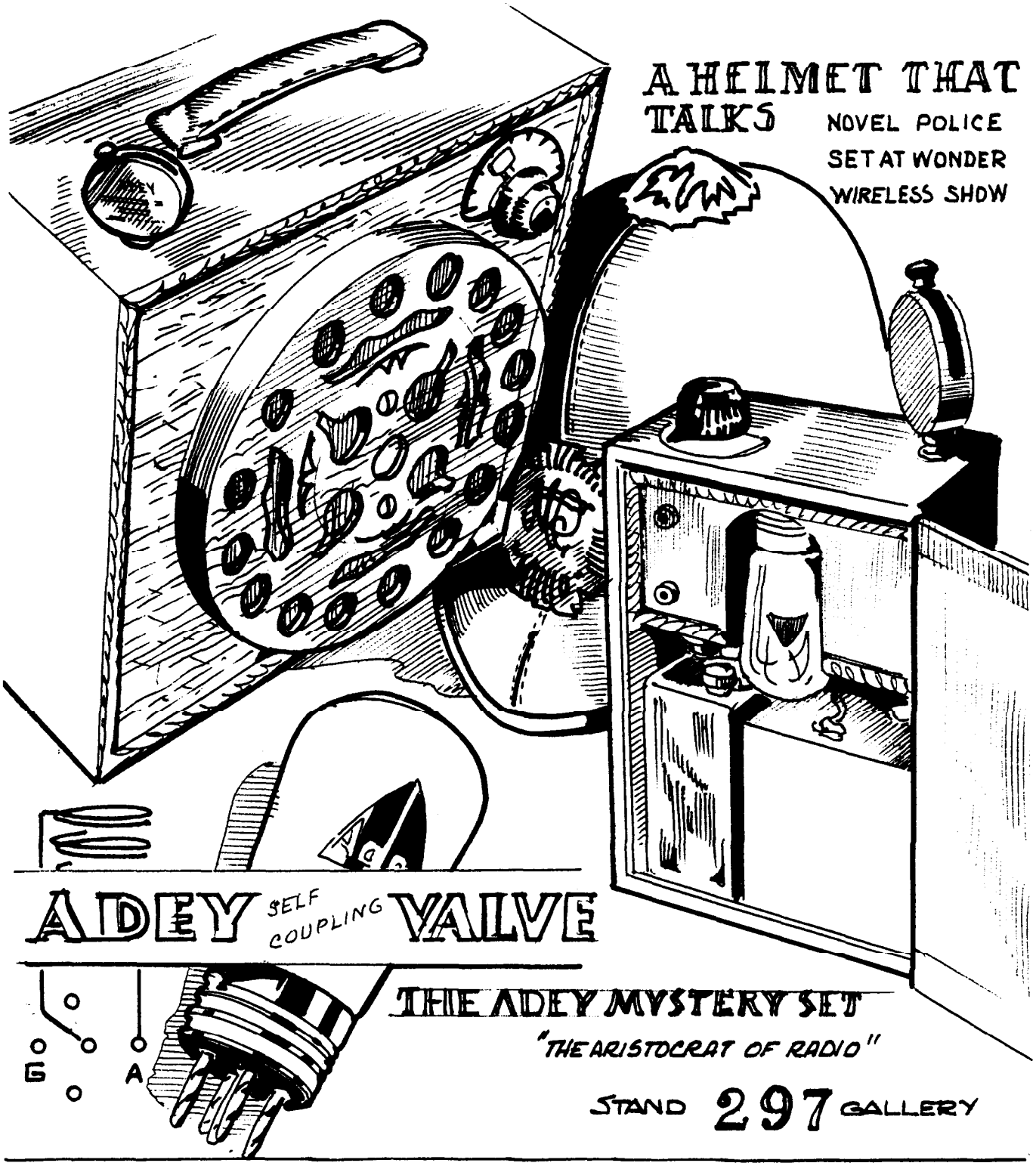
BRITISH **VINTAGE WIRELESS** SOCIETY



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THE BRITISH VINTAGE WIRELESS SOCIETY

Bulletin correspondence to:

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Ealing,
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Membership application forms can be obtained from

Mr. Jonathan Hill,
Hon Membership Secretary, BVWS,
14, Victoria Court,
London, W3

N.B. MEMBERSHIP RENEWAL FOR 1979/80 is now due ... renewal date April 1st

DEADLINE FOR NEXT ISSUE..... 20th May ..... Please get articles and ads sent off even sooner if you can. Articles of all sorts needed.

ANNUAL GENERAL MEETING 1979

JUNE 3rd June 3rd

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See page 50

Contents:

FRONT COVER ILLUSTRATION All items on this front cover relate to the Adey Radio Co. Ltd. David Read has written about the company (page 55) and in particular about the Adey Portable 4 receiver illustrated on the left of the front cover. The story behind the policeman's helmet is also told in the article. The smaller set on the right is the Adey Cigar Box Portable of 1930. The Adey valve shown has a H.F. anode choke wound on the base and the base connections are as shown in the adjacent diagram.

BRITISH VINTAGE WIRELESS SOCIETY

Volume 3 Number 4 BULLETIN March 1979

EDITORIAL

In the Bulletin of exactly one year ago (March 1978, Vol 2., No.4.) the subject of Anniversaries was discussed in the Editorial. At that time mention was made of Prof. David Hughes and his experiments at his house at 94 Great Portland Street in 1879. This year, if the claims of the Hughes 'lobby' are to be taken seriously, we are celebrating the hundredth anniversary of the first radio signalling system. Prof. Hughes, inventor of the microphone, did undoubtedly set up a signalling and receiving system in 1879 which appears to have been remarkably like later systems using spark transmitters and a self-restoring coherer. It was while he was making some adjustments to his 'Induction-Currents Balance' that he observed the effect of an inductive spark on a separate circuit containing a microphone and a telephone. He soon found that the transmitting and receiving circuits could be separated by considerable distance and still work.....500 yards along Great Portland Street, a stone's throw from the BBC headquarters of later years, was no mean achievement. Hughes' claim as the 'inventor of radio' has all the good credentials required apart from a contemporary publication. David Hughes was quite accustomed to making his ideas known to his collegues both in the form of publications and as addresses to learned societies. But on this occasion he chose to show the effect to various colleagues before presenting a paper on the subject to the Royal Society. William Preece, Sir William Crookes and others visited Hughes' rooms in December 1879. On Feb 20th 1880, Mr Spottiswoode, (President of the Royal Society) Prof. Stokes and Prof. Huxley after an initial astonishment declared that the phenomenon was due to well known electro-magnetic induction effects. Hughes rightly believed that this was not so and although he later referred to 'aerial electric waves' it is highly unlikely that he had any idea that he was providing some experimental evidence for the theories of James Clerk Maxwell of some 14 years earlier. The Induction Balance that Hughes was working with at the time of his discovery is described in some detail in his communication to the Royal Society in May 1879. This instrument consisted of an arrangement of coils, telephone, microphone and a micrometer screw for adjusting the degree of coupling between primary and secondary coils. A clock-work operated contact breaker was also used. The instrument was used to compare the effects of different materials when introduced into one of the coils and Hughes derived numbers from his balance readings which may have been related to the magnetic susceptibility. The presence of a bad contact in some part of the circuit led to the discovery of 'aerial conduction' as he sometimes called it.

Whatever we may think of Hughes' place in the history of radio, there is no doubt at all that his illustrious critics missed a golden opportunity. Hughes undoubtedly was not the man to perform the great systematic experiments of Heinrich Hertz which followed 8 to 10 years later, but that Preece, Stokes, Crookes, Spottiswoode and Huxley as well as others failed to recognise a matter worthy of further investigation may seem a little surprising. Preece and Crookes did at least show their ability to 'recognise' the subject at a later date. Crookes in his famous 'Fortnightly Review' article of February 1892 both recognised the great possibilities of wireless telegraphy and also made a direct reference to Hughes' experiments of 1879. Preece, of course, 'recognised' young Marconi when he arrived on the scene in 1896.

1979 then marks the hundredth anniversary of a great event and an even greater missed opportunity.

P.T.O.

Yet another anniversary occurs in 1979. On March 14 1879, Albert Einstein was born. Einstein may not be thought of as belonging to the history of radio in the strictest sense but there is a connection. The velocity of electromagnetic waves which appeared in Maxwell's equations appeared again in the most famous of all Einstein's equations: $E = mc^2$. In a sense, relativity grew out of electrodynamics and Einstein's first paper was entitled 'On the Electrodynamics of Moving Bodies'. It is of interest that, while Einstein's ideas profoundly affected most of the classical ideas of space, time, mass, gravitation they left Maxwell's equations completely unscathed. Einstein took away the rigid 'aether' that had permeated nineteenth century thinking and which had arisen in connection with Maxwell's equations and when it was gone Maxwell remained merely clarified by it all while 'Einstein' replaced everything else.

So much for anniversaries - though we mustn't forget that our own anniversary occurs on April 25th when the BVWS will be three years old.

THE ANNUAL GENERAL MEETING

This will take place on Sunday June 3rd at the Harpenden Public Hall where we held our Winter Wireless Swap.

We hope that this time and venue will suit as many members as possible. It is not easy to find a place as suitable as this elsewhere but we are always ready for good practical suggestions from members in other parts of the country....so remember for next time, if you want the meeting in some other place, join us in finding and arranging things. Many members have suggested other towns or cities but Harpenden received overwhelming support from the big turn-out at the last meeting and most people seemed to think it was ideal in every possible way for our A.G.M.

The A.G.M. will take place sometime in the afternoon but the meeting will start with a swap session at about 11.00 a.m. which will continue until 5.00 p.m. The A.G.M. will probably commence at about 1.45p.m. when lunch has been served.

So once again, bring plenty of wireless items for exchange and bring lists of 'wants' with you also.

One further item we would like you to bring relates to our next publication of a reproduction catalogue. Members owning choice catalogues are asked to bring them to the A.G.M. and to exhibit them. During the meeting we will discuss the question of which catalogues members think deserve to be reproduced and you will be asked to vote on an 'order of priority' for perhaps the next three or four publications.

Elections will be held at the A.G.M. Previously members have been quite happy to see the present administration 'carry on the good work'. But this time we hope some of the old hands are going to be replaced with new blood. Anybody wishing to stand for any office should be proposed and seconded by BVWS members. If possible, the secretary should be notified well before the meeting of nominations for office but in any case come to the meeting prepared to 'electioneer' in a good democratic tradition.

See you at Harpenden Public Hall ..... 11.00 a.m. .....Sunday....June 3rd.

How to get there: The town of Harpenden is on the A6 about six miles north of St. Albans. Arriving at Harpenden on the A6, turn East at Station Rd. and then South at Arden Grove and observe the parking area on your right. You can't miss the Hall and, to give you the usual bearing, it is behind the Harpenden Arms Pub.

If you require any further information or directions contact our meetings organiser Roger Rayment (incorrectly declared to be Roger Snelling in the last Bulletin! Sorry about that and apologies to both Rogers.) Roger Rayment: 22, Grosvenor Rd., St. Albans, Herts. Tel: 56 50736.

THE SEARCH FOR A TOP-PIP BRIGHT EMITTER

PART III

By Philip Beckley

It was a characteristic of Western Electric valves of the 1920's that they used a pair of flat plates one on each side of the filament/grid assembly for their anodes, the filament being a hairpin shape supported at the top.

Possibly as a left-over from this early electrode layout S.T.C. (Now I.T.T.) used to make a hot cathode ionisation vacuum gauge (or manometer tube) type M103/1G using flat plate anodes, and a hairpin filament (see Fig.1)

The filament (pure tungsten) consumed 2.4 amp at about 6 volts so offerred promise of enough emission to operate a loudspeaker. As sold these tubes were some 8 inches long including the body of the tube and the sealed-off extension for connection to a vacuum system (see Fig. 2). As produced they were sealed off with a rather soft vacuum inside.

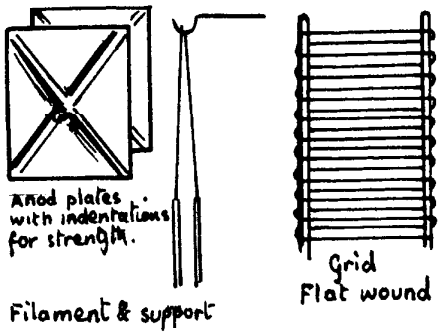


Fig 1

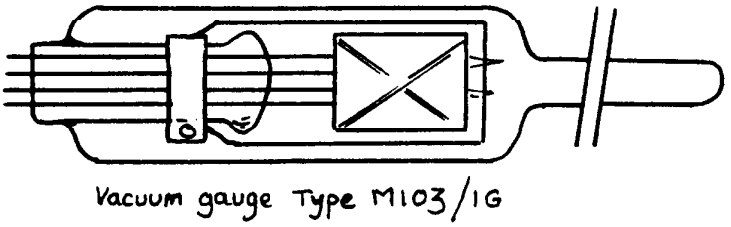


Fig 2

So, it was necessary to arrange for a few tubes to be pumped hard and outgassed (baked at 450°C) besides shortening the long extension tube till it formed only a normal top seal-off pip. After some difficulty, these modifications were carried out on several tubes and tests were made of the resulting 'valve'. On inspection before modification the grid pitch looked very open, but since an output valve was sought I hoped that this would not reduce μ too far.

At the time efforts were still being made to find valves which would operate a Marconiphone V2 reflex receiver, so tests were made to map performance over a range of operating conditions. A great many graphs were drawn and the outcome is summari ed below:

Filament 6volts 2.4 amps

	For Detector	For Output Valve	For LF/HF amplifier
V_a volts	50	200	100
V_g volts	0 to -3	-12	-6
g_m ma/V	0.28	0.6	0.45
R_a k	15	12	13
I_a ma	1	8	2.5
μ	4	7	6

Encouraged by the results base shells were made up for the valves by cold working brass tube to make a splayed out socket for the bottom of the bulb. Ebonite insulators were used to carry four pins and the whole fixed with various cements.

The overall result is shown in Fig.3. The base shells were polished and stamped BEB6 before mounting the bulbs on them in conformity with the naming code of the home 'factory'. Two of the tubes were put into a Marconiphone V2, and with 42volts H.T. supply the set was tried out. The usual slide rheostat was set at zero ohms to avoid overheating from the five amps of filament current and a large external rheostat and car battery used to power the filaments. Remarkably, the detector oscillated well when asked and loudspeaker reproduction of the local station was quite possible at the usual V2 level of volume.

Of course 5amp of filament current at 6volts is a terrible overkill compared to DER's or even R type valves, never mind the 0.06 valves....but the experience was educational!

Just to see how loudspeaker reproduction would go a simple 2-valve L.F. amplifier was set up and a system amounting to a V2 plus 2L.F. using 4 BEB6's was run up. Loudspeaker output was very good given proper bias and 200volts on the last valve.

However it was only for fun, as 60watts of L.T. power really is too much and four stages of large-filament valves emphasises the 'bright-filament-crackle' which the 20's litterature tells us about. Added to which you can't close the lid of a V2 with $6\frac{1}{2}$ inch high valves in place!

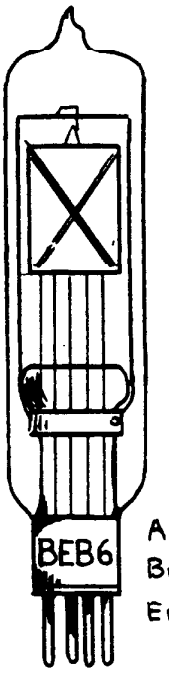


Fig 3

A "Beckley" Bright Emitter.

The BEB6 then, was a great success as an output valve, well able to drive a Magnavox loudspeaker and with plenty of dynamic range. It could well be the cousin of the LS1/LS2 family (look them up!). Probably it would do well in a low power transmitter with more anode volts, as its R_a is a little high for a final audio amplifier.

A few years later I decided to obtain a few more to improve my 'stock' but alas wher once there had been 40 in the manufacturer's rack there were now none at all. "No more will ever be made .....". So another rare bottle will never get a wider circulation tion.

I have found that a line-up consisting of: BEB5 H.F.(Not neutralised); BEB5 detector; BEB5 1st L.F., R.C. coupled; BEB6 output, transformer coupled, gives a very satisfactory result and offers plenty of experience in set handling and valve control.

There's nothing like practice to teach the operator the difference between a filament hot enough for adequate performance yet cool enough not to waste filament life.

Having worked out the manometer tube vein, thoughts turned to manufacture of a valve from scratch, design and all. It would of course be a bright emitter exhaisted at the top. Part IV tells of the problems encountered.

I am sure that, if Gerald tyne had heard about Philip Beckley's own personal 'Saga of the Vacuum Tube' , he might well have considered adding a chapter on 'Cottage Industies in Wales'. I look forward to reading Part IV of Philip's 'Saga'. Ed.

DON'T FORGET THE A.G.M. ..... SEE PAGE 50

Nominations required for all B.V.W.S. Committee offices.

Membership dues now due (April 1st) ..... renewal form included with this Bulletin
Please complete and send to the membership secretary now.

FROM THE EDITOR'S BOOKSHELF

Memories of a Scientific Life, by Sir Ambrose Fleming. Marshall, Morgan & Scott Ltd., London & Edinburgh. 1934 244pp.

This 1930's paper back contains a lot of good material for the wireless historian despite its somewhat condescending style. There is a forward to the book by Sir Oliver Lodge who, like the author, was over 80 years old at the time the book was written. Lodge's forward is in the form of a letter to the author praising his great achievements by parallelling them with his own (Lodge's) great achievements.... quite delightful. The early chapters of the book deal with Fleming's earliest memories- in his third year - at his parent's home in Lancaster and later in London, at Rosebery Villas, north of Kentish Town. As his father couldn't afford the large premium required to apprentice him to an engineering firm, he prepared himself for the London Matric'. He obtained a first class B.Sc. at University College, London in 1870. He then progressed from the new 'Science Schools' at Sth. Kensington, a teaching job at Cheltenham College, some 'coaching' in a boarding house at Eastbourne to St. John's College, Cambridge in 1877...having passed examinations in Greek, Latin, and Theology as well as elementary mathematics! He interweaves many of the 'great names' into his own story as he progresses to the newly established Chair of Electrical Engineering at University College, London. He describes his interest in electromagnetic waves as having stemmed from the days when he was a student of James Clerk Maxwell at Cambridge. A long and detailed account is given of his involvement with Marconi and as a consultant to Marconi's Wireless Telegraph Company and his rôle in designing the transmitting station at Poldhu. In Chapter VI he describes his interest in the 'Edison Effect' in the mid-1880's as well as the interest Preece had in the same subject. He lectured at the Royal Institution and wrote learned papers on the subject in the 1890's but the application of the 'Edison Effect' to rectification of wireless signals did not occur to him until October 1904. He immediately succeeded in detecting transmitted signals on sensitive D.C. instruments and on the next day he asked the manager of the Edison-Swan Lamp Factory to make him twelve carbon filament lamps to operate from 12volts and to have the filament surrounded by a metal cylinder. Thus was born the 'Thermionic Valve', Fleming's most famous invention. The book is very readable, has a few passages of pure sentimentality, is a little pompous in places and although filled with useful facts has the frustrating habit of missing out vital dates or names. A.R.C.

The Economic Development of Radio, by S.G.Sturmey, Duckworth 1958

The author undertook the writing of this book as one of a series of studies prepared by members of the Department of Political Economy of University College, London. Rather than examining the the economic development of radio per se the book's starting point is that economic progress depends on the capacity of industry to introduce a rapid succession of new products and processes. This proposition led Dr. Sturmey to use the development of the Radio Industry to explore what predisposes an industry to wards accepting innovation eagerly or with reserve.

The reviewer came to the book as a complete amateur with little scientific knowledge about radio but a considerable curiosity about how the early radio firms developed. In these terms the book has provided a welcome introduction to the early days of the radio industry.

After briefly tracing of the history of the technological development of radio, Dr. Sturmey goes in some detail into the development and sale of valves and comments wryly, "The subject of valve prices is one which arouses a good deal of emotion." ! Later, he follows the commercial development of radio and comments on the 'free for all' which existed in respect of entry to the trade and that many of the smaller firms collapsed through their own technical incompetence or through lack of finance at a crucial point in their development. He also pays attention to the way research by the set makers was limited because of the presence of these numerous small firms. He deals with the important role of the amateur in the early days but draws attention to the fact that most purchasers of sets had no ability to judge their intrinsic merits which led competition to focus on price and obvious advertisable features rather than on price in relation to quality.

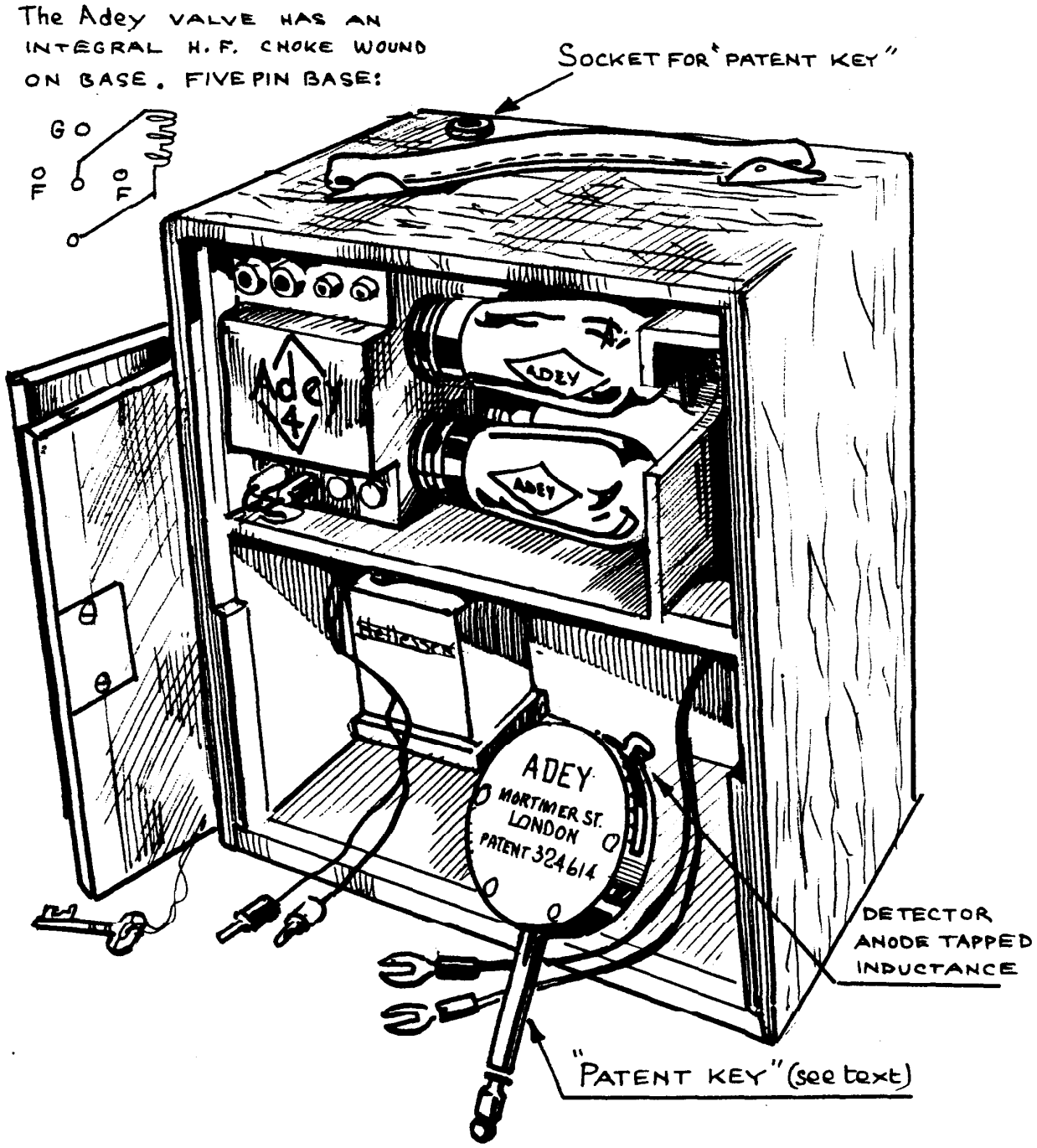
In his conclusions the author deals, among other things, with the nature of innovation and relates this to the radio industry. He also comments on the three-tiered structure

of the industry (the large electrical firms, the specialists and the assemblers) and how this has affected the amount of research carried out.

The book has been immensely useful in showing how the various economical developments in the industry came about and anybody concerned with the economic history of radio will almost certainly find a good deal of background material here.

Pat Corby

THE ADEY PORTABLE 4



THE ADEY PORTABLE 4 RECEIVER

By David Read

The few years between the start of public broadcasting in 1922 and the development of a mass production, mass consumer industry, were characterised by literally hundreds of manufacturers seeking to cash in on the radio boom. Most of the smaller companies were not equipped to compete; their designs were unoriginal with respect to circuits and inadequate with respect to method of manufacture and quality of construction.

By 1930 therefore, the industry had polarised into the larger concerns who chose to stay in the consumer end of their businesses, and a few smaller companies who deserved to survive because they offered something different or better. Such a company was Adey Radio Co., Ltd., founded in 1924 to exploit the ideas of H.W.Adey and exemplified by his ortable 4 receiver introduced in 1929.

Like many things designed by individualists, the set looks 'quirky' from the outside with its strange key and loudspeaker bulge. Viewed from the inside it takes on a functional beauty which, together with the set's performance, never fails to astonish. Apart from the patent key and choke valves, the basic circuit is conventional and shows that Adey put his ideas into the problems of space saving, reliability, ease of manufacture and servicing. He seems to have understood that a successful engineering design is one which works well yet is compact and inexpensive. In these respects he set a standard which was unique at the time and holds good to the present day.

Examination of the Portable 4 shows careful attention to every detail, from the moulded chassis with its lugs for holding the resistors and capacitors in their correct positions, to the beautiful Adey logo visible inside the hinged back.

The design approach is modular throughout:-

Bakelite chassis moulded to control position of components and wiring layout, i.e. used in terms of engineering and production technique.

Patent interchangeable choke valves allowing plug-in close coupled stages.

Four function 'key' brought outside the cabinet to control: 1) HT and LT switching - achieved by pushing in position 1. 2) Wavechange switching - Long waves in position 1 and short waves in position 2. 3) Tapped detector anode inductance providing additional selectivity and control of degree of positive feedback....controlled by multi-position switch on key. 4) Variable coupling between detector anode inductance and aerial circuit inductance ..... controlled by rotation of key around vertical axis.

Plug-in integral speaker with cone diameter virtually equal to width of cabinet without upsetting the tight space/component relationships.

Adey was ahead of his time in his use of modular concepts of chassis design, plug-in stages, and simplification of wiring - all astonishingly forward looking. Their effect in design achievement can be judged by comparing the Adey 4 in size and performance (at 9" X 8" X 7" it was the smallest loudspeaker portable on the market) with the more usual 16" X 16" X 9" of the Py Q and similar TRF portables of the day. Not only is the Adey half the size; in terms of range, selectivity and quality of sound, it is the equal of all but the very best.

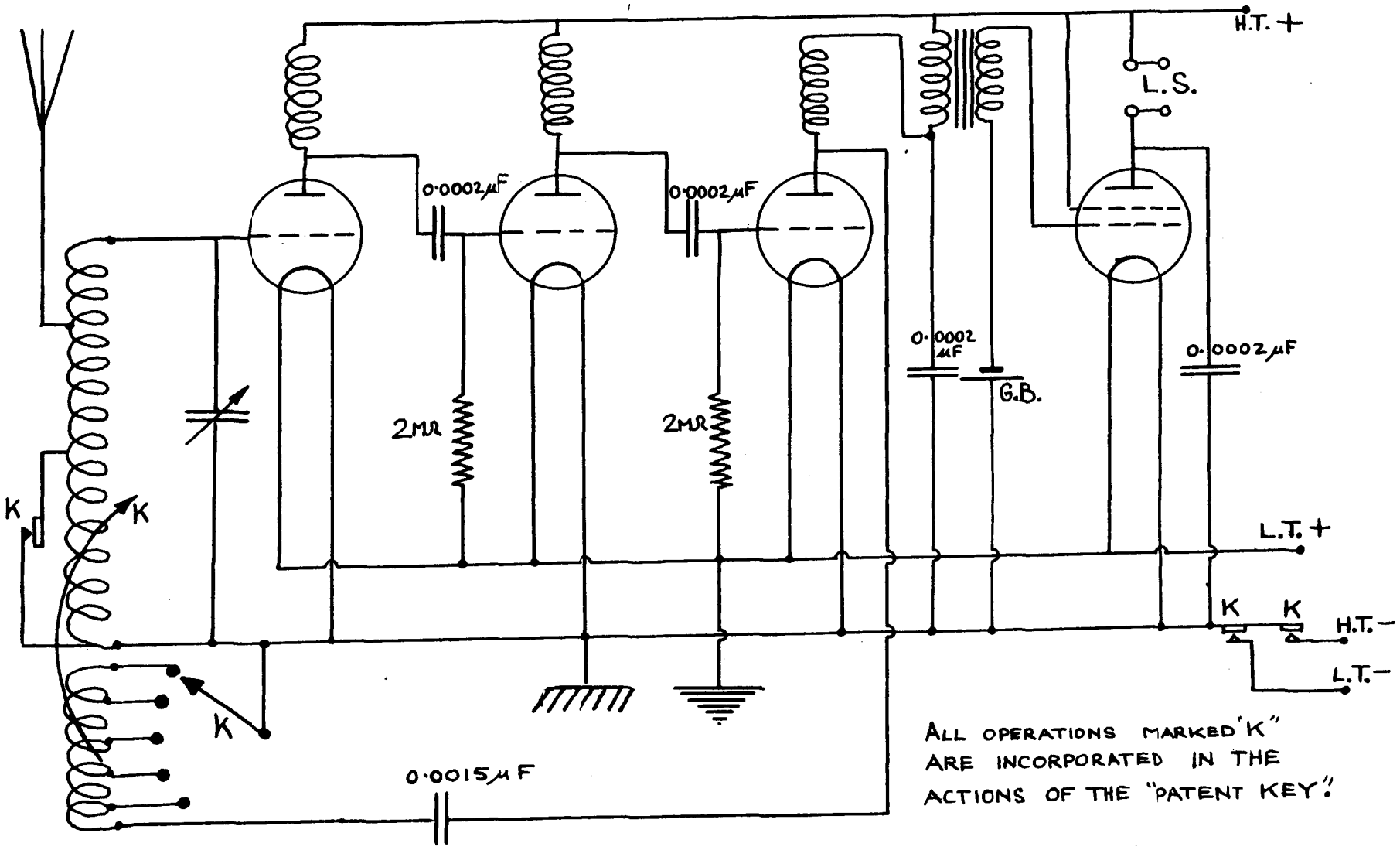
ADEY RADIO - A BRIEF HISTORY

Horace William Adey was born in Shropshire in 1887 and educated at Wellington Grammar School. At the age of 18, dissatisfied with the long apprenticeships and traditional ideas that stood in the way of youthful ambition, he set sail for America. There, by energy and skill, a man could achieve responsibility at a young age.

He joined the C & C Electric Company as an electrical engineer, took American citizenship, and at the age of 20 was posted to Australia, designing and supervising the C & C Company's generating and switchgear installations.

There he married, raised two daughters and two sons* but, at the outbreak of the first World War returned to England for family reasons. During the war and in the years following, Horace Adey had a farm in Staffordshire and regained his British citizenship.

THE ADEY PORTABLE 4



ALL OPERATIONS MARKED 'K' ARE INCORPORATED IN THE ACTIONS OF THE "PATENT KEY".

With the start of broadcasting in 1922 he began to think about applying his electrical skills to the new commercial possibilities presented by the radio boom. From the beginnings his efforts were directed towards portables. What inventions and production techniques could be used to achieve compact design, ease of manufacture, reliability, low power consumption and good performance? In providing solutions for these design problems he was not only inventive, but was able to draw from his first hand experience of American production engineering.

After early experiments in Maidenhead starting in 1922, the first Adey portables were made in Goodge Stree, London, in about 1924. He called these early sets 'Mosmophones' after Mosman Bay in Australia. The design emphasis was on electrical efficiency and quality of construction. Integral speakers did not exist and a range of smophones was designed for use with headphones, horns and the Sterling Primax Lumiere diaphragm loudspeaker. A good quality clock (of the same make as was used in Rolls Royce cars) was incorporated in some of the receivers to switch them on and off at predetermined times.

In 1927 Adey moved to premises at 99 Mortimer Street, London, W.1. and formed Alphian Wireless Ltd, adding a 'radio chair' to his products. The chassis and controls of this chair were in one arm, a loudspeaker was in the other arm and a frame aerial was wound in the back.

During these early years, Horace Adey had been working on his ideas for a compact radio envisaging a size to performance ratio hitherto unknown and to be made possible by tchniques of circuit design and production engineering. These ideas saw their first light in 'Patent 324721 Nov 3, 1928 receiving sets construction of', in which the 'key' and patent circuit are described. Adey then changed his company name to Adey Radio Ltd., and the first Adey patent portable receiver' was offered to the public at the 1929 radio exhibition at Olympia. The two and four valve sets incorporated a Celestion cone speaker of very good quality and the response of the press and the public to the Adey 'mystery receiver' was enthusiastic. Advertisements quote, 'The Adey Mystery Key no only unlocks the set but acts as switch, volume control, station selector, etc.'

Those familiar with Adey's sets will have noticed the absence of the patent/royalty plate found on virtually all British receivers of the period. The purpose of the plate was to confirm that royalty had been paid within the purchase price. Most basic British patents for receiving systems were the property of the Marconi Company, and not surprisingly Adey received a letter from Marconi's which claimed infringement. Adey stood his ground, replying that Marconi's must prove the area of infringement at which Marconi's, a notoriously litigous company, dropped the issue.

In 1930, Adey Radio announced a policeman's radio and made sets available to Scotland Yard and various regional police forces for trial. The set was the size of a cigar box $2\frac{1}{2}$ inches thick, containing a one-valve regenerative patent circuit plus battery, and was operated by the patent key. The set was carried by the policeman in his pocket. The loudspeaker he carried on his head. The 'Evening Standard' wireless correspondent describes the system:-

"When the policeman's helmet was evolved nobody imagined that it would be the ideal loudspeaker. Yet this is what has happened. The cone shape is there ready for the purpose."

Quoting from the 'Police Review': "A drive unit weighing 3oz is fitted in the crown of the helmet, and the helmet acts as the diaphragm. A system of keeping patrolling policemen in touch with HQ by wireless when satisfactorily accomplished will supersede the police phone box."

Also in 1930, Adey demonstrated an amplifier for the deaf, employing a magnetic horn as a microphone and driving headphones via the patent circuit.
During this period Adey employed an oil painter, and many of the receivers were finished in original landscapes, seascapes and decorative motifs. Such sets found their way to many distinguished families and must have been the ultimate in hand made, hand finished radio products.

During the early '30's, the four valve set was further developed so that even smaller size was possible through the use of 'choke valves' patented in 1931, and the introduction of a moulded bakelite chassis....this is the set described and illustrated in this issue of the Bulletin.

Further patents were granted for choke and choke/capacity self coupling valves, and produced for Adey by Tungsram Hivac and Cossor. The showroom was moved to 71 Blandford Street, London W.1. and production of the Adey portables reached between 100 and 200 per week. The business by now employed about twelve people in the various stages of receiver assembly with Roland Adey in charge of the workshop.

Finally, for the 1935 Radio Olympia, the Allwave Portable was introduced. It was advertised as the only all-wave self-contained portable in the world. It was very little larger than the standard portable and covered 15 to 60, 200 to 550, and 1000 to 2500 metre bands. Reports from the show said that it could receive American and Australian stations with ease. It was an immediate success and was exported round the world. The BBC gave it particluar recommendation in their list of short wave receivers, and Herr Hitler was an eventual buyer for his own use.

The, late in 1935, Horace Adey died from peritonitis caused by a perforated ulcer. He was not quite 48 and had, in ten years, created a small business whose products were unique. At the time of his death he was working on further stages of miniaturisation and application of radio to new uses. He had foreseen the coming of war and wrote that it would be a 'radio war'. For a while the firm continued to make radio sets, but without Horace, known as the 'Governor', the business had no heart or inventiveness left. Plans for a new larger factory at Marylebone were at an advanced stage, but these were cancelled and the business was wound up.

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* Roland W. Adey, born April 1912, was kind enough to provide me with such papers as have survived, and his valuable time. D.R.

TRANS-ATLANTIC LETTER

From Dave Brodie

As we enter the Spring Season, plans are being drafted throughout the U.S.A. for the usual Regional meetings of collectors. As of this date, I can list the following:

Joint A.W.A. & Indiane Historical Radio Soc. Meet.	Auburn, Indiana.	21st April
Joint A.W.A. & California Historical Radio Soc. Meet.	Foothill College, Los Altos, California.	5th May
Annual A.W.A. Spring Meet.	East Bloomfield, New York.	12th May
South-East A.W.A. Regional Conference.	Charlotte, N.Carolina.	Some time in June
New England A.W.A. Meet.	New England Wireless Museum, East Greenwich, Rhode Island.	11th August

Members of the B.V.W.S. who may be in these areas at the above dates are cordially invited. Write to me for further details.

Museums

There are quite a number of private and public wireless and electronic museums throughout the United States. I am now collecting information for a short series on a few of them for future Letters. It is hoped that many of you will take the opportunity to visit one or more during your travels. To start this series let's take a look at the Foothill Electronics Museum located on the campus of the Foothill Community College which is about 40 miles south of San Francisco, California.

The antique radio collection in this museum originated from the private collection of Douglas Perham, a technician who became active in amateur radio during the early 1900's and in 1910 was employed by the Federal Telegraph Company in the manufacture and installation of transmitters using the arc obtained in Denmark from Valdemar Poulson. A group of radio pioneers and local businessmen insured the future preservation of Perham's archives and artifacts by forming the Perham Foundation in 1959. Following a successful campaign to raise funds in the community, the museum was constructed and it was opened in 1969 with the Perham collection and many other artifacts from other sources.

The museum now includes the De Forest Memorial Library which houses personal papers and documents of that great inventor. The library also contains many other books, periodicals and documents obtained from the private libraries of other radio and electronic pioneers. The visitor will also find a representative collection of radio valves dating from the Fleming valve (1904), the De Forest audion (1906) to valves still manufactured today. Antique receivers from the 20's and 30's are on view together with operating crystal sets and early wireless equipment including a Marconi magnetic detector and an early Marconi tuner.

The Federal Telegraph Co. Exhibit (which company was subsequntly merged into the International Telephone and Telegraph Company) includes artifacts from the predecessor Poulson Wireless and Telegraph Co.(1909) together with a recorded and projected history of 'Federal'. Transmitters of the arc and spark types are on display and of particular interest is the reconstructed station FN, considered by many to be the first broadcast station to operate on a regular scheduled basis (starting on the air in January 1909) and located then in the nearby city of San Jose, California.

Two amateur stations occupy the museum. One is a 1920 vintage spark transmitter (6LC) and a Navy type SE-143 receiver. The other is a modern operating station (WB6WSL) used by the museum's amateur radio club. Operating displays are provided to demonstrate the fundamental laws of electricity and magnetism. The museum is open daily to the public.

Free Crystal Sets.

The December 1978 issue of the A.W.A. Bulletin includes a brief reference to the results

of a study designed to determine the oldest broadcasting station in the U.S.A. Of the four stations finally considered for that honour, station KDKA of Pittsburgh, Pensylvania was selected. Station KQW of San Jose California (one of the four final ists) has rather persuasive credentials to support its claim to fame and perhaps the issue will never be settled to everyone's satisfaction.

Charles David Herrold commenced broadcasting regular scheduled programmes during January 1909 and continued thereafter. Initially, no call letters were used - merely the salutation, "This is San Jose". Broadcasts continued until the U.S.A.'s entry into World War I at which time all transmitting of this nature was prohibited. During the period 1909 to 1917 a succession of calls were used, such as FN, 6XE, 6XF and SJN. The station resumed operation after the war with the assigned call letters KQW. In 1949 the station was acquired by the Columbia Broadcasting System and now operates from San Francisco under the call letters KCBS.

During its early years, the station operated regularly and reported news, broadcast music from a wind-up Victor Talking Machine, broadcast special programmes to amateurs and used guest speakers.

What does all this have to do with free crystal sets? Simply this - in 1909 Herrold was aware that his listening audience consisted only of amateurs in the immediate area using home-made receivers. He rectified this situation by building crystal sets and giving them, without charge, to the public living within range of his arc transmitter!

These 1909 crystal sets are now as scarce as Marconi magnetic detectors .... well, almost as scarce.

NEW MEMBERS SINCE DEC 1978

The following members have joined B.V.W.S. since the last membership list was circulated in December 1978.

Abbott, H.E.T., 77, West Street, Harwich, Essex.

Herring, Nigel, 19, Bryn Terrace, Smith House Lane, Brighouse W.Yorks. Tel: Brighouse 711480

Hopwood, A.E., The Close, Holdfast, Upton-on-Severn, Worcester, WR8 0QZ Tel: Holdfast 2134

Lowe, James F., 16, Kitchener Parade, Newcastle 2300 N.S.W., Australia Tel:049-22389

O'Brien, Morris John, 5, Edgar Rd., San Remo 3925, Victoria, Australia Tel:056 785317

Overs, Russel, 8, Park Rd., Walsall, W.Midlands. WS5 3JT. Tel: 021-357-5130

Robertson, Ian S., Dept. of Natural Philosophy, University of Aberdeen, Aberdeen AB92UE Tel: Aberdeen 40241

Saunders, J.T., 19, Ennerdale Rd., Kew Gardens, Richmond, Surrey, Tel: 01-940-4921

Weller, H.S., 100, Rosebery Rd., Epsom Downs, Surrey KT18 6AA

The Society welcomes these new members. Established members living nearby may like to make personal contact ... if they havn't already done so.

Change of address:

Kenneth Brooks, 91 Sea Mills Lane, Stoke Bishop, Bristol. Tel: Bristol 685280
R.A.Stevenson, Geldeston Hall, Beccles, Suffolk.

Members are requested to inform the membership secretary when they change their address. The next up-to-date mebership list will be prepared for December 1979.

EXCHANGE

SEARCHING

Two short wave coil packs for Gecophone 'Overseas' Mains set (1933). Also wanted: Murphy A52 in good condition. Also: An early pre-war S.W. set (Hallicrafter/ Hammerlund/Colling). Timothy Ritchie, 51, Marriott Rd., Muswell Hill, London, N10 1JJ. Tel: 444-5030

Ekco AD65; Philco 444; Amplion Dragon speaker; Marconiphone sets; crystal sets. Have Cossor Silvertone 2-valve battery set for trade (Mint condition). A.R.Nolfe 7, Cambrian Way, Ewloe, Clwyd, N.Wales, CH53RE. Tel: 0244 1534329

BBC - GPO registration No. period multivalve wireless set wanted - must be in first class condition throughout. Will exchange a MkIII tuner and/or Marconi aircraft spark transmitter. Dennis Yates, 327, Coppice Rd., Arnold, Nottingham. Tel: 205441.

Replacement mains transformer req'd for Marconi/H.M.V. Model 559 (4v, 350-0-350 with 6.3v tap). Also: 1930's or early 40's radiogram - no particular model but must have 78 r.p.m. autochange. Also: 2volt accumulator in decent condition. Also: steel gramophone needles. Stephen Sidaway, 32, Cemetery Rd., Lye, Stourbridge, West Midlands, DY9 7EF. Tel: Lye 3366

Copies of Wireless World Valve Data for 1929 and 1930. Can swap for any other years between 1925 and 1940. J.W.Stokes, 281C, Hillsborough Rd., Mt. Roskill, Auckland 4, New Zealand.

Ekco AW70 circuit or manual required. Also: American valve tester...Type L-177 manual, circuit or information. A.Gates, 3B, St. Phillip's Square, Battersea, London, SW8 3RU. Tel: 720-5839

Pre-War television sets and literature wanted. R.Brewster, 454, Diablo Drive, Pittsburgh, PA 15241, U.S.A. Tel: 412-833-4287

Valves wanted: DER, DE5, DE6, Cossor 215P, 220P, 220PA, 230XP, 220VS, 220PT, 220HPT, 210DET; Lissen H210 & HL210; Mullard 'ORA' & Weco; Marcon V24; BTH B5, B6; Osram HL2KMET, New or 100% good used. Also required: Igranic plug-in coils - honeycomb 1pin, 1skt type. Single, double and three way adjuctable holders for these coils. Inigraph or Ormond 4" slow motion dial. Telsen W349 iron cored coils, single or 2-gang. Ormond differential slow motion reaction condenser with knobs - 0.0002 mfd each half. Clarkes 'Atlas' mains unit model AC188 or AC300. Brownie No3 crystal set or Marconiphone crystal 'Universal Baby', Gecophone crystal set. Finally, horn speakers by: S.G.Brown, BTH (C2), Amplion Lion etc etc. Norman Richardson, 2, Edna Rd., Maidstone, Kent, ME14 2QJ.

Scott Taggart ST600. ST700 any condition. 1933 Lissen Skyscraper 4 kit radio, with or without cabinet, also wiring blueprint for same. Also req'd: Practical Wireless mags for April, May 1956, Jan 1943, Aug, Dec. 1942. American Command receivers, transmitters Robert Warner, 45, Eastry Close, Stanhope Estate, Ashford, Kent TN232RS.

Service manual for HMV Model 800. Information on 1930's Mullard valve tester. Trophy 6 receiver marketed by Peto Scott - working or not. Lissen receiver 1934 approx AC Mains Model 8043-2 working or not. R.W.James, 'Ione', Pinesfield Lane, Trottiscliffe, Kent, ME19 5EN. Fairseat 823674.

Crystal sets(any make) and early radios such as Arcphone 22, Brownie No 2, Kenmac Listener, Burndept etc. For exchange only (see disposal ad below). Dieter Zimpel, D8000, Munchen 80, Lucile-Graun Str 42 W.Germany. Tel: 089 28 2801

Valves: early bi-grid types. Cosmos DEII, AC/G, AC/P, AC/S. Osram KL1 and KL2. First world war Mk III tuner - any condition. Holder for Marconi S625 valve. Milnes HT unit. All wave receiver c.1929. A.P.Carter, Trellis Cottage, Shalford, Nr Guildford, Surrey. Tel: Guildford (0483)504213.

SEARCHING CONT'D.

Circuit diagram for Mullard All Wave Super Seven c. 1934. Ditto for Philips 2601 & 2607. D.E.Hewlett, 23, Grace Rd., Downend, Bristol, BS16 5DY Tel: 0272-569897

'Innards' for Pye type 25 or details. C.Heys, Elect. Eng. Dept., B.I.T., Dean Rd., Bolton, Lancs. Tel Bolton 28851 Ext 213.

Aluminium black horn flare 10"-12" open end 2⅝" other end for Amplion Type AR-13. Also req'd: Steel Swan neck for Amplion 'Dragon' speaker. Alan T. Shaw, 12, Clarendon Rd., Smethwick, Warley, West Midlands. Tel: 021-558-2223.

Any information, parts etc., including suitable battery eliminator for Cossor Melody Maker Model 234. Also seeking any round Models (e.g. Ekco's AD65, A22 etc) in any condition. The above items, and in fact any interesting crystal or valve sets up to 1940, are required by a 13 yr old recent addition to the ranks of enthusiasts and any assistance will be greatly appreciated. Alan Darcy, 70, Oakwood Rd., Hollywood, Birmingham, B47 5DX. Tel: Wythall 822730.

DISPOSING

Copies of Radio Times 1924-30. Copies of The Listener 1930-35. Timothy Ritchie, 51, Marriott Rd., Muswell Hill, London N10 1JJ. Tel: 444-5030

Spares and valves up to present day to trade for items listed in 'Searching' ad above. Stephen Sidaway, 32, Cemetery Rd., Lye, Stourbridge, West Midlands, DY9 7EF Tel: Lye 3366.

MkIII tuner and Marconi Wireless Telegraph Co. Aircraft Spark transmitter offered in exchange for BBC period set as indicated above. Dennis Yates, 327, Coppice Rd., Arnold, Nottingham. Tel: Nottingham 205441

Vintage transfers can be obtained....No up-to-date information. ut at one time it was possible to get Black on gold BBC stamp with the words 'Approved by Postmaster General' Some manufacturer's stamps were also available. For information write to: Vintage Transfers, 522, H olly Lane, Erdington, Birmingham, B24 9LY.

All wave table receivers c.1946:- Pye 15A. A.C.mains. G.E.C. battery (2v fils). Also Marconi CR200 VLF receiver 14-550 kHz. similar appearance and construction to CR100. A.P.Carter, Trellis Cottage, Shalford, Nr. Guildford, Surrey. Tel 0483 504213.

Several German & Austrian radios of early '30's. Also Volksempfanger (VE301) and DKE-Deutsche Kleinempfänger 38. Also valves, R-types and former German army (Wehemacht) valves. Dieter Zimpel, Address as above in 'searching'. These items for exchange only.

Valves: PX4, PX25, D025,D026,PX650,PT425,PT625,U65/550, DEP610,DEL610,DD620,S610,CV171, NT82,AR58,TDD2A,DA3, HD22,VP23,TP25,PEN25,NR41,ARP12,VR21,QP22B,220TH,220 1 PT, ARP4 and many others, Also cabinet for 'Butler' crystal set. Norman Richardson, as above.

Large-ish balanced armature speaker 1930's - nice condition - goes well, oak cabinet. Hanging corner speaker 1930's - nice condition - Blue Spot unti coil continuous but no noise. Mahogony plywood finish. Small drive unit for Sterling horn speaker 1920's goes well. Best offer for each or all items. Roger Snelling, 23, Dorset Close, Chelmsford, Essex, CM2 9UD. Tel: 0245 73230.

Wireless Worlds from 1930. Bound and unbound. Also about 1000 other wireless magazines mainly from 1932 up to the 1950's.....for sale or swap. Also 1000 battery valves (2v) from about 1927 and mains valves from the same period. Christopher Sawyer, 210, Gordon Ave., Camberley, Surrey. Tel: 0276 29460

PRE-WIRELESS WIRELESS TELEGRAPHY

By Roger Snelling

Long before Marconi filed his provisional patent in 1896 and even before Heinrich Hertz performed his early experiments in Karlsruhe in 1888 the idea of wirelee telegraphy was well developed and much practical work had been achieved.

The first 'wire-less' link was conceived in 1842 and set up in 1844 by courtesy of an unknown sea captain, Samual Morse, in a letter to the secretary of the Treasury of the United States which was laid before the House of Representatives on December 23rd 1844, described his experiments as follows: "In the autumn of 1842, at the request of the American Institute, I undertook to give the public in New York a demonstration of the practicability of my telegraph, by connecting Governor's Island with Castle Garden, a distance of a mile; and for this purpose I laid my wires properly insulated beneath the water. I had scarcely begun to operate, and had received but two or three characters, when my intentions were frustrated by the accidental destruction of a part of my conductor by a vessel, which drew them up on her anchor, and cut them off. In the moments of mortification I immediately devised a plan for avoiding such an accident in the future, by so arranging my wires along the banks of the river as to cause the water itself to conduct the electricity across. The experiments, however, were deferred till I arrived in Washington; and on December 16, 1842, I tested my arrangement across the canal, and with success. The simple fact was then ascertained that electricity could be made to cross the river without other conductors other than the water itself; but it was not until the last autumn that I had the leisure to make a series of experiments to ascertain the law of its passage. The following diagram will serve to explain the experiment:" (Fig.1.)

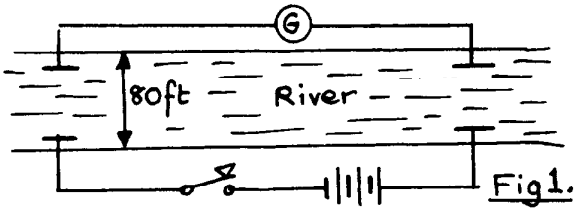

Fig1.

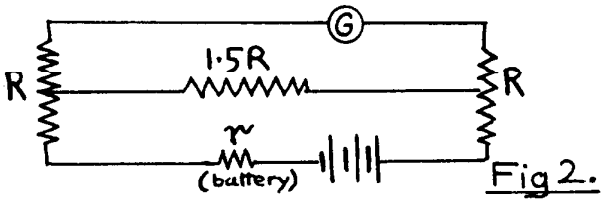

Fig 2.

Morse found it necessary to make the wires along each shore three times as great as the distance from shore to shore across the stream. The equivalent circuit shown in Fig. 2. is based on Morse's figures. Later, under Morse's direction, his assistants Messrs Vail R Rogers, established communication in the same way across the Susquehanna River, a distance of nearly a mile. Similar attempts to send signals through water were made by James Bowman Lindsay between 1854 and 1860. Lindsay eventually succeeded in signalling across the Tay where the width is greater than a mile using apparatus like that of Morse. In 1880 Professor John Trowbridge of Harvard University suggested the use of circuits resembling those of Morse, modified by using a current interrupter in the sending circuit and a telephone receiver in the receiving circuit. This modification takes advantage of the high sensitivity , the portability and the rapidity of action of the telephone as a current indicator. About 1882 Alexander Graham Bell used the Trowbridge method over a distance of a mile and a quarter on the Potomac River. Experiments of this nature were carried out by a number of other investigators in several countries. In Britain J.W.Wilkins began experimenting in 1845 and in the March 28, 1849 issue of Mining Engineer he seriously proposed linking England and France by a wire-less telegraphy system based on water conduction.

Apart from these conductive methods other serious attacks were made on the problem of wire-less telegraphy and one of the most persistent investigators was William Preece, Engineer-in-chief to the British Postal Telegraph Department. Preece attempted to utilise the electromagnetic induction between two long parallel wires, one at the sending station and the other at the receiving station. The wires were carried on poles and were grounded at one or both ends. The sending wire contained a battery and an interrupter, or else an alternating current generator, and the receiving circuit contained an ordinary telephone receiver. The pulsed magnetic field of the sending wire linked with the receiving circuit and induced corresponding pulses in it. which were detected by the telephone receiver. Preece began his experiments in March 1882 and established wireless contact across the Solent between Southampton

and Newport, Isle of Wight...though this was again a conduction system using the Solent water. In 1884 he noticed that messages being transmitted along insulated wires in iron tubes beneath Gray's Inn Rd., London, were being picked up in independent telephone circuits carried on poles over the roofs of houses eighty feet high! He then carried out several experiments in Newcastle and systematically measured the inductive effects in adjacent circuits. His experiments continued in different parts of Britain, and the Bristol Channel was the location of some of his most successful results. He communicated most successfully between Lavernock Point in Sth. Wales and the Island of Flatholm 3.3 miles S.E. in the Bristol Channel. This was in 1892. When the cable linking the Island of Mull and the Scottish mainland broke in 1895, Preece came to the rescue and maintained uninterrupted communication by wire-less telegraphy for three weeks. Preece achieved enormous success with his wireless systems and even some 'fuss' in the press of a type later to be enjoyed by Marconi. However, Preece recognised the severe limitations of the methods and saw that it was really something of a technological dead end. But his familiarity with and knowledge of the art of wireless telegraphy put him in a good position to recognise the value of the Marconi system when the young Italian inventor was introduced to him in the spring of 1896.

The man who, pre-Marconi, came nearest to true 'wireless' as we now know it was Prof. Dolbear of Tufts College, Massachusetts, who applied for a United States patent in March, 1882 for a system of electrical communication without wire or conductor. Fig.3 shows a diagram of the apparatus illustrated in the patent specification. The transmitting station, shown at the left, consisted of a condenser H' connected to one terminal of the secondary of an induction coil G, of which the other terminal of the secondary was grounded at C. The primary of the induction coil contained a battery and microphone transmitter T. The receiving apparatus consisted of a telephone receiver R connected between ground, condensers and battery as shown. Professor Dolbear, in his patent specification, describes the action of the apparatus as follows:

"Now if words be spoken in proximity to transmitter T, the vibration of its diaphragm will disturb the electric condition of the coil G, and thereby vary the potential of the ground at A, and the variations of potential at A will cause corresponding variations of the potential of the ground at B, and the receiver R will reproduce the words spoken in proximity to the transmitter, as if the wires C & D were in contact, or connected by a third wire. Electrical communications may be thus established between points certainly more than half a mile apart; but how much farther I cannot say".

In some other of Dolbear's writings he speaks of using an automatic break and a morse key in the primary of his coil instead of the microphone transmitter, and he also speaks of using a gilt kite carrying a fine wire from the secondary of the Ruhmkorff coil. Prof. Dolbear's explanation of his own apparatus was quite unsatisfactory and indeed most other contemporary explanations were quite inadequate. Doubtless Dolbear's experiments came very close to the true radiation of electromagnetic energy and his patent was even used some years later by De Forest in an attempt to prove priority over Marconi!

These are just a few examples of the hive of activity that was going on in the nineteenth century and emphasises the fact that wireless communication was 'discovered' because scientists and pragmatic 'inventors' were looking for it.

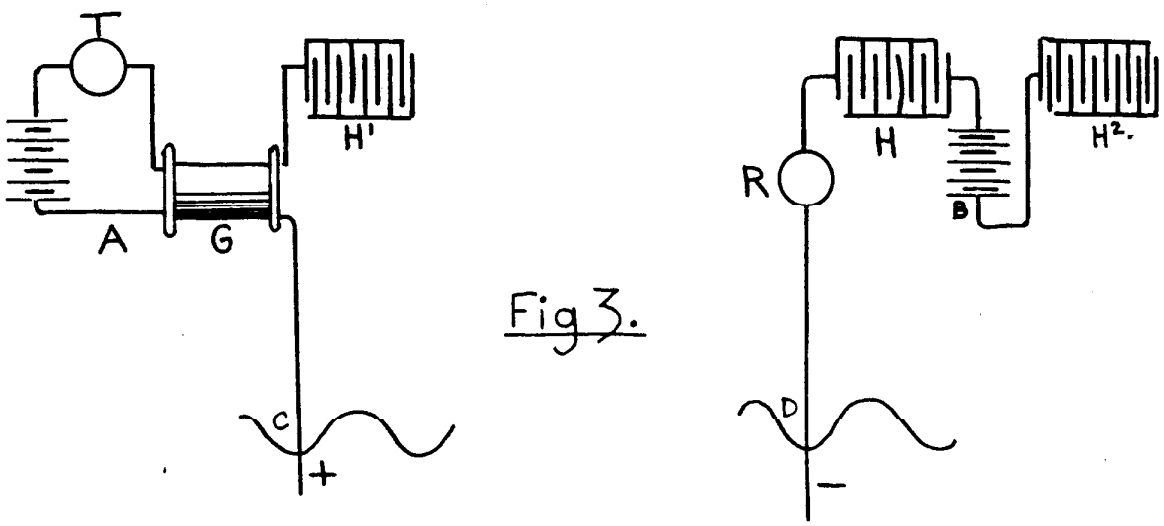

Fig 3.

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