THE PROPAGATOR

MONTHLY NEWSLETTER OF THE ILLAWARRA AMATEUR RADIO SOCIETY
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MEETINGS ARE HELD ON THE SECOND TUESDAY OF EACH MONTH (EXCEPT JANUARY) AT 7:30 PM AT THE STATE EMERGENCY SERVICES BUILDING, MONTAGUE STREET, NORTH WOLLONGONG. VISITORS ARE WELCOME TO ATTEND MEETINGS.

THIS MONTHS MEETING -: This month's meeting of the I.A.R.S. will be held on Tuesday 8th October at above address.

VALE THOMAS JAMES MEAD VK2EJM. 1929-1985.

It is with sadness I record the sudden passing of Jim Mead VK2EJM on Monday 16th September 1985. Jim was well known to all in the Illawarra Amateur Radio Society and was an excellent Ambassador for the hobby of Amateur Radio, being well known in many area's of the world. Jim migrated to Australia from England in 1956 with his family and finally settled at "Primbee By The Lake" as he called it. He spent 26 years at A.F.L. until the closure of the company in 1982, forcing an early retirement for him. Jim was active in many Community Projects over the years and was also highly respected in the Masonic Lodge, rising to Chairman for a number of terms. Never one to complain, he was always first to offer assistance to one in need. He became well known through his Novice Call, VK2NYY (Naturally Yakkety Yak, or New York Yankee) and always had a cheery word for whomever came across him on the bands, where he would settle down with a "Bucket" of tea and chat on. Jim suffered a slight stroke in December 1983 but bounced back as bright as ever, being involved in the I.A.R.S. Club affairs, serving on the committee, also affectionatley known as the "Tea Lady" for a number of years.

Jim's cheeky manner will be missed on the daily VHF skeds he held and on the local Sunday club net he helped to run for a number of years.

73, to a good Mate and a fellow Amateur. To Tina and family, from all who knew and respected Jim, Our deepest Sympathy.

Dave Myers VK2DFL.

-spanning a great distance with low power. According to calculations it was impossible to achieve such communication by propagating the signal over that great distance because with distance the signal would get so weak, that it could not be detected. A different phenomenon was at work that would allow propagation of signals beyond the line of sight.

Heinrich Hertz had demonstrated that radio waves propagated in straight lines and found that their direction could be altered by reflective surfaces of conductive material. In 1902 it was suggested in two independent studies by Kennelly from the US and Heaviside from Great Britain that the upper atmosphere consisted of an electrically conducting region that deflected signals across the Atlantic. In 1924 the British scientist. Appleton apparently discovered the electrified region and in 1925 he and his co-workers supposedly found conclusive evidence of its existence by measuring the angle of arrival of radio signals from a nearby transmitter. They figured that signals could only arrive from one direction - by reflection from the area in the earth's atmosphere about 100 miles high. For this work Appleton was Knighted by the British Empire.

In 1925 Briet and Tuve transmitted short bursts of radio energy vertically and detected echoes which they figured could be reflected only by the ionosphere.

Reflections are only one possible explanation for getting the signals from the sky at those angles. Too bad they did not get exposed to more work that was being done in optics at that time. In 1870 John Tyndall presented the earliest recorded scientific demonstration of a peculiar optical phenomenon - light being trapped in a stream of water. In his demonstration he used an illuminated vessel of water and showed that, when a stream of water was allowed to flow through a hole in the side of the vessel, light was conducted along the curved path of the stream. This was the closest thing to fiber optics. Lenses were already known. Too bad they did not see the similarity between radio waves and light, and get the idea of another way of propagating radio waves. Things had to wait. Today we know that light is on the high end or the electromagnetic wave scale.

So this was a handy explanation: "mirrors in the sky" reflecting radio waves back to earth; it was generally accepted. The idea has carried until the present. Any anomalies were judged as exceptions and all kinds of explanations have been tried in order to explain the mechanics of unusual propagation modes.

A Critical Look

Let's have a look at the reflective theory and see how well it fits real life. The first thing that really hit me is the scale to which all those nice pictures are drawn. It is immediately noticeable that the earth is usually drawn in one scale and the ionospheric layers are drawn in another scale, about 10x. See fig. 1 showing the typical picture shown in the literature. It explains how signals might reflect but it does not approximate the real geometric condition. Figure 2 shows the earth and the ionosphere drawn to scale. The average height of the F1 layer is around 180 km and the F2 layer about 500 km on a summer day. Assuming an average launch angle of 11° on the 20 m. band, it seems that we need about four hops to propagate a signal one quarter way around the earth. Now if we work Europe on long path, we'd go about twelve hops. Considering the natural dispersion of the signal with distance and loss per reflection off the ionosphere and the earth, it seems to me that it is very unlikely that we could have any signal left at the other end.

Another questionable thing is the mechanics of the reflection from the ionosphere. Figure 3 shows the typical picture used in the literature explaining ionospheric reflection. In order to reflect signals one would expect a good reflective surface, larger in size than the wavelength and of good conductivity (reflectivity) with clearly difined surface border. But we know that the ionosphere (atmosphere?) is very thin and molecules are far apart from each other. I find it hard to believe that we can get sufficient reflection of signals from that type of medium to yield the signal levels experiencing in Amateur Radio. The shape of the curve is also very unusual, it looks like refraction over about 270°. In reality, the ionosphere would rather absorb the energy than "turn it around". So I am not very convinced that the mechanics of reflection are all that clear and acceptable.

Various propagation modes that cannot be explained by present theory are labeled as exemptions and there is great deal of speculation and explanation trying to find the place for them and make them fit the theory. For example, transequatorial v.h.f. propagation: signals bouncing off ionized bubbles; one way skip: investigation inconclusive; sidescatter, backscatter: bouncing a signal from **an area of the earth which is reachable via the ionosphere from both ends of the path.**

We will not elaborate too much on them; there is enough mentioned in the antenna and propagation books. We will try to explain these exemptions with a new theory.

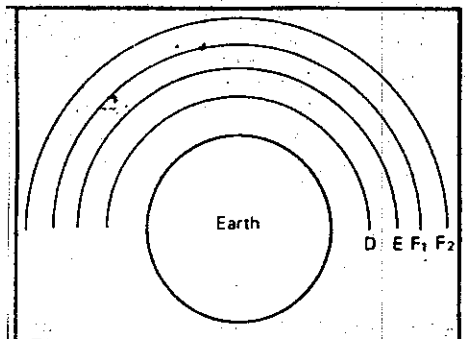


Fig. 1- Typical presentation of ionospheric layers grossly distorts actual relative sizes and distances.

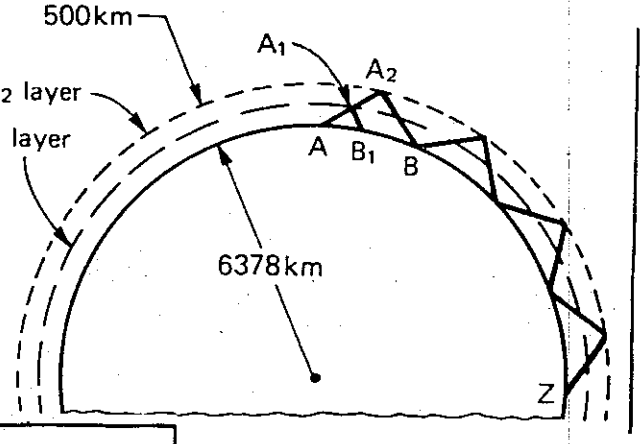


Fig. 2- When the earth and ionosphere are drawn to scale, and accurate geometry is applied, the unlikely situation of four F2 reflections for a North America to Europe contact becomes evident. Long path would require twelve such reflections.

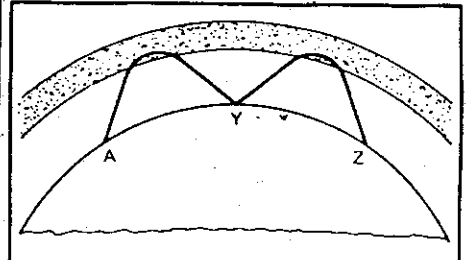


Fig. 3- Conventional graphic representation of ionospheric reflection.

FROM 'CQ' JUNE 1980

Continued next month.

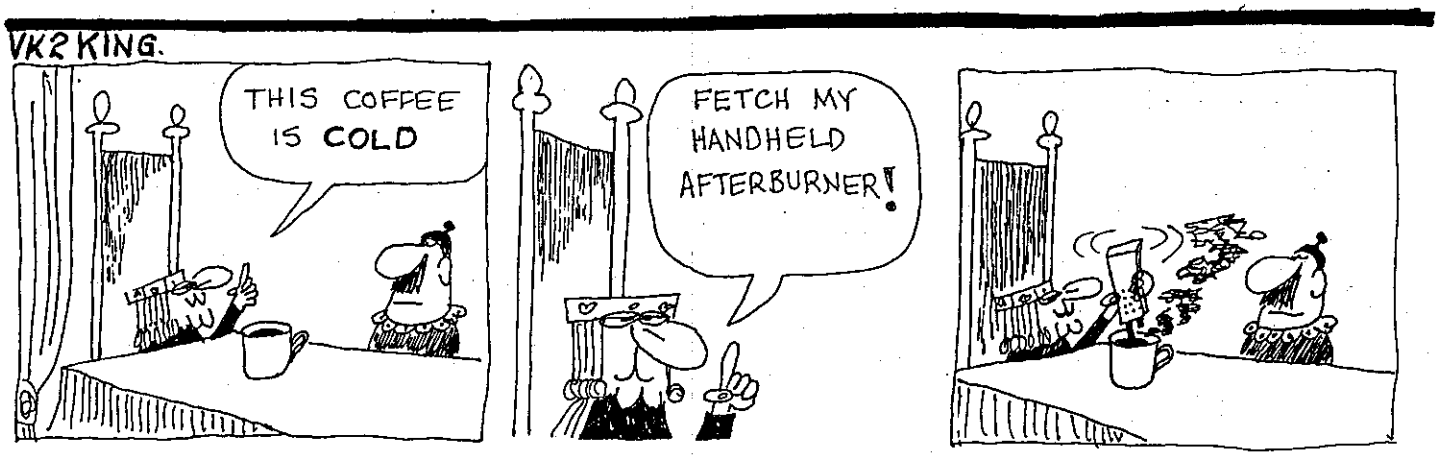
Part 2:The New Theory

You will find that repeater frequency allocations (and that goes for commercial ones too), are never on adjacent channels in any given geographical area. Even though your rig may have 25kHz channel spacing, you will find that in any particular area the repeater channels are spaced at least 50kHz apart for the above reason. The interleaving channels are used several hundred kilometres away. An example of 'cutting it a bit fine' is Manly on 146.875 and Mt. Murray on 146.850, and we do sometimes experience trouble and vice versa.

JOTA 1985 -: It's on at Bass Point !!!
Jamboree of the Air will again be held at the Bass Point site as in previous years. A generator will be on hand to supply the power so you only need to bring your own gear and an extention lead. If you want your own operating area bring your own tent or use the large marquee provided. The generator is capable of running any number of rigs. As all those who have been at Bass Point will agree the site is ideal for antennas and is a good site for all round transmitting. (Remember the large rhombic antennas of previous years !!!)
If interested, contact Peter VK2XAN.

NEW CALLSIGNS -: Among those who passed the last A.O.C.P. exam were the local stations Rob VK2MT (ex VK2JRC) (what was that saying 'MT vessels make the most ....'?), Peter VK2JAM (ex VK2VCK) and Baz VK2BAZ (ex VK2KTA). Congratulations to all of you and we hope to hear these new calls regularly on the air.

WANTED -: Weston LM230A or similar Department of Communication approved mobile transceivers.
Contact Merv Moore VK2PJS at the next Meeting.



E.M.E. REPORT BY LYLE VK2ALU

Moonbounce Report - October 1985.

No activity over the past month, other than a visit to site with Hans VK6ZT, who is in Sydney for two weeks. He is active on EME on 432MHz from his home QTH. He was given a demonstration of reception of sun noise at 1296MHz and seemed impressed by the pointing accuracy needed by a 30 foot dia. dish operating at 1296MHz.

Various types of security systems were discussed at the last Committee meeting. Paul VK2KPS undertook to take up possible means of providing a suitable system with people at the University. He now advises that they are showing quite some interest in his proposals, but that much more needs to be done before construction may commence.

In the meantime as much as possible of the EME equipment is being kept off the site.

Lyle VK2ALU.

Satellite Notes.

Oscar 10 transponder operating schedules were changed on Sept. 8 to

Mode B	MA 122 to 189
Mode L	MA 190 to 206
Mode B	MA 207 to 220
OFF	MA 221 to 039
Mode B	MA 040 to 105
OFF	MA 106 to 121 (subject to Sun Angle)

Another change in operating schedule may take place in October.

The attitude of the spacecraft was modified early in September. The target attitude was Lon 200 Lat N30. By the middle of the month spin modulation fading had been materially reduced during the portion of the orbit occuring during the local evening period, allowing error free copy of the RTTY Bulletins on the Mode B beacon. This RTTY is transmitted on the beacon frequency of 145.810 MHz (plus or minus Doppler shift) on the quarter past and quarter to the hour. It is sent at 50 Baud and lasts for 3 to 4 minutes.

The RTTY bulletin consists of two parts with a break of a few seconds in between. Each part includes some 8 or so lines of numbers which can be decoded to provide present operating conditions in the spacecraft, and also a plain language message which is brought up to date from time to time by a Command Station to advise users of matters of interest.

Copies of videotapes covering three lectures on Satellite communication and equipment used by Australian Amateurs are being obtained from the WIA Videotape library in Adelaide. It is hoped that excerpts of these tapes may be collated for presentation at this month's club meeting.

Lyle VK2ALU.

U.H.F. Television Channels.

As Australia has opted for 7 MHz wide U.H.F. television channels, the majority of U.H.F. tuners show incorrect channel numbering because they are designed for 8 MHz channels. For example, the recently opened local SBS transmitter on U.H.F. Channel 59 will be found at about the Channel 55 position. Information in the D.S. Catalogue is not correct for Australia. The correct details are as follows:

Channel Number	Frequency Limits (MHz)	Group	Channel Number	Frequency Limits (MHz)	Group
	Band IV				
28	526 - 533	1	54	708 - 715	C
29	533 - 540	2	55	715 - 722	A
30	540 - 547	3	56	722 - 729	B
31	547 - 554	1	57	729 - 736	C
32	554 - 561	2	58	736 - 743	A
33	561 - 568	3	59	743 - 750	B
34	568 - 575	1	60	750 - 757	C
35	575 - 582	2	61	757 - 764	A
	Band V		62	764 - 771	B
36	582 - 589 *	3	63	771 - 778	C
37	589 - 596 *	1	64	778 - 785	A
38	596 - 603 *	2	65	785 - 792	B
39	603 - 610 * ⁕	3	66	792 - 799	C
40	610 - 617 ⁕		67	799 - 806	A
41	617 - 624		68	806 - 813	B
42	624 - 631		69	813 - 820	C
43	631 - 638		70	820 - 827 ø	
44	638 - 645		71	827 - 834 ø	
45	645 - 652		72	834 - 841 ø	
46	652 - 659	A	73	841 - 848 ø	
47	659 - 666	B	74	848 - 855 ø	
48	666 - 673	C	75	855 - 862 ø	
49	673 - 680	A	76	862 - 869 ø	
50	680 - 687	B	77	869 - 876 ø	
51	687 - 694	C	78	876 - 883 ø	
52	694 - 701	A	80	883 - 890 ø	
53	701 - 708	B			

NOTE - * 585 - 610 MHz Television - Primary
Radio Navigation - Primary

⁕ 608 - 614 MHz Television - Primary
Radio Navigation - Secondary

ø 820 - 890 MHz Television - Secondary
Fixed and Mobile Services - Primary

de VK2DOI

Radio comes to Australia

Development of wireless telegraphy left to amateurs

After two years of experiment, 22-year-old Guglielmo Marconi was granted the world's first patent for wireless telegraphy in 1896. In 1900, he formed the Marconi Wireless Telegraph Company, which concentrated on installing wireless in ships.

The same year, the chief electrical engineer of Victoria's postal department, H. V. Jennvey, experimented with the Marconi system, with the idea of establishing radio communication between Victoria's Cape Otway lighthouse and passing steamers, but nothing came of his efforts.

Neither the Commonwealth nor the State Governments showed any interest in wireless, but in the middle of 1903, the British Government installed a Marconi plant in Brisbane to communicate with the Cape Moreton lighthouse on the tip of Moreton Island. 'If the system proves successful, it will probably become extended for strategic purposes to other parts of the Australian coast,' said the *Year Book of Australia*. 'As regards the application of the wireless telegraph to business and other purposes, the postal authorities are awaiting the completion of certain improvements projected by the inventor.'

Marconi's man goes home

Marconi continued to make these improvements, and in 1905 his company began a regular service between Queenscliff in Victoria and Devonport in Tasmania. Two years later, a representative spent some months demonstrating that the service could be extended to Hobart. 'But unfortunately for Australia this kind of business is under the control of the Federal Postal Department,' reported *The Storekeeper*, 'and having said that, it is hardly necessary to add that the wretched system of obstruction to anything new ... effectually blocked the way. Consequently the Marconi Company representative packed his bag and departed.'

For many years, the development of wireless telegraph in Australia remained in the hands of amateurs. In 1910, the versatile George Taylor founded the Wireless Institute of Australia, the first association of its kind in the British Commonwealth.

But the man responsible for the development of wireless and broadcasting in Australia on a national scale was a young Englishman named Ernest Fisk.

Became a telegraphist

Fisk, born in 1886, left school at the age of 13. He worked in a factory, a railway station bookstall, and in the clerical section of the Sandhurst Post Office, where he learned Morse code and became a telegraphist.

In 1905, he joined the Marconi Company as a wireless operator. After demonstrating the potentialities of wireless with the Newfoundland sealing fleet off Labrador, he came to Australia in 1910 as wireless operator on the Orient liner *Otranto*. He was then commissioned by the Marconi Company to instal wireless sets on Australian ships.

This beam wireless picturegram of Ernest Fisk was received in Australia from London on 12 September 1934, during the first experimental transmission using the new AWA system. Fisk was born in England and trained as an electrical engineer at the Marconi Company's school. He came to Australia in 1910, and three years later was made managing director of the newly formed Amalgamated Wireless (Australasia) Ltd—AWA. In 1918 Fisk picked up the first direct wireless message from England, at his home in the Sydney suburb of Wahroonga. The broadcast was made from the Marconi station at Carnarvon in Wales. Fisk was knighted in 1937. He died in Sydney in 1965

When Amalgamated Wireless (Australasia) Ltd—better known as AWA—was formed in 1913, Fisk became managing director. At his house at Wahroonga, Sydney, he had an experimental wireless station, which on 22 September 1918, with Marconi's cooperation, received the first direct wireless message from England. 'When I decided to make my first series of tests in an endeavour to reach Australia without the assistance of intermediate stations, I found my friend Fisk in readiness to bring to the experiment the wealth of knowledge and experience that he had accumulated,' said Marconi.

The historic first message was transmitted in Morse code. The sender was the Australian Prime Minister, Billy Hughes, who took the opportunity to make a spirited recruiting speech. It read: 'I have just returned from a visit to the battle-field where the glorious valour and dash of the Australian troops saved Amiens and forced back the legions of the enemy, filled with greater admiration than ever for these glorious men and more convinced than ever that it is the duty of their fellow-citizens to keep these magnificent battalions up to their full strength.'

First public broadcast

The first public demonstration of broadcasting in Australia took place on 13 August 1919, when Ernest Fisk followed an address to the Royal Society of New South Wales with an amplified recording of the National Anthem, transmitted from his office a few blocks away.

A more impressive demonstration, however, was given by Fisk on 13 October 1920 to an audience of politicians and privileged visitors who packed the spacious Queen's Hall in Melbourne's Parliament House.

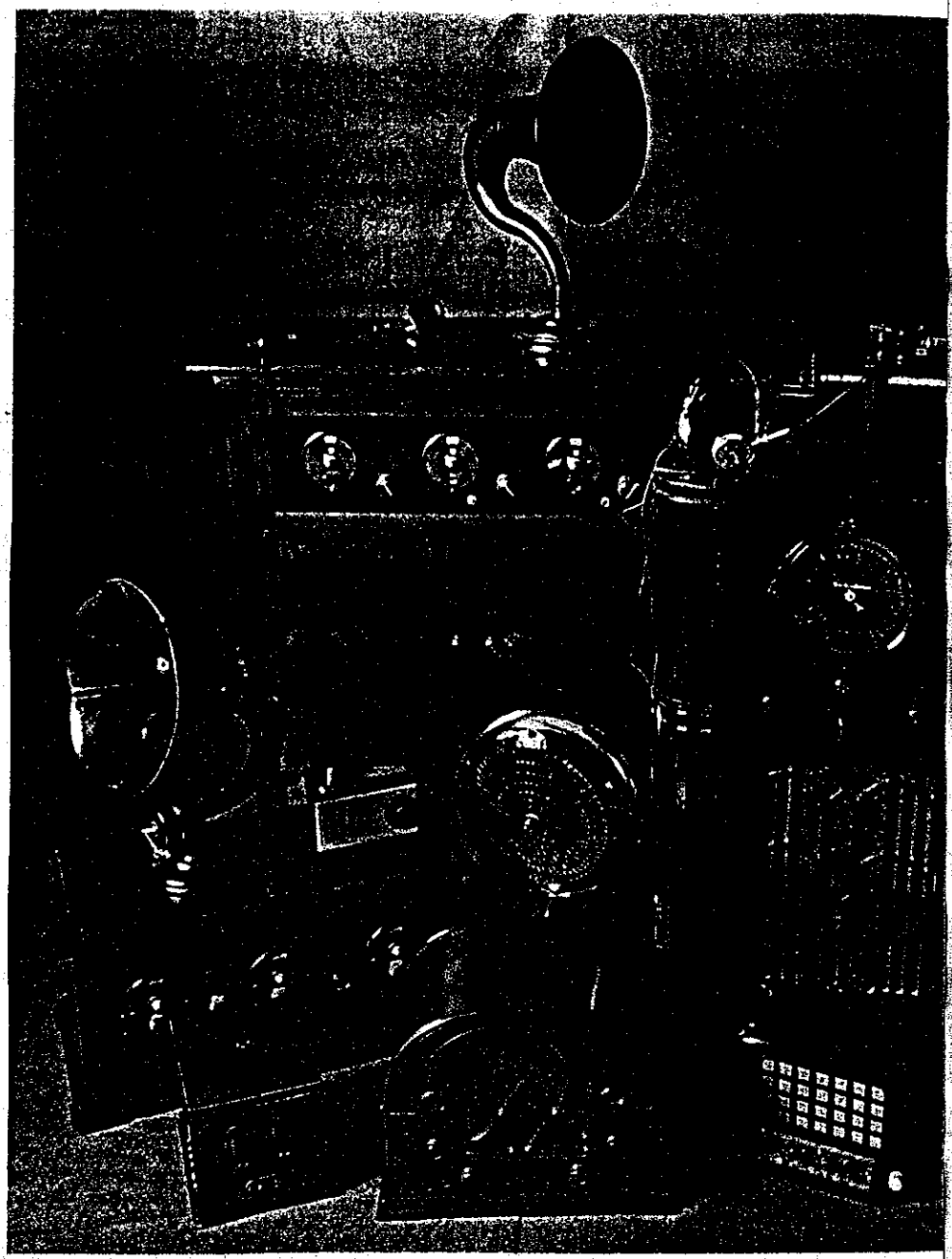
'Precisely as the last stroke of seven echoed through the great Hall, the vestibule and corridors of the House reverberated with the orchestral strains of *Rule Britannia*,' wrote an awed reporter in the periodical *Sea, Land and Air*. The music came from a gramophone installed in a house at Middle Brighton, 19 kilometres away, and the transmission was so faithful that 'even the gentle grating of the steel needle against the smooth surface of the record' could be heard.

The reporter went on to explain how the transmission was made, from a 'few aerial wires suspended from a mast' in the Middle Brighton garden. 'With these aerial wires as a starting point, so to speak, of their flight, the silent, invisible ether waves, carrying the sound waves on their crests and troughs—precipitated themselves into space at a velocity of 669,600,000 miles an hour (1.078×10^9 km/h) . . . Instantaneously they were caught by a similar set of aerials erected above Parliament House, and connected with a highly sensitive and accurate, yet robust and simple, apparatus in the Queen's Hall.'

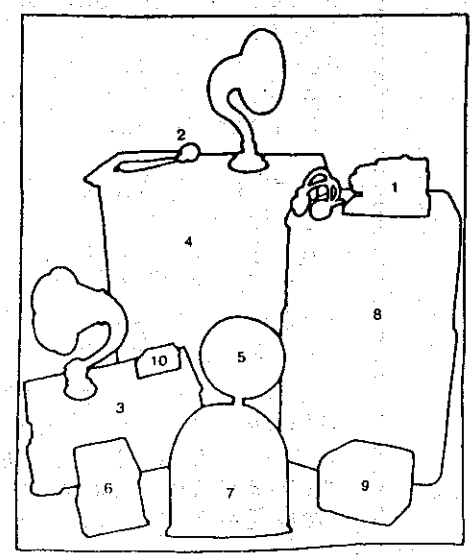
After some more instrumental pieces, the astonished audience heard 'an actual reproduction of a human voice' singing *Advance Australia Fair*. The first singer in Australia to perform to an invisible audience was Miss L. Walker, who had recently been awarded a Melba scholarship. Only a few months before, Melba herself had made Britain's first broadcast, from the Marconi works.

Fisk told the audience that the object of the demonstration was to show that wireless telephony was real and could play an important part in developing Australia. 'With his own wireless equipment, which is quite as simple to use and maintain as a motor car or machine-shearing apparatus, the man who produces our primary wealth will have a ready means of communicating with his neighbours and with his nearest town,' Fisk said. 'He will be able to transact his business, improve his social life, call for medical assistance and do many other things which to-day are impracticable. He will also be able to receive daily news of the world from the capital cities, and even musical entertainments . . .'

Fisk said that a wireless telephone service between Tasmania and the mainland, or between Australia and New Zealand, was quite a practicable proposition, and that 'within a few years we shall listen to the human voice carried by wireless waves from the United Kingdom'. Less than four years later, his prophecy was fulfilled. On 3 June 1924, Ernest Fisk's voice was transmitted by short-wave wireless from England to Australia.



The oldest radio in this collection, a crystal set, dates from shortly after the beginning of broadcasting in Australia. A crystal set was tuned by moving a tiny piece of wire called a cat's whisker about the surface of a crystal of galena in search of a sensitive spot that detected the signal. Earphones were always used with crystal sets, which were popular until the early 1930s. They required very long aerials, as did most receivers in those days. The paraphernalia over houses in the early days of radio was often very elaborate, while indoors, especially in the 1920s, the sets were dominated by large horn-shaped loudspeakers. The batteries that operated the sets were also large—about the size of a modern car battery—and were usually stored in a cupboard under the set



1 Crystal set, 1924
2 Lady's earphone for crystal set
3 Radiair five-valve set, 1925-26
4 Five-valve radio with horn speaker, 1926
5 Loudspeaker for radio, 1927
6 Telefunken radio, 1928-29
7 Atwater-Kent six-valve set, 1932-33
8 Westinghouse radio, 1937
9 'Fisk' Radiola, 1946
10 Japanese portable valve radio

SOME HISTORY AND FACTS ABOUT THE CALENDAR

The calendar as we know it has evolved from a Roman calendar established by Romulus. Consisting of a year of 304 days divided into 10 months, commencing with March. This was modified by Numa who added 2 extra months, January and February. Making the year consist of 12 months of 30 and 29 days, alternatley plus 1 extra day and thus a year of 355 days. This calendar required the use of an Intercalary month of 22 or 23 days in alternate years and in the year 46 BC Julius Ceasar asked the help of the Egyptian astronomer Sosigenes as he had found that the calendar had fallen into some confusion. This led to the adoption of the Julian calendar in 45 BC (in fact the year 46 BC was made to consist of 445 days to adjust for earlier faults and is known as "The Year of Confusion".

In the Christian system the years are distinguished by numbers before or after the Incarnation. The period being denoted by the letters BC (BEFORE CHRIST) and AD (ANNO DOMINI). The starting point being the Jewish calendar year 3761 AM (ANNUS MUNDI) and the 753rd year from the foundation of Rome. This system was said to have been introduced into England by St Augustine about AD 596 but was not in general use for some time and was ordered to be used by the bishops at the Council of Chelsea in AD 816.

In the Julian calendar all centennial years were leap years (ie: the years AD 1200, 1300, 1400, etc) and for this reason towards the end of the 16th century there was found to be a difference of 10 days between the Tropical and calendar years. This was corrected in 1582 when Pope Gregory ordained that October 5th should become October 15th, thus making the 10 day correction, and that only every fourth centennial year should be a Leap year. This is known as the Gregorian calendar and is the one which we now use. It was adopted by Italy, France and Portugal in 1582 and other countries made the correction at various dates up to as late as 1923. The change from the Julian to the Gregorian calendar did not take place in Great Britian and her dominions until 1752, when the correction was made by the ommission of eleven days, Wednesday September 2nd being immediately followed by Thursday September 14th.

The Julian and Gregorian calendars are also sometimes referred to as the Old Style and New Style calendars, it is interesting to note that these terms originally applied to the date of the beginning of the year (NEW YEARS DAY). In the Old Style this was on the 25th March and was changed to the 1st January (New Style) in England at the time of changing from the Julian to the Gregorian calendar in 1752. New Years Day was changed to January 1st in Scotland in 1600.

THE EQUINOCTIAL OR TROPICAL YEAR is the time that the Earth takes to revolve round the Sun from one Spring Equinox to another. This is approximately 364.24219 mean solar days or 365 days 5 hours 48 minutes and 45.216 seconds. The Equinox being the point where the Sun crossess the Equator, making day and night equal.

THE CALENDAR YEAR is 365 days except if the year number is divisible by 4 evenly, this being Leap Year and consists of 366 days. The last year of a century is not a Leap Year unless its number is divisible by 400 (ie: the years 1800 and 1900 were not Leap Years but the year 2000 is).

Items for sale
##############
For enquires and/or purchase please contact
VK2TEA, Randolph Pax, Hm 280427

1)	Large screen B/W TV in excellent working order	$18
2)	Color TV with schematics, not working	$15
3)	MTR19 2m rig with Xtals for 6 channels	$50
4)	MTR25 2m rig with Xtals for 1 channel (40W output)	$40
5)	Radiogram (portable)	$15
6)	Assorted magazines approx 25 electronic and 30 scien.	$10
7)	Heater 2 bar , 1kW	$10
8)	Grease gun (never used)	$ 9
9)	Datsun 180B Workshop manual (uncondensed version)	$15
10)	Datsun 1600 Workshop manual (scientific version)	$ 5
11)	3 ring folders (lots) 10 for $5 or 1 for $1	<<<<
12)	Car ramps (hardly used)	$20
13)	240/115V transformer and 115V motor driven variac	$10
14)	various assorted books	cheap
15)	Quality telefunken TLX1 professional speakers	$250
16)	Indoor clothes drying stand	$ 3
17)	valve tester/multimeter (working)	$15
18)	Grundig reel to reel tape recorder	$15
19)	Wall mounting shelving brackets (lots)	$15
20)	tea serving tray (wood)	$ 5
21)	coffee table	$10
22)	coffee table	$10
23)	kitchen table	$15

all goods in usable condition unless otherwise stated

A sacriligious re-examination of current wave propagation theory and proposal of a new, more comprehensive and logical alternative. Noted Canadian contester VE3BMV dares to challenge traditional thinking. Don't be intimidated by the title; this is an emminently readable, fascinating, and thoroughly thought-provoking article.

Electromagnetic Wave Propagation By Conduction

An Innovative Theory Based on Fiber Optic Analogy

BY YURI BLANAROVICH,* VE3BMV

Quite often new advances in technology and measuring equipment, given the right opportunity and timing, can produce some surprising results. In my case it was the opportunity to advance from wire and vertical antennas into rotatable antennas. Being interested in the mechanics of radio wave propagation, observing the various modes of propagation and trying to put two and two together, I was not always satisfied with available explanations in the literature. The matter was aggravated when I started to play with high performance antennas: the Razor Beam of my own design. The first version of Razor consisted of 3 Quad and 2 Yagi elements. The next version—on a 60 foot boom—consisted of 7 elements: Yagi reflector, Quad reflector, two Quad driven Log cell elements, Quad director, Yagi director and Yagi director. Two stacked antennas were used on the 15 meter band, the top being at 106 feet and the bottom at 51 feet or alternately at 37 feet above ground. The antennas exhibit a very clean and sharp pattern with back and side lobes being down about 50 dB from the main lobe. The antennas were designed experimentally on 144 MHz models. As far as I was able to tell, those antennas produced maximum obtainable gain per given boom length with excellent front-to-side and front-to-back lobes. (More information on those antennas will be given in future articles.)

Being a dedicated contester, the real test of the antennas came in the contest fire. The excellent *CQ* contests, presented exceptional opportunities to observe ionospheric propagation. With the—Razor Beams, a telescope instead of field glasses. A number of things could be observed that normally would be unnoticed when using "ordinary" antennas.*

The *CQ* contests allowed me to observe a number of anomalies and exceptions to present propagation theories by virtue of the great amateur population on the air at the same time all over the world. At least 5000 stations were active on the 15 m. band.

The stacked antenna system allowed me to observe various angles of radio wave propagation and revealed some interesting facts. The deeper I got into my observations, the more I became convinced that the present theory of electromagnetic wave propagation telling us of signals bouncing between the ionosphere and the earth is not all consistent and perhaps not valid. More thinking and sorting out of ideas led some interesting conclusions that I would like to present here. It is my hope that this article will stir up quite a bit of controversy and discussion, and that it will contribute to the clarification of the matter. I believe that we are faced with another great opportunity for Amateur Radio to demonstrate it's ability to contribute to the science of radio communications.

Presented here are observations that I was able to collect in the limited time available (it *is*, after all, only a hobby). Some of the findings are summarized here. More work must be done to collect more accurate supportive evidence. In future articles I would like to elaborate more on some aspects of the subject with perhaps wider participation by other Amateur Radio operators world-wide.

Reflective Theory

The present radio wave propagation theory is based on the assumption that radio waves are propagated by reflections from a mirror-like ionosphere, returning to the earth's surface, bouncing off it back to the ionosphere and so on. Let's have a good look at this theory and where and how it started, and how valid it is.

Lets call the present propagation theory "reflective", so we can refer to it easily.

Marconi, in 1901, made his first DX contact across the Atlantic accomplishing something that his theoretical friends considered impossible

* *Box 292, Don Mills, Ontario, M3C, 2S2, Canada.*

*They also helped to achieve excellent results from relatively ordinary country—VE—and produced two world records in the *CQ* WPX SSB and CW contests, even with the operator being relatively out of shape!

REPEATER REPORT GRAEME VK2CAG

There is not much to report on repeaters for a change this month. The only significant thing to report is thet 6850 was on 20 second timeout for 2 days around 13/9/85 because the ident tone was a bit low, (second tone up from the lowest). The repeater had been in almost continuous use in the days prior to this, and there had been a noticeable lack of wind about this period, with overcast days preventing the sun from giving useful input via the solar panel.

However, recovery was very quick when the wind came, and in spite of heavy useage the ident tone has been on the middle tone for most of the time, occasionally going up to no. 4. This was the first time since the end of last summer that there has been even any hint of energy shortage.

With the onset of the summer season again, lets hope that all who use this repeater remember the energy problem we faced last summer, and benefit from that experience by helping to educate those who do not know the energy situation at Mt. Murray.

If you are not sure what I am talking about, then please refer to past copies of the 'Propagator' where the energy situation has been discussed in detail.

One thing that I would like to mention is that there has been some interference heard at times on our repeaters. Some of this interference is caused by paging systems, some by spurious emissions originating from commercial 2 - way radio services, and some from our own fellow amateurs. In the cases of persistant interference in the past, where it has been reported to the authorities, the interference has stopped in a very short time after it being reported. This is the result of prompt attention given by the department in genuine cases where sufficient information has been given to help track down the offender.

One cause of interference by our own fellow amateurs is the practice of using a frequency only 25kHz away from a repeater input frequency for tuning up or to use as a simplex channel. Many may not know that by transmitting 25kHz up or down from a repeater input can cause that repeater to trigger and produce unintelligible signals or just noise. Any receiver (and that includes a repeater's receiver) will hear a signal on an adjacent channel if that signal is strong enough. In CB jargon it is known as 'bleed-over'.

Here is an example: Channel 6850 at Mt. Murray has a selectivity 50db down at 20kHz, and 70db down at 25kHz. The mute on the repeater' receiver opens at 0.2µV, so this means that a signal which is 25kHz off the input channel and which produces a signal strength equivalent to 70db above 0.2µV at the receiver will open the repeater and cause noise to be heard from the repeater. This signal strength required works out to be 200µV. This level could reasonably be expected from a transmitter located at line of site to the repeater such as at Shellharbour or Kiama.

So please, when selecting a channel to transmit on, check that it is more than 25kHz away from a repeater input, otherwise you may be unknowingly annoying someone who is listening to or using that repeater.

THE ILLAWARRA AMATEUR RADIO SOCIETY

P.O. Box 1838, Wollongong, 2500.

Meetings: Second Tuesday of every month except January at 7:30 pm in the S.E.S. Headquarters, Montague Street, North Wollongong.

Repeaters:

VK2RAW-6850	VHF	Mt Murray
VK2RUW-8225	UHF	Hill 60, Port Kembla
VK2RIL-7275	VHF	Sublime Point
VK2RIL-8725	UHF	Sublime Point

Broadcasts: On Sunday evening prior to the club meeting - 7:00 pm RTTY, 7:15 pm voice. Transmitted on 7275 VHF and by relay to 3.562 MHz. Callbacks after voice broadcast.

W.I.A. Relay: On 6850 at 11:00 am and 7:30 pm each Sunday.

Club Nets: 3.562 MHz SSB on Sunday at 8:00 pm and slow morse net on 28.440 MHz on Tuesday at 8:00 pm.

Newsletter: "The Propagator", published monthly to reach financial members in the week preceeding the club meeting. All articles, adds, etc to the editor by the 3rd Tuesday each month.

Membership: The Secretary, I.A.R.S., P.O. Box 1838, Wollongong, 2500. Full membership is $10 per annum; students and pensioner concessional members $5 per annum.

Awards: The award of the Illawarra Amateur Radio Society is the Lawrence Hargrave Award. VK stations require 10 contacts with I.A.R.S. members. Overseas stations require 5 contacts with I.A.R.S. members. Contact with VK2AMW is sufficient for the award. Band details, date, frequency, station worked and $2 or 4 I.R.C.'s to The Award Manager, I.A.R.S., P.O. Box 1838, Wollongong, 2500. No QSL cards required.

Store: The club store operates at each club meeting.

Committee: President-Keith Curle VK2OB, 24 Beach Dve, Woonona.
Vice President-Bill Chadburn VK2DYU, 45 Beltana Ave,Dapto.
Secretary-Jim Hayes VK2EJH, 1 Kathleen Cres, Woonona.
Treasurer-Andrew McEwan VK2XGC, 7 Nioka Ave, Keiraville.
Auditor-Geoff Cuthbert VK2ZHU, 1 Nioka Ave, Keiraville.

General Committee: Ian Callcott VK2EXN, Wojciech Tomczyk VK2OE, Martin Hutchings VK2BMH, Gerhard Mueller VK2XGA,Dave Routledge VK2NGS, Paul Suters VK2KPS.

Repeater Chairman: Graeme Dowse VK2CAG

Repeater Committee: Bill Jut VK2KWJ, Rob McKnight VK2MT, Morry Van De Vorstenbosch VK2EMV, Peter Woods VK2JAM, Ian Callcott VK2EXN, Mike Keech VK2DFK, Dave Colless VK2EZY.

EME Co-ordinator: Lyle Patison VK2ALU

Store: Ray Ball VK2PHD/XCC

Publicity Officer: Dave Myers VK2DFL

Broadcast Officer: Paul Suters VK2KPS

Propagator Editors: Paul Suters VK2KPS, Jim Hayes VK2EJH, Gerhard Mueller VK2XGA.

Life Members: Graeme Dowse VK2CAG,Keith Curle VK2OB,Lyle Patison VK2ALU.