25th February. On a beautiful calm and sunny Sunday afternoon a party of four set off from Ealing to meet Ray Bailey and Denis Groombridge at Hemel Hempstead.

At the launch site, Ray decided to take advantage of the calm weather by doing preliminary tether flying. Dave Green had volunteered to do the inflation and despite some slight wind problems, successfully notched up his second inflation followed by some tether flying under Ray's instruction.

Next Ray gave Glenys Derrick a short tether flight and demonstrated the control which can be achieved over a balloon - hovering motionless, then descending very slowly, to pause six inches from the ground before making contact. By this time Ian Fennemore was busy with his new photo equipment and declined a turn in the basket, so Ray, Dave and I prepared for a free flight.

We rose slowly from the launch field, taking time out to wave to the audience which had gathered. With no sensation of motion we climbed to 1000 feet and levelled off, drifting parallel to the road alongside the launch field.

One of the first skills which must be mastered in becoming a pilot is the timing of the use of the burner in maintaining level flight. First there is the delay of several seconds before the balloon responds to any extra heat put into the envelope. Second the required length of "burn" and the interval between "burns" varies with the weather and the number of passengers carried. Third you must learn to feel the altitude of the balloon without the aid of instruments. I spent most of the flight holding our altitude with reasonable success except for one lapse in concentration. (In my experience a loss of concentration usually results in the balloon descending rapidly toward high tension wires!).

Next it was time to practice landing by the approach and overshoot method. This went well enough for a serious landing attempt to be made. I lost height over a main road and headed toward a suitable field just beyond, reducing the speed of descent by burning more frequently as we neared the ground.

Contact was not too hard, but we still had a small forward movement, toward a small stream, which we gently dipped into before the balloon responded to the burner and lifted on to the far side - preserving dignity and dry feet!

The retrieve crew although hampered by sightseers' cars were on hand to supply a full fuel cylinder and a change of passengers for a fly-on.

This time Ray took off with Glenys and Denis, giving Glenys her first free flight (which she enjoyed very much). Forty minutes later they made a gentle final landing as the light was fading.

So ended a very enjoyable day with tethers, two flights, and two more converts to ballooning. Will you be next?

Joe Lou

The Film Column

At the Annual General Meeting of the Film Section, held on March 6th, a new committee with the task of steering the section through the next year was elected. It consists of six stalwarts from the old committee - Ted Cooke, Michael Dennis, Richard Grigsby, Ron Hall, Ted Morrison and Tom Ruben - and one newcomer, Yvonne Ferrier. The meeting saw the resignation of Annette Mattock after over a decade of service on the committee, for the last four of which she has been its very hard-working and efficient secretary.

The new committee will shortly start choosing next season's films, so now is the time to bombard them with your requests and suggestions.

By the time you read this the current season of film shows - our 25th - will have ended. An account of this season will appear in next month's instalment of the "History".

National Film Theatre

Calling all fantasy fans. The NFT in April are showing some forty films under the title "Fantasy Authors on Film". The authors include Ray Bradbury, H.G. Wells, Conan Doyle, Henry James, Daphne Du Maurier, Dennis Wheatley, M.R. James, John Wyndham and Lewis Carroll, among many others in what promises to be a highly entertaining and spine-chilling season. In addition there are German films of the Third Reich, new French films, British films featuring Peter Finch, and a celebrity lecture by Charlton Heston. Full details are in the programme booklet in the library.

SOCIAL CLUB BUDGET

The 1979/80 social club budget will be discussed at the meeting scheduled for Thursday 22nd March. All section secretaries should have sent budgets to Pat Donovan by last Friday. If you forgot, hurry!

MOTORING SECTION

This column has been absent from the Bush Telegraph for some months mainly because I haven't written anything and also because there has been very little activity within the section. However this time of the year brings thoughts of reviving the spring navigation run. Difficulties over cost, organising and competing, and legality of insurance and the organising of this sort of run are debateable. Running a "rally" within the law, even the 12 car "rally" for which no authorisation is required, has been made impossible if the 'normal' sort of event is to be adhered to. If however, there is enough enthusiasm and support I am willing, with some help, to organise something. Please contact me if you are interested in any aspect.

DIY maintenance and the hiring of tools etc. has not shown much activity lately obviously due mainly to the weather. Recent additions to the list include an electric (12 v DC) spark plug cleaner, small chain wrench for oil filter canisters, and the special splined wrench for Ford cylinder head bolts; please note Ford 2 litre OHC engine users.

A full list of tools and gadgets available on loan to any member of the Social Club is given below:

	Charge
(1) New Socket Spanner Set (AF, Metric & Whit.)	10p
(2) Jacking Ramps and Axle Stand	10p
(3) Pulley/Gear/Sprocket Puller (8")	6p
(4) Eezi-bleed (Hydraulic Systems)	3p
(5) Carbancner (Twin-carburettors)	3½p
(6) Hydraulic Trolley-jack	10p
(7) Axle Stands	2½p
(8) Grease gun kit	10p
(9) Ball-joint Puller	3p
(10) Colourtune 500	5p
(11) Ford Special Tool (internal spline cylinder head bolts)	39p
(12) Compression Tester	3p
(13) Torque Wrench (160 lb. ft.)	2p
(14) Valve seat re-cutting kit	9p
(15) SPQR Tappet Adjuster	5p
(16) Valve spring compressor	4p
(17) Coil spring compressor (McPherson Strut)	2p
(18) Brake pipe flaring tool	8½p
(19) Universal clutch aligning tool	5p
(20) Universal sump plug tool (new replacement)	2p
(21) Sockets up to 1¼" UNF	-
(22) Universal circlip pliers	3½p
(23) Metric spanners 10-19 mm	3p
(24) Engine hoist and stand (2000 lb)	8p
(25) Strobe timing light	2½p
(26) Battery jump leads	-

(27)	Set of taps and dies UNF	
(28)	Creeper	8p
(29)	Hydraulic pillar jack	4p
(30)	Stromberg carburettor adjusting tool	5p
(31)	Impact driver ½" square drive	2p
(32)	New adjustable torque wrench (15-100 lb ft)	5p
(33)	Bendix spring compressor	10p
(34)	Battery charge tester (hydrometer)	-
(35)	Antifreeze strength tester (hydrometer)	-
(36)	Spark plug cleaner (12 v DC)	8p
(37)	Chain wrench. (Oil filter canisters)	3p

BP Energal Super Viscostatic 20 w - 50 engine oil £9.63/25 litres.

BP Antifreeze (glycol based) £2.35/5 litres.

A good selection of workshop manuals, mainly for British cars is also available.

For these or any other information contact Graham Taylor, Chemistry (322).

BRIDGE SECTION

During February the section has played three matches in the London Business House league. The first away to Mullard 'B' resulted in a heavy defeat by 1-9, and at half time in the return match a similar result seemed possible, but a good second half for us retrieved the position from 6-40 IMP's to 69-72 IMP's to clinch a 5-5 draw. In the other match we completed the double over BP 'B' by winning 6-4.

The only match to be played in the Hammersmith league was against Heathfield who at the time were joint league leaders with us. After a closely contested match we were the winners by 6-4.

The section will be holding their Annual 'Pairs' Competition on Wednesday 18th April starting at 6.30 pm, will anybody interested in playing please contact R. Fraser Ext. 323 before Wednesday 11th April.

Results for February

		IMP's	Victory Points
LBH	Mullard 'B'	30 - 73	1 - 9
LBH	Mullard 'B'	69 - 72	5 - 5
LBH	BP 'B'	49 - 41	6 - 4
Hammersmith	Heathfield	49 - 32	6 - 4

BADMINTON SECTION

The new floor has now been laid and the safety aspects of playing badminton have improved as a consequence. Whether the standard of play has improved as well is open to debate!

One special request to everybody - PLEASE DO NOT DRAG TABLES, CHAIRS OR EQUIPMENT ACROSS THE FLOOR; LIFT IT. Thank you.

Some match reports will feature in next month's issue.

Poets Corner

The following verses were found one day stuck to an empty distilled water container which lurked beneath a cold and lifeless still. It was anonymous, and when the late Ogden Nash was consulted, via the medium of Madame Claire (221B Goldhawk Road, "Messages for the Masses", extra after 6 pm), the poet made a noise reminiscent of someone turning over. Nevertheless we reprint it in full.

STILL WATERS

Water-

Despite the fact that some people don't think it oughter-
Lacks the basic inspiration

To undergo a process which, if it existed, would probably
be known as "self-distillation".

Condemned thereby to life precarious,

It must rely upon users, wasters, plant-growers, steam-
ironers, battery-toppers, and every other non-celestial
Aquarius

TO TURN THE TAP

(And flick the switch), thus ensuring that the slight liquid
deficit they have created does not become a 100% air-gap!

A History of The Film Section

by Ted Morrison and Tom Ruben

Part VII

No Film Society could exist without the dedication and hard work of individuals, and no historical record of its activities would be complete without acknowledgement to them. In the summary of the first fourteen years of our history (part I of the current series of articles) this was not possible, but full recognition up to 1968 appeared in the first series. Since that time no fewer than nineteen persons have served on BICC Film Society committees in capacities ranging from chairperson to do-it-yourself electrical engineer. They have not only coped with the running of the section and the many emergencies that inevitably arise, but also have striven to improve the presentation of programmes to their audiences. It should be remembered that it is not only the choice of films that attracts an audience but also the ironing out of niggling problems such as brightness of picture, quality of sound, warmth of the hall, comfort of the seats and so on. With varying degrees of success these problems have been tackled year in and year out by these individuals working until all hours behind the scene.

Certainly the most consistently demanding job is that of film secretary. It needs a dedicated person to cope with all the facets relating to the administrative side. We have been fortunate in always finding a volunteer for this position, and most have stayed the course for several seasons in succession: people like Mike Dennis, Karen Jackson, Carol Tilbury and up to this month Annette Mattock. Whoever she or he has been, the post has demanded a lot. The secretary must organise the committee into a working unit to ensure smooth running of the section. This involves setting up meetings at the end of the previous season in order to delegate responsibilities between the committee members and to organise the choosing and booking of films. Simple in theory but difficult in practice, especially choosing the films. Committees have met in homes, offices, laboratories, on the 4th and 5th floors, over lunch and even out on the lawn in hot weather! Armed with film catalogues and personal choices, they have discussed, argued and cajoled in an effort to get their choices accepted, and in the middle, trying to maintain a sense of proportion and fair play - the secretary. Even when a 'final list' was produced, the problem of dates, costs and actual bookings had to be resolved. At one stage it was agreed that a film poll should be taken throughout the establishment so that the views of our potential audience could be considered. It was a good idea but has lapsed during the past few seasons. Once the season's programme has been established, the secretary must check that the hall is available and that chairs and heating will be provided. A brochure must be produced and regular monthly programmes must be written, printed and sold. Posters must be purchased or, if not available, must be designed by willing volunteers. Dennis Cooper has been a tower of strength here; those who attended our opening film show this season witnessed his efforts in our poster display. Finally, the prompt arrival of the films to allow a pre-show run-through is

essential, and most of our secretaries have suffered from the agonies of late arrivals. Frantic phone calls to the distributors as the hours tick away is no way to prepare for a retirement pension!

As if this wasn't enough, most of our secretaries have taken it upon themselves to organise tickets for outside events such as national and local Viewing Sessions, and at the time of the year when so many other personal activities are reaching a peak they have (with the help of other committee members) booked films for and presented shows at children's Christmas Parties at Wood Lane and Bloomsbury Street. (We suspect that they have enjoyed this aspect more than they care to admit). Then, as the term of office reaches its conclusion, the secretary organises the AGM as required by the Social Club rules. Obviously he or she could not cope without the able help of not only the other committee members but also the Management, the Social Club, Typing Pool, Studio, Works Engineering, General Office, Print Room, Accounts Department, electricians, Bush Telegraph editors and programme sellers. Nevertheless, the secretary is the king (or queen) pin of the organisation. As stated earlier, the importance of our other committee members has been in their ability to tackle problems, make constructive improvements in the quality of presentation and try to improve the comfort and well-being of the audiences, as well as their contributions to choosing the films. The successful effort of Richard Grigsby and Tom Ruben to improve the picture brightness was mentioned in a previous instalment. On another occasion they wrestled with the problem of sound quality, and although they succeeded in improving this to some extent they could find no answer when confronted with a poor quality print which on occasions gave the impression that the film had been recorded in a motorboat, with the actors speaking through cottonwool! Thank God for tolerant audiences on these occasions. Tolerance was also the operative word with respect to the seating. Seats were perhaps the most moaned-about subject of the early film shows, as sitting on these "canteen couches" could be quite an ordeal. In fact one person, who shall remain nameless, still swears that the comfort of the seats was related to his interest in the film; if he did not like the film the seats became progressively harder - and vice versa. He felt, in fact, that the seat was the best film critic in Wood Lane. Fortunately all these seats have now been replaced. Another idea we had was to attach cinema-type ashtrays to the back of each seat, but it was abandoned when we realised that in the dark a fire hazard might arise involving either the seat or its occupant. Now we have gone to the other extreme and banned smoking in one half of the hall.

Other instances where efforts have been made to improve the well-being of the audience have been Richard Grigsby's "food market" (sandwiches by courtesy of the Canteen) and the provision of background music from various committee members' tapes. We even sometimes have a 'speech from the rostrum' (delivered as often as not by Ted Morrison) prior to the show - but of course we lock the doors first! Joking apart, though, we feel that personal contact with the audience is essential, and could be extended into discussion after the show.

Finally, a word about an extra service that has been provided at small cost for the benefit of those interested in films and film-making. For some years Annette Mattock and Tom Ruben have regularly circulated various film magazines such as 'Films and Filming', 'Sight and Sound' and 'Continental Film Review.' Some years ago a long-standing member of the film section was 'elected' to purchase the latter publication each month. As the years have progressed so this magazine has taken on a more liberal pictorial approach with the result that (a) the said purchaser becomes more apprehensive by the month, and (b) the magazine now takes years instead of months to circulate. So much for catering for those interested in films! Perhaps there is a clue to successful programming here?

It would be remiss not to record the names of committee members who have served over this period. Therefore we are including here a list of all those stalwarts who have served between 1967 and 1979, and will just say thank you on behalf of all the audiences that have attended their film shows. For the sake of completeness we start this with a list of secretaries during the first fifteen years, while for the subsequent period, covered by this series of articles, we list the complete committees. This list temporarily interrupts the checklist of films that we have shown; the second instalment of that list will be published next month.

<u>Seasons</u>	<u>Secretary</u>	<u>Committee</u>
1954-6	Don Tester	
1956-64	Ted Morrison	
1964-5	Tom Ruben	
1965	Harry Shipley	
1966-7	Stuart Castle	
1967-8	Mike Dennis	Tom Ruben Albert Pinching Chris Winstanley
1968-9	Mike Dennis	Tom Ruben Albert Pinching Chris Winstanley Annette Mattock Arthur Boardman Ted Morrison
1969-70	Karen Jackson	Tom Ruben Albert Pinching John Shapley Annette Mattock Arthur Boardman Ted Morrison Brian Tilbury Mike Dennis
1970-1	Mike Dennis	Albert Pinching Russell Pride Annette Mattock Arthur Boardman Ted Morrison Brian Tilbury
1971-2	Mike Dennis	Tom Ruben Albert Pinching Russell Pride Annette Mattock Ted Morrison Brian Tilbury
1972-3	Mike Dennis	Tom Ruben 'Doc' Watson Richard Grigsby Annette Mattock Peter Higgins Ted Morrison
1973-4	Carol Tilbury	Tom Ruben 'Doc' Watson Richard Grigsby Annette Mattock Peter Higgins
1974-5	Carol Tilbury	Tom Ruben Ron Hall Richard Grigsby Ted Cooke Tom Bonikowski
1975-6	Annette Mattock	Ron Hall Richard Grigsby Ted Cooke Tom Bonikowski
1976-7	Annette Mattock	Ron Hall Richard Grigsby Ted Cooke Tom Bonikowski
1977-8	Annette Mattock	Ron Hall Richard Grigsby Jim Clarke Ted Cooke Tom Bonikowski
1978-9	Annette Mattock	Ron Hall Richard Grigsby Jim Clarke Ted Cooke Tom Bonikowski Albert Pinching Mike Dennis Tom Ruben Ted Morrison

The Other Side



One disadvantage of being a BT Editorial Board member is that one is prohibited from entering all the competitions, so one has to resort to other people's puzzles. So it is with a great sense of "well I never" that we present a winner - Mike Hagger. He is shown in our photograph receiving his prize, a Kenwood Chef food mixer, from Lars Philipson (left), Sales Manager of Amcel Ltd, who sponsored a crossword competition in *Plastics and Rubber Weekly*. The editor of PRW, Brian Williamson is on the right of the picture.

In an exclusive interview for the BT Mike told himself that his wife, Gill, was delighted with the prize. He did not think that success would change his way of life, but it might change his waistline!

Dysphagian Diary

(The occasional column that sticks in the throat).

As long as there is printing and proof reading there will be typographical errors, but the best are always those which convey a meaning which is plausible almost to the point of making the reader wonder whether there is an error at all. Karl Plessner came across just such an example in a leaflet for a one-day symposium on "Newer Optical Materials" to be run by The Materials Science Club. The Club, it said was formed to promote interest in materials,

"..... through the medium of topical interdisciplinary discussion."

Shades of BT Editorial meetings!

There are some statements, on the other hand, which would probably be correct - if only they could be understood. Keith Sichel gave us a clip from "ELECTRON",

"The DoI's Computers, Systems, and Electronics Requirements Board has established a project to improve the co-ordination of commonly agreed protocols for user level data communications."

Sorry Keith, can't help. The only protocol we observe is thumping our calculators when they go on the blink.

Another type of "funny", depending on one's sense of humour, is the juxtaposition. From a listing of monographs on Analytical Chemistry comes the following gem, spotted by Andy Platt.

"The analytical chemistry of industrial poisons, hazards and solvents"

by Morris B. Jacobs

"The analytical toxicology of industrial inorganic poisons"

by the late Morris B. Jacobs.

Of course, having plotted a way through the minefield of grammatical, typographical and other slips, the reader has to decide for himself whether the statement is true. Occasionally a check is possible. Mike Fox thought there was something wrong with a vacuum cleaner advertisement in the "Observer Magazine".

"The incredible power of the 1.3 horsepower motor (rated at max. 900 watts)"

That, he calculates, is an efficiency of 108%!

Lastly this month something for you to supply the words. Sports shops are now selling a feminised version of the famous "Bullworker" exercise gadget.

Sorry, no, it's the "Lady Bullworker".

Family Tree

Opposite is another of our popular "Family Tree" puzzles (especially for all those who couldn't solve last months "Genealogist's Dinner Party" problem!). The idea is to connect the great-great-great-great-grand-father word in the centre to the 64 peripheral words via the interceding "generations", which may be found as follows. Working outwards from the centre, each word has TWO "offspring", each begotten according to ONE only of the following rules:

- (1) It may be an ANAGRAM of the preceding word:
- (2) It may be a SYNONYM for the preceding word:
- (3) Father and son words may be HOMOPHONIC (sound the same) (e.g. RIGHT, WRITE, WRIGHT, RITE):
- (4) Successive words may be formed by ADDING or SUBTRACTING one letter, or by CHANGEING one letter, anywhere in the word, the remaining letters KEEPING THE SAME ORDER. (Hence PAN - PAIN - RAIN - BRAIN - BRAN, etc.):
- (5) Father and son words may go together to form another longer word, (e.g. CAR-PET, IN-TACT, REST-RAIN, etc):
- (6) Father and son may form a well-known word-pair (e.g. PLUM PUDDING, YELLOW STREAK, CABLE DRUM, GOLF CLUB, etc.):
- (7) Father and son may go together in a wider sense than in (6) to form a well-known phrase or saying, connecting words such as conjunctions, prepositions, and the definite or indefinite article being ignored (e.g. BLACK (as) SOOT, TIGHT (as a) DRUM, JACK (-in-the-) BOX, ROCK (and) ROLL, etc).

All the rules may apply in either direction, i.e. either CAR or PET, for instance, may be nearer to the centre, so may ROCK or ROLL. NO ABBREVIATIONS are to be used.

To help (or hinder?) you, we've filled in one intermediate generation. Fill in the rest, and send your completed puzzle (or a signed Xerox copy) to reach Geoff Holder not later than Friday, 6th April, when the first out of the hat will win the sender a prize of £2. (There may well be alternative solutions to any one line of descent - we will accept any that are within the above rules and which use words of the given number of letters).