AWA Newsletter

 # 106

November/December 2014

A Member of the SARL

Antique Wireless Association of Southern Africa

Inside this issue:

AWA Committee:

* President—Ted ZS6TED
* Vice Pesident—Jacques ZS6JPS
* Technical Advisor—Rad ZS6RAD
* Secretary/PRO—Andy ZS6ADY
* Western Cape—John ZS1WJ
* KZN—Don ZS5DR

Reflections:

It's the silly season once again, where everyone goes moggy on buying loads of presents for all and sundry and going on holiday and doing things that we only do once a year, like pigging out on exorbitant food and wine and lying in the sun until we turn as pink as lobsters.

Then when we get home again, we have to diet, pull the purse strings in for at least 3 months and walk like John Wayne for 2 weeks because of the sunburn.

Its not that we don't know this will happen, because we did the same thing last year, and the year before, but man, are we suckers for punishment.

It's a Southern Hemisphere thing, because this is time for our summer holiday.

Ah well, be that as it may, we do enjoy ourselves and sometimes even end up with new goodies ourselves.

As a good friend of mind says "whatever it is that blows your hair back", do enjoy this time of year.

It is a time when we can see those we haven't seen for a long time, be they family or friends, do things we can only dream about during the year and of course spend more time on radio catching up with those we haven't heard for a long time.

It's a time to renew friendships and a time to develop new ones. A time to blow the cobwebs out of your transmitters and warm the valves up to a nice cherry glow. It's a time to reflect on the past year and set ourselves new goals for the upcoming year.

From all of the committee to all of you who have supported us this past year, a great big thank you.

This will be our last Newsletter for the year and when we come back in January, maybe with a slightly changed format, it will be back to the wheel at full speed.

Happy Holidays to you all and whatever it is you do, Happy Hanukah, Merry Xmas or just chill out baby, do have a wonderful festive season and we look forward to invading your space in the New Year and giving you another 12 issues of this Newsletter.

Be safe if you are going away and drive carefully on our roads.

Best 73

DE Andy ZS6ADY

WIKIPEDIA

Optical Telegraphs

The first telegraphs came in the form of optical telegraph including the use of smoke signals, beacons or reflected light, which have existed since ancient times. Early proposals for an optical telegraph system were made to the Royal Society by Robert Hooke in 1684 and were first implemented on an experimental level by Sir Richard Lovell Edgeworth in 1767.

The first successful semaphore network was invented by Claude Chappe and operated in France from 1792 through 1846.

During 1790–1795, at the height of the French Revolution, France needed a swift and reliable communication system to thwart the war efforts of its enemies. France was surrounded by the forces of Britain, the Netherlands, Prussia, Austria, and Spain, the cities of Marseille and Lyon were in revolt, and the British Fleet held Toulon. In the summer of 1790, the Chappe brothers set about devising a system of communication that would allow the central government to receive intelligence and to transmit orders in the shortest possible time. On 2 March 1791 at 11am, they sent the message "si vous réussissez, vous serez bientôt couverts de gloire" (If you succeed, you will soon bask in glory) between Brulon and Parce, a distance of 16 kilometres (9.9 mi). The first means used a combination of black and white panels, clocks, telescopes, and codebooks to send their message.

The Chappes carried out experiments during the next two years, and on two occasions their apparatus at Place de l'Étoile, Paris was destroyed by mobs who thought they were communicating with royalist forces. However in the summer of 1792 Claude was appointed *Ingénieur-Télégraphiste* and charged with establishing a line of stations between Paris and Lille, a distance of 230 kilometres (about 143 miles). It was used to carry dispatches for the war between France and Austria. In 1794, it brought news of a French capture of Condé-sur-l'Escaut from the Austrians less than an hour after it occurred.[9]

It helped Napoleon enough to be widely imitated in Europe and the U.S. In the Peninsular War (1807–1814), several similar telegraphs had been used in the Lines of Torres Vedras, by the Anglo-Portuguese army. The Prussian system was put into effect in the 1830s. The last commercial semaphore link ceased operation in Sweden in 1880.

Semaphores were able to convey information more precisely than smoke signals and beacons and consumed no fuel. Messages could be sent at much greater speed than post riders and could serve entire regions. However, like beacons, smoke and reflected light signals they were highly dependent on good weather and daylight to work (practical electrical lighting was not available until about 1880). They required operators and towers every 30 km (20 mi), and could accommodate only about two words per minute. This was useful to governments, but too expensive for most commercial uses other than commodity price information. Electric telegraphs were to reduce the cost of sending a message thirtyfold compared to semaphores, and could be used non-stop, 24 hours per day, independent of the weather or daylight.

CW Activity:

This last quarter has been very slow for me on CW and I just really want to thank the guys who have kept the CW net going.

To Barry ZS6AJY who has always been there to support the group and to those who regularly contribute an hour of their precious time on a Saturday afternoon to keep the net going, I salute you gentlemen.

Its no easy task to keep a net going for so long and we know in the history of our SA Amateur Radio Fraternity, that nets come and go all the time.

We have been so fortunate to have a few dedicated CW operators who are there to fly the flag and keep our AWA CW net going.

I often read on the SARL forum of much CW is happening around the globe. How full the DX bands are of CW, which I can attest to myself, having done a lot of listening around on the bands.

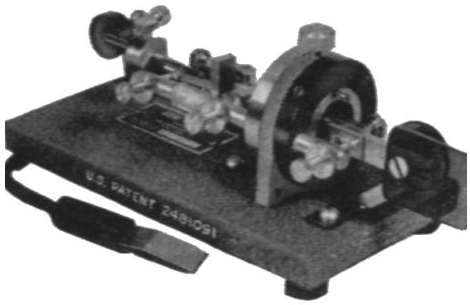
There are still many CW operators alive and well and frequenting the bands from ZS. One just never hears them on local bands at all, because there are many out there with the opinion that CW has died its death on the local bands.

Maybe if we could get them to change their minds, our bands would have a lot more activity on CW, which would attract more to the band segment for CW, which would attract more to either start doing CW again or to join in with the fun being held operating CW.

Its probably just a pipe dream, but it would certainly do a lot for the mode and the bands.

In the New Year, we hope to bring you a more filled CW column, that will be more informative and centered on CW, giving more up to date information about what's happening in the world of CW.

CUAGN



Dowkey Vibrator

SSB activity:

How the bands change during the summer time. From nice quiet frequencies that seem to work well during the winter and are fairly stable, to the unstable QRN filled frequencies during summer as the storms across the country certainly take their toll.

Yet there are those persistent radio nuts who will always be on frequency somewhere or another, either calling CQ or having regular skeds with others. I of course include myself in this category, so no flame suit necessary.

I often ask myself, what it is that drives us to often sit listening to snap crackles and pops while trying to coax someone, anyone to come back to our call and have a chat with us.

Whatever it may be, I know that I am not the only one, so there is more often than not, bound to be someone who will hear me and come back.

The higher we go in frequency, the wider the net goes and the more people there are that will hear us calling. My late brother, who was a hardened drinker, would often say "somewhere in the world it must be 09:00 and there's a pub that's open ", which gave him a good excuse to crack an ale.

Well the same thing applies to ham radio, somewhere in the world its time for someone to be on their radio calling CQ and looking for someone to chat to.

The bands should be quite active during the summer break in the Southern Hemisphere. So keep a look out on the local frequencies as well as the DX bands. You could be pleasantly surprised.

AM:

Well, if you thought the SSB frequencies were bad, then you should keep well away from AM. Double sideband, double the noise.

The majority of the AM transmissions from the AWA include musical testing. I see there are a lot of questions being asked on the SARL forum around the validity of doing musical transmissions on the amateur bands.

Part of the questioning goes around the whole issue of copyright, with a reference to Wikipedia given the timeline of copyright validity.

How this applies to music, I don't know because music copyrights are normally taken out by the company releasing the music.

So if we take the timeline in to consideration, most of the music companies still exist, so copyright still exists in the majority of music played today.

What are the rules around copyright infringement ? I know there are many loopholes in copyright, for instance if you change the wording in a written document, then you are not infringing copyright. Many musicians have bypassed the copyright laws by changing the tune slightly, playing in a different key to the original, changing the words etc so as to be able to sing a song that was made popular by someone else and not get had up for copyright infringement.

Music that is transmitted in public places or on radio stations for public listening has to be licensed, how does it affect us in the amateur bands ?

A good question for thought.

Homebrew AM

The Van der Bijl legacy
by Richard ZS6TF AWA Historian

Hendrik van der Bijl is best known to South Africans as the industrialist who founded Iscor and Escom and gave his name to the town of Vanderbijlpark.

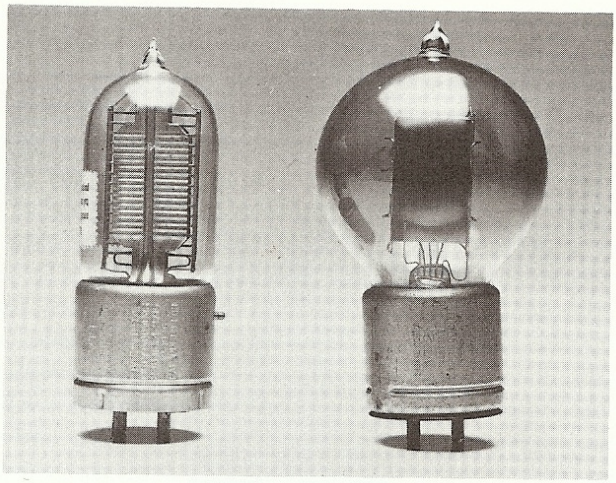
A lesser known aspect of his life, but of great importance to radio amateurs, is the scientific work and practical development that he conducted in the field of electronics and with the thermionic valve in particular.

Born in Pretoria in 1887 he completed his studies in South Africa at Victoria College Stellenbosch and in 1909 was enrolled at the University of Leipsig to work under 3 renowned physics professors, including Professor Jaffe who later designed Russia's first atomic bomb. He quickly developed a reputation and in the following year he transferred to the famous Technische Hochschule University in Dresden. He took his doctorate in 3 years and during his subsequent appointment to a lectureship in 1913, he conducted research into the photo electric effect. He used a metallic wire grid to measure the speed of the electrons in a vacuum dislodged by impinging ultra violet light and in the process unwittingly re-invented the basis of Lee de Forest's Audion (the first triode valve) with the difference that ultra violet light prompted the electron emission whereas de Forest had used an incandescent filament. In 1913 the Audion was still a curiosity, very fragile, and imperfectly understood. De Forest sold his patents to the American Telephone and Telegraph company (AT&T) in that year just as Van der Bijl published the results of his work in his famous paper accepted by the Deutsche Physikaliche Gesellschaft. This conveyed to the scientific world that Van der Bijl had a deep understanding of the theory and mathematics of electron emission phenomena. It caught the attention of Dr Robert Millikan, the discoverer of cosmic rays, at the University of Chicago. He invited Van der Bijl to join his staff at the Ryerson laboratory and in particular, he was recommended to AT&T by Millikan to head up the effort sponsored by them to improve on and develop the Audion into robust and reliable practical devices that could be used for extending the range of landline telephone circuits through amplification, and generate "continuous waves for telephony without wires". Van der Bijl was truly the right man in the right place at the right time to do this. He had personal dialogue with the great radio inventors of the time such as Heising, Fleming, Colpitts and Armstrong, and knew and understood the implications of and underlying principles of their work. In 1914 with WW1 looming he made a key discovery namely that due to the non-linear current-voltage characteristic curve of the vacuum tube it could be used to impress speech frequencies on high frequency continuous waves, now known as modulation. By 1915 the first American transcontinental telephone line from New York to San Franciso was operational using valves incorporating his improvements in the repeaters. Later in the same year under stringent secrecy, two way voice transmissions between Arlington Virginia and the Eiffel tower in Paris some 4800km, and shortly afterwards to

Honolulu 8000km were achieved using a vast bank of paralleled 25 W power triode RF amplifier valves configured by Van der Bijl and using a modulator based on his principle.

Valve design information was exchanged with the French authorities to help with the war effort and they produced the TM valve (Télégraphie Militaire) which was then copied by the British to become the R type valve. Van der Bijl recorded many other applications achievements such as voice scrambling by sideband inversion in 1917 but to the author the simpler things are more important.

The first production valve manufactured by Western Electric was the type M for telephone repeater duty. It had a massive cast brass base and planar electrodes with a useful life of 400 hours. Theoretical studies by Van der Bijl indicated that this life could be improved considerably by increasing the electron-emitting area of the filament enabling lower temperature operation. The first valve incorporating his improvements, the type L had a useful life of 4500 hours, eleven times that of the type M and 100 times better than the Audion with which he started. It fell to him in 1916 to write the first ever valve specifications for the US army signal corps. The result was the VT1 receiving tube and the VT2 transmitting tube. The valve had a pressed brass base, the envelope had a strong glass foot enabling the brass to be formed around it for mechanical stability, and the electrodes were nested, with a central filament, a format to predominate in valve topography for the next 100 years. The short connection pins engaged sprung contacts in the socket as the valve was rotated to engage the bayonet fixing, located and latched by the pin visible on the side of the base of the VT1 illustrated below. This was adopted as a standard known as UV base which persisted until 1930. The VT1 and VT2 were produced in great numbers and after the war they found their way onto the general market by way of signal corps surplus sales to the delight of thousands of amateur radio enthusiasts.



Western Electric VT1 and VT2.

In 1920 Van der Bijl published a textbook entitled ”The thermionic vacuum tube”. This for the first time was a full treatise on valves at a university graduate level and endured as a standard textbook for this purpose for 30 years. The fundamental equation in the book for the current transfer characteristic of a triode became known as the “Van der Bijl” equation. (The annotation is that of George D Walker, a famous radio amateur)

(24). Hence, if the potential of the cathode be maintained constant, the fundamental expression for the current in a three-electrode tube is

$$* \quad I = f\left(\frac{E_p}{\mu} + E_g + \epsilon\right), \quad . \quad . \quad . \quad . \quad . \quad . \quad (26)$$

where E_p and E_g are the potentials of the anode and grid with respect to that of the cathode. We shall have occasion to make extensive use of this relationship in dealing with the three-electrode thermionic tube.

It will be shown later that a device like that shown in Fig. 13 and whose current-voltage characteristic can be expressed by the function (26) can be used as amplifier, radio detector, oscillation generator, etc.

A device which depends for its current on the emission of electrons by photo-electric means is not as suitable for these purposes as thermionic devices, because photo-electric currents are generally very small and the emission of electrons by heat is much more practical than emission under the influence of light.

* This is called the v.d. Bijl Equation

Furthermore, the illustrations of the valves on pages 181 and 240 of his book are none other than the VT1 and VT2 valves made to his design.

240 THERMIONIC VACUUM TUBE

in Fig. 125. The plate resistance is shown here and in the following curves as a function of the plate potential, the grid potential being zero. To obtain the plate resistance for any grid potential other than zero, all that is necessary is to add μE_g to the plate potential and read the resistance from the curve at the value of plate potential equal to the value so obtained. Thus, since μ is about 5.6, the plate resistance at a plate potential $E_p = 160$, and grid potential $E_g = -9$ is that corresponding to an abscissa of $160 - 9 \times 5.6 = 100$ volts, namely, 5000 ohms. The minimum amplification required of this tube is 25 miles of standard cable, which corresponds to a power amplification of 230. (See table on page 219.) The logarithmic plot of this tube's characteristic is shown in Fig. 126. The slope of the line is close to 2, indicating a parabolic relation between current and voltage over the operating range.

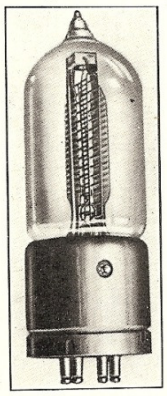


FIG. 127.—Western Electric Receiving Tube. Length: 10 cms.

Fig. 127 shows a type of tube, commonly known as the *VT*–1, that is suitable for use either as detector or amplifier and is designed to operate on a plate voltage of about 30 volts when delivering power directly to a telephone receiver. Its operating filament current and voltage are 1.1 amperes and 2.5 volts, and its amplification constant is 6. Its other characteristics

62. Voltage Amplification. Consider first the case in which the tube is used as a voltage amplifier. The voltage developed in the impedance Z_0 is $e_0 = i_p Z_0$, which according to equation (22) becomes:

$$e_0 = \frac{\mu e_g Z_0}{r_p + Z_0},$$

and the voltage amplification is therefore

$$\mu' = \frac{e_0}{e_g} = \frac{\mu Z_0}{r_p + Z_0}. \quad \ldots\ldots (26)$$

It must be noted that e_g is the a-c. potential difference actually established between filament and grid.

It will be seen that μ' increases as Z_0 is increased and asymptotically approaches the maximum value μ when Z_0 becomes infinitely large compared with r_p. The constant which depends on the structure of the tube and determines the stray field, is therefore simply the maximum voltage amplification obtainable from the tube. When a tube is to be used as a voltage amplifier it should therefore be designed to have as high a value of μ as possible. Fig. 89 shows a Western Electric voltage amplifier. The amplification constant μ of this tube is 40.

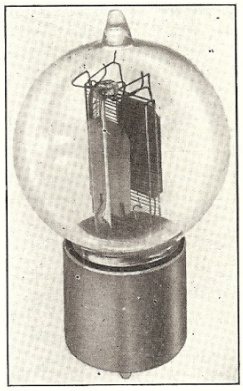


FIG. 89.

A voltage amplification of several hundred fold is not hard to obtain, it being simply necessary to design the tube accordingly, since μ is a struc-

When he returned to South Africa in 1920 he brought these with him and these same valves still exist today in the collection of the SAIEE museum. At this time his career took a turn away from research and development. His appointment to the position of technical adviser on industrial development to the department of mines set him on a path to become the greatest South African industrialist of note, chairman of Iscor, Eskom, and founder of many other key enterprises. His obituary when he died in 1948 records the qualities of Hendrik Johannes van der Bijl PhD. FRS. LLD. DSc. M AmIEE FIRE FRSSA as a visionary, planner, producer, and humanist, a rare combination in an individual.

To counter those people who persist in changing names, re-writing history, and debasing one of Van der Bijls legacies Eskom, radio amateurs and AWA members in particular should be proud of and thankful for his contribution to our radio heritage and need to ensure that this part of his story is not forgotten in the future.

RESULTS OF THE VALVE QSO PARTY—OCT 2014

The Valve QSO party held over the 2nd weekend in October, once again attracted a lot of activity on AM and SSB. Unfortunately, not many logs were sent in. But then, we do call it a fun activity and not really a contest, so if we can attract activity on the bands, then we have achieved what we set out to do.

Highest scores AM:
Richard ZS6TF = 90 points
Hennie ZS6HAV = 32 POINTS
Jacques ZS6JPS = 26 points

Highest scores SSB:
Henry ZS6MC = 108 points
Theunis ZS2EC = 29 points

I don't know if it is safe to put certificates in the mail yet, but if you are one of the above and would like me to e-mail your certificate and you can print it out yourself, then please let Andy ZS6ADY know.

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Get your backdated issues at
http://awasa.org.za

Antique Wireless Association of Southern Africa

Mission Statement

Our aim is to facilitate, generate and maintain an interest in the location, acquisition, repair and use of yesterdays radio's and associated equipment. To encourage all like minded amateurs to do the same thus ensuring the maintenance and preservation of our amateur heritage.

Membership of this group is free and by association. Join by logging in to our website: awasa.org.za

Notices:

Net Times and Frequencies:

Saturday 06:00—AM Net—3615
Saturday 07:15—Western Cape SSB Net— 7140
Saturday 08:30— National SSB Net— 7140; relayed on 14140
Saturday 14:00— CW Net—7020
Wednesday 19:00— AM Net—3615, band conditions permitting.

For Disposal:
Barry ZS2H has let me know he has the following items for disposal.
TS510 with power supply and built in speaker. Fully restored and operational condition.
Eddystone EA12 receiver, fully restored.
Wanted: Heathkit DX150 series receiver.
Please contact Barry on 041 360 3052 or email him barglen29@gmail.com

Visit to Bloemendal Tx Station.
Jacques ZS6JPS will be arranging a visit/tour at the Bloemendal (now Meyerton) transmission station on January the 17th (Saturday). Any interested members can contact him so that he can relay the numbers, perhaps we should state a cut-off date (say Dec 19). Some have also expressed interest in visiting the Meyerton station in the morning and then Hartrao in the afternoon - not sure whether we should rather split it (Meyerton in Jan and Hartrao in Feb), but perhaps those interested in joining could comment whether they'd like to do both in one day or not. We can also look at renting a micro bus for transport.

Details of the Meyerton station is below, and a schedule of all their transmissions at this link: http://www.mwlist.org/sw.php?locationid=40000067 . *Meyerton Short Wave Broadcasting Relay station, operated by SENTECH in South Africa. Transmitter Power: 25kW, 100kW, 250kW, 500 kW. Used to transmit international programs for all of Africa by Channel Africa (from Johannesburg), BBC World Service, Radio France International, Voice of America, Deutsche Welle (Germany), Adventist World Radio, IBRA Radio (Sweden), NHK Radio Japan, and others. Also the domestic Afrikaans service Radio Sonder Grense is transmitted on shortwave frequencies from here.*
Coordinates: *26°35'34"S 28°8'24"E*
Contact Jacques ZS6JPS at jscholtzp@gmail.com