AWA Newsletter

#63

March 2011

A Member of the SARL

Antique Wireless Association of Southern Africa

Inside this issue:

AWA Committee:

* President—Don ZS5DR
* Technical Advisor—Rad ZS6RAD
* Net Controller—Willem ZS6ALL
* Secretary/PRO—Andy ZS6ADY

*Western Cape—John ZS1WJ

Reflections:

Isn't it wonderful ! The bands have finally come to life with some semblance of good communication being able to take place. 40m is probably the best I have heard it in a long time. Then you hear the "guru's" saying that it's not going to last long. We are now supposed to be half way through this sunspot cycle and have already reached the peak. What lies ahead, we do not know.

One thing I will say though, is during this period of low sunspots and poor communication I have still had as many, if not more contacts than any normal period of a cycle.

I must confess, I am really blessed with a QTH that has no signs of any QRM and even when conditions are poor, I have still been able to hear many stations with a Q5 readability. Often to my distress, many more than have been able to hear me.

This being the case, I believe there are many Amateurs out there who have deceived themselves by thinking that propagation has been so poor, they need to put all their radio's in mothballs and wait for things to improve.

Well I have news for them, things have improved, maybe just for a couple of days, but they have improved. So get out the radio's, connect them to the aerials, (those long wire thingies that go up on poles) and start calling "CQ". You may just be pleasantly surprised by the response you get.

The first response I got after putting my beam back up on the tower was from TJ3AY, Om Henry in Cameroon. What a pleasant surprise.

I've heard US stations on 15 and 20m, Africa stations, European stations and just because I was there.

How many times do we need to hear that same message on the SARL bulletins about calling CQ and seeing who's out there. It really is good advice, especially if you're considering selling off all your radio equipment. Go on, give it a bash. You may just be pleasantly surprised.

Best 73

De Andy ZS6ADY

Wikipedia—The Transistor

Physicist Julius Edgar Lilienfeld filed the first patent for a transistor in Canada in 1925, describing a device similar to a Field Effect Transistor or "FET". However, Lilienfeld did not publish any research articles about his devices, nor did his patent cite any examples of devices actually constructed. In 1934, German inventor Oskar Heil patented a similar device.

From 1942 Herbert Mataré experimented with so-called *duodiodes* while working on a detector for a Doppler RADAR system. The duodiodes built by him had two separate but very close metal contacts on the semiconductor substrate. He discovered effects that could not be explained by two independently operating diodes and thus formed the basic idea for the later point contact transistor.

In 1947, John Bardeen and Walter Brattain at AT&T's Bell Labs in the United States observed that when electrical contacts were applied to a crystal of germanium, the output power was larger than the input. Solid State Physics Group leader William Shockley saw the potential in this, and over the next few months worked to greatly expand the knowledge of semiconductors. The term *transistor* was coined by John R. Pierce. According to physicist/historian Robert Arns, legal papers from the Bell Labs patent show that William Shockley and Gerald Pearson had built operational versions from Lilienfeld's patents, yet they never referenced this work in any of their later research papers or historical articles.

The name *transistor* is a portmanteau of the term "transfer resistor".

The first silicon transistor was produced by Texas Instruments in 1954. This was the work of Gordon Teal, an expert in growing crystals of high purity, who had previously worked at Bell Labs. The first MOS transistor actually built was by Kahng and Atalla at Bell Labs in 1960.

CW Activity:

The AWA CW net has been quite well attended again for a change and the 40m band has been working really well.

I hear from Clive and Barrie the QRP net is still running well and conditions on 80m have also been good.

The World Wide DXCC CW contest was held a short while ago and boy were the bands busy. I have not heard so much CW in a long time.

Even 40m during the early morning hours was full of DX calling CQ for the contest. In fact one could hear them on the bands right up until about 08:30 on Saturday morning.

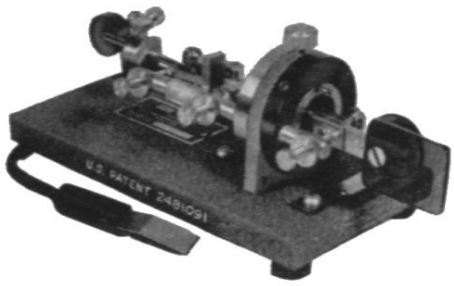
I have no idea how many were in the contest, but I'm sure it will not be long before the results are made known. I always am amazed by the scores that are chalked up by the top stations.

Granted, the majority of CW stations are from the US, but I know there are a few ardent, inspired CW operators here in SA who always enter the contest.

The local contest for the AWA, the CW Activity day, did not draw any where as many contestants and was actually very slow. Maybe a full 24 hour period for CW in SA is asking a bit much.

There were only 3 logs submitted for this activity period and my thanks to Pierre ZS6A, Eddie ZS6BNE and John ZS5JON for their logs. Pierre of course walked away with honours for the most contacts and even though Eddie and John submitted their logs as check logs, it is still greatly appreciated.

Well done Pierre, you are a true ambassador for CW.



There were, of course quite a few stations heard on the bands, and I am sure there could have been a few more logs submitted, but so be it. We do however say the idea behind the activity day is to encourage operation in CW.

DE ZS0AWA/CW …-.-

SSB Activity:

Well as we have already said so much about the bands working so well, there's no need to say it again here, but the bands have been good.

The SSB net continues to grow again on Saturday mornings, with record call in's taking place. We still have not managed to beat the 32 stations from one Saturday in 2008, but we're getting pretty close.

Willem's greatest pleasure is go "National" on a Saturday call in with at least one station from each division, and this has been easily achieved these last few weekends. The list seems to grow and grow with many new stations calling in.

This ultimately means the membership is growing each time as people are discovering what the AWA is about.

Every month I get at least 2 –3 more requests for the Newsletter to be mailed to additional people. Now our Mission Statement says, "Membership is by Association", so once you have associated yourself with us, we class you as a member.

Because there is no membership fee to be paid, we also can't strike you off the role if you are not paid up to date.

So remember, once you become a member of the AWA, you're there for life. Automatic Life Membership.

Of course, this means you will keep on receiving this newsletter probably until the day you go SK, and then still a few issues after that, just to make sure you don't miss out.

Collins 32S1 Tx

AM:

The AM net is really only pertinent to the AWA as it is really local conditions that apply and not any DX at all.

I must tell you, the Collins Collectors Association in the US have a Wednesday evening AM net on 3880, but I doubt we would ever hear anything from them. They mostly run 1Kw stations, and they have quite a big following.

This month we have particularly good conditions on Saturday mornings with the band opening around 05:45 and lovely quiet conditions. Reports are normally in the 5/9 plus area with some stations only using around 25 to 30w of modulated power.

There have been at least 6 –7 stations calling in on the AM net and this is really good as there seems to be a bit of growing interest in the AM net. Several stations are using more modern Transistor rigs, while the rest have all valve or at least valve finals.

A word of caution to those using the transistorised rigs, is to rather err on the side of caution with the output power and not to try pushing the rig too hard on Tx, as you could end up with a rather costly replacement of finals. Make sure to read the manual, and then read it again about operating on AM.

The quality of musical transmissions has improved greatly and once again I am reminded about what a privilege we have in SA being able to transmit music for test purposes. No other country has the opportunity to do this, as far as I am aware.

Just a reminder to those doing MF transmissions, your MF may not be more than 3 min long and there must be a break of at least 5min before your next MF is transmitted.

Collins 51J4

Why Ham Radio Endures in a World of Tweets –

David Rowan (Editor Wired Magazine)

Somehow it makes little sense that amateur "ham" radio continues to thrive in the age of Twitter, Facebook and iPhones. Yet the century-old communications technology — which demands such commitment that you must generally pass an exam to receive a license — currently attracts around 350,000 practitioners in Europe, and a further 700,000 in the United States, some 60 per cent more than 30 years ago.

What is it about a simple microphone, a transmitter-receiver and the seductive freedom of the open radio spectrum that's turned a low-tech anachronism into an enduring and deeply engaging global hobby?
For a start, there is that thrill in establishing a magical person-to-person long-distance radio conversation that no commodified internet communication can compete with. In a world of taken-for-granted torrents of e-mails, instant messages and Skype video-chats, there is a purity and a richness in the shared experience of exchanging "73s" during a live "QSO" with strangers on another continent.

Why, the very ham slang that defines the community — 73 translating as "best regards", and QSOs as two-way conversations — tells practitioners that they belong to a special, mutually curious and highly courteous club. And the fact that DXers (long-distance amateur operators) take the trouble to acknowledge received transmissions and conversations by sending their new contacts custom-designed postcards through the analog postal service … well, that is charm itself in a world where it's considered excessive to end a communication with anything more effusive than a "bestest".

You only need study a handful of these cards to understand, even today, the old-fashioned excitement of connecting with a stranger who might be many thousands of miles away. The postcards — known as QSL cards — can be as quirky and personality-filled as the senders themselves. At times humorous and characterful, at others terse and geographically factual, they have naturally inspired their own subculture that has spurred DXers to collect and display them much as they would colorful foreign postage stamps.

The cards invariably display as a minimum some basic factual information about the sender. This will generally include the radio operator's individual call sign, his (there are not too many "hers") location, and a few details about the signal detected. And just to show that the Twitter generation did not invent the linguistic contractions exemplified in text-message speak, QSL cards too rely on slang and abbreviations to pack information into a tight space.

So cards will display the "RST" — the received radio station's readability, signal and strength; perhaps details of the sender's "XMTR" (transmitter) and "ANT" (antenna); and occasionally a request to reciprocate, expressed as the shorthand "PSE QSL TNX" (please send an acknowledgement card, thanks) or the more chatty "hw abt a crd om?" (How about a card, old man?) Old man, by the way, is not a reference to the recipient's age — just as, on the rare occasions when the DXer is female, she is referred to as a "YL", a young lady, whatever her chronological age.

DXers have been exchanging QSL cards since at least 1916, when Edward Andrews of Philadelphia — call sign 3TQ — recorded the receipt of a card from 8VX of Buffalo, NY. Over the next decade, the hobby took off — so much so that, by 1928, Paul Segal (W9EEA) had formulated an "amateur's code" setting out six key qualities to which practitioners must adhere: "The radio amateur is considerate… loyal … progressive … friendly … balanced … [and] patriotic," Segal specified, always ready for service to country and community.

Since then, the hobby has captivated royalty and celebrities alike. Among the most celebrated DXers have been the late King Hussein of Jordan (call sign JY1), Queen Noor (JY1H) and Juan Carlos, King of Spain (EA0JC). Had you picked the right moment, you could have chatted to Morocco's King Hassan II (CN8MH), the former Sultan of Oman (A41AA) or Bhumiphol Adulayadej, King of Thailand (HS1A).

If monarchs have never appealed, you could instead have shot the breeze with Marlon Brando (FO5GJ), prime minister Rajiv Ghandi of India (VU2RG) or the CBS anchorman Walter Cronkite (KB2GSD) — not forgetting the singer Cliff Richard (W2JOF), Joe Walsh of The Eagles (WB6ACU) and genuinely beyond-this-world DXers such as Yuri Gagarin and Helen Sharman.

It's little wonder that collectors describe the buzz of receiving a new exotic foreign card as akin to that of philatelists discovering a rare commemorative stamp. That explains why the late Jerry Powell, a New Jersey ham between 1928 to 2000 (W2OJW), proudly displayed the 369 cards he had gathered from Okinawa to Papua.

Another obsessive collector, Thomas Roscoe of Brookfield, Ohio (K8CX), has created an awe-inspiring QSL museum where he displays his trophies from Afghanistan to Zimbabwe. (You can see his individual cards at hamgallery.com). Take a journey with

Roscoe to Wallis & Futuna Island and Western Kiribati, to Kyrgyzstan and Kerguelen Island; visit "states" whose international status is somewhat contentious, such as the Republic of Ichkeria and the Principality of Sealand; celebrate one-off events such as Operation Desert Storm in Saudi Arabia, or the *Queen Mary*'s last voyage.

But it's not simply the romance of card-collecting that continues to inspire DXers, nor the blunt urge to communicate. Instead, hams talk proudly about belonging to a global "brotherhood," with few rules and little bureaucracy and the ability to transcend language, religion and race — while never quite knowing who they might come in contact with.

Plus, of course, the chance to be a genuine real-life hero. Days after a magnitude 7.3 earthquake devastated Haiti in January, amateur radio operators were busy at work connecting rescuers within the country and contacting survivors' families. When a magnitude 8.8 earthquake hit Chile the next month, and the phone network collapsed, a radio operator named Alejandro Jara broadcast the first information from the ground.

Hams stepped in on September 11, 2001, and during Hurricane Katrina. Then there was Tony Pole-Evans, a bird lover with a short-wave radio on Saunders Island, who famously risked his life during Argentina's 1982 invasion of the Falkland Islands to radio the first news back to Britain that 1,000 soldiers had landed on Goose Green.

How exciting it must have been to intercept that particular radio call. And boy, what a QSL card to top one's collection. You can tweet all you like, but this is the way to communicate.

(Re-printed with permission from David Rowan—Editor Wired Magazine)

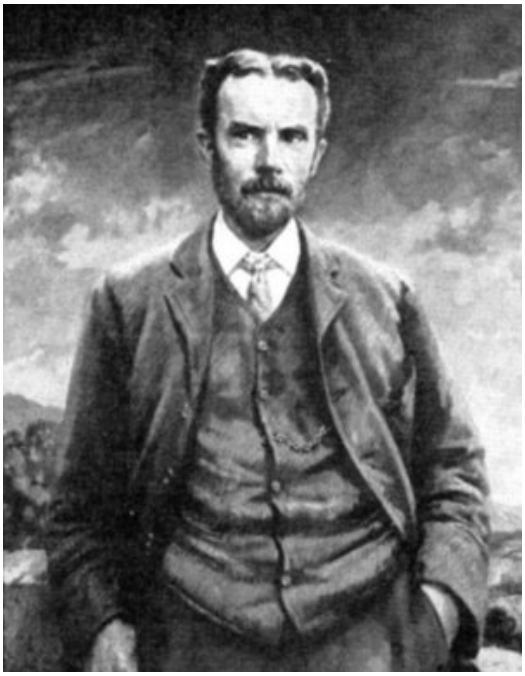
Woman radio operators at work in a Royal Navy Establishment.

History of Coaxial Cable

(John ZS5JF)

Introduction

Radio amateurs today use coaxial cable to connect the equipment to an antenna. Prior to its invention the common transmission line was an open-wire balanced feeder made from wire and insulating spacers. The history of coaxial cable is an interesting topic.



First recorded patent for coaxial line

The first known patent granted for coaxial transmission line was a British patent in 1880 to Oliver Heaviside, a self taught British electrical engineer. Those astute in history will recognise the name as the one due to the Kennelly-Heaviside layer; we now call the ionosphere, which Heaviside in conjunction with Kennelly discovered the reflecting medium high above Earth. Heaviside was the nephew of the British inventor Sir Charles Wheatstone, the co-inventor of the British telegraph system and known for his invention of the Wheatstone Bridge to measure resistance.

Oliver Heaviside

Heaviside's coaxial cable was a copper tube, which formed the outer of the line. The inner concentric (coaxial) conductor was a copper wire which was supported by insulating discs to keep the central wire a constant distance from the inner of the copper tube. The major dielectric was air, giving low loss to signals travelling along it.

The use of the word "*cable*" as we know it today for coaxial lines implies a flexible type of conductor. In the old days the word cable meant anything that contained wires, such as mains cable, or telephone cable with multiple pairs. Similarly transatlantic cables could be multiple pairs or coaxial lines or a mixture of both types, today we also have fibre optic cable, but the "*conductors*" are strands of glass or plastic to act as a waveguide for a light source.

Heaviside was a prolific experimenter and he coined the names of several items used today. He invented the word impedance, admittance, conductance, permeability, inductance, reluctance and permittance, which we still use today. He also solved Maxwell's equations and invented differential equations in order to perform this work.

Heaviside's coaxial transmission lines found many uses; not the least was the transatlantic cables used to carry telegraph and later telephone traffic over vast distances. The first transatlantic telegraph cable was a normal wire cable laid in the late 1800s and was a disaster. The inventor was Lord Kelvin, earlier Sir William Thompson. He however did not know about distributed capacitance, inductance and impedance, the signal loading on this cable was so high it limited the signalling speed to about 5wpm. Unfortunately the cable failed about 2 weeks after it was laid and was never re-established. It was a financial disaster for the sponsors.

A German patent in 1884 was granted to Ernst Werner von Siemens for a concentric coaxial transmission line similar to Heaviside's design, but little detail is known about this patent or whether the cable was ever put into service.

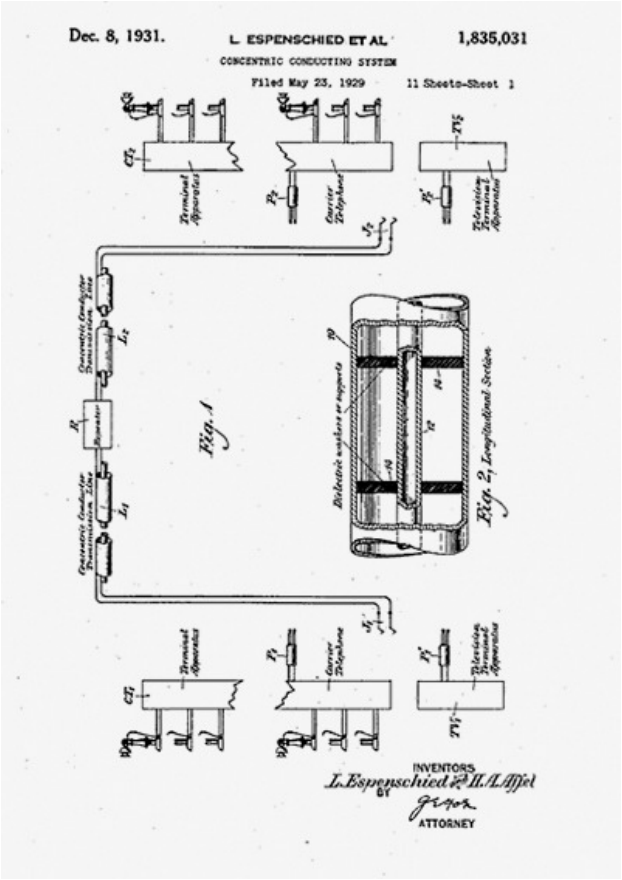
US patent for coaxial cable

The next known patent for coaxial cable was granted to two American engineers. This patent granted in 1931 was almost the same as Heaviside's original design but had a subtle difference. It was semi-flexible and could be coiled more easily. The patent diagram clearly shows a similar construction to Heaviside's design with an outer copper jacket and inner wire supported by insulating discs.

U.S. Patent No. 1,835,031 for a "*concentric conducting system*" was awarded to Lloyd Espenschied of Kew Gardens, New York, and Herman A. Affel of Ridgewood, New Jersey, and assigned to the American Telephone & Telegraph Co (today AT&T). This although similar to Heaviside's patent allowed more bending to occur and the cable could be coiled on a large diameter drum for laying at sea. They also showed the use of repeater stations along the line to boost the signal level.

Lloyd Espenschied in 1904 became an amateur radio operator and later a telegraph operator with a maritime station. He also

later determined experimentally the optimum impedance to use for high power, high voltage and minimum attenuation at 10GHz in the 1940s, these being 30-ohm, 60-ohm and 77-ohm respectively. Significantly the Germans standardised on 60-ohm before the war.



The next significant use of coaxial cables occurred in 1936.

The first experimental carrier telephone system was laid between London and Birmingham with a cable made by Standard Telephones and Cables (STC) which consisted of 4-coaxial cables carrying up to 4-channels per coax. The cable was sheathed in lead as per the normal telephone cables to protect the inner conductors. This revolutionised telephony as many separate telephone channels could be carried on a single cable. The system used SSB suppressed carrier transmissions spaced 15kHz apart.

US patent diagram for coaxial line, which clearly shows the outer tube, inner tube and insulating discs as used by Heaviside.

The second significant event in 1936 was the televising of the Berlin Summer Olympic Games. The transmission was carried by a coaxial cable between Berlin and Leipzig where the main German television transmitter was located. The cable used was very similar to the British Post Office type and laid in sections about 50km in length with repeater stations to boost the signal level, no doubt gleaned from the US patent paper.

The 1936 Berlin Summer Olympics was a massive propaganda event for Hitler where the entire German team were only members of the Aryan race. Hitler wanted to demonstrate to the world their superior race and its technological advances. Hitler however was greatly displeased when an American-African athlete, Jesse Owens, claimed 4 gold medals in the field events.

Lloyd Espenschied and Herman A. Affel with a section of their original coaxial cable taken on the 20 anniversary of the patent.

All of these coaxial cables where either rigid or semi-rigid in form. The next significant step was the invention of flexible coaxial cable as we know them today. Prior to this, during the run up to the Second World War, a committee was set up in the USA to ponder on the ideal impedance for coaxial cable. This was still rigid line made from copper tubing.

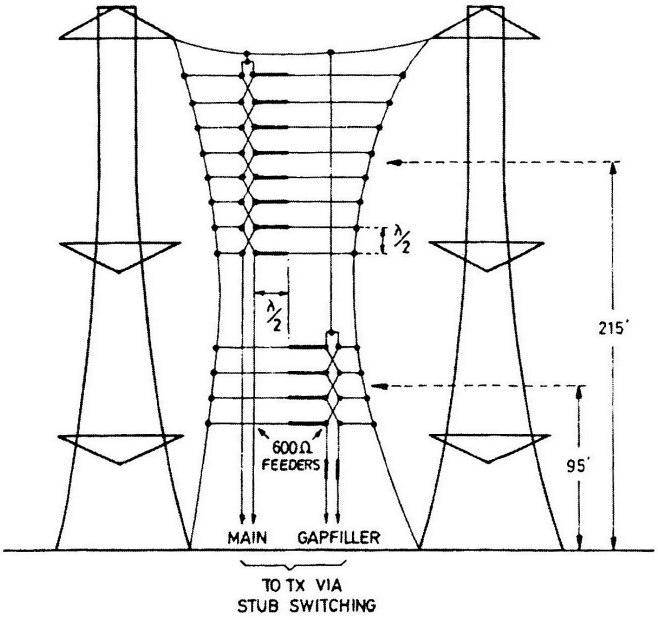
The impedance battle

As the war in Europe was inevitable the allied scientists and engineers needed to define the common impedance so that coaxial cable could be manufactured in high volume to suit the various users and to introduce some standards. Some factions of this committee favoured 75-ohm cable and they demonstrated that this was the ideal impedance to feed half wave dipole antennas and they also showed that 75-ohms had the lowest attenuation per unit length. This committee had many engineers and scientists and the arguments went back and forth as to which was the ideal impedance to adopt. During all this wrangling a Canadian engineer had little to say but finally spoke. He told the committee he had been studying the US copper water pipe tables and proposed that 52-ohm be the preferred impedance, although this hadn't been tabled previously. He showed that 52-ohm impedance could be made in any required diameter as the standard US water pipe tables had all the necessary size tubes. Hence, no extra tooling was needed and so 52-ohm became the standard for a practical reason.

Chain Home Radar

During the run up to WW2 the British realised that a radio direction finding system (later called RADAR) was necessary and embarked on a design called Chain Home in 1935. The transmitter developed very high peak power and the need was to convey this signal from the transmitter to the base of the transmitting tower with the minimum loss. On the prototype system ordinary

GPO telephone poles and insulators were used with 200-pound per mile copper wire as a balanced feeder arrangement, although this worked the danger of damage from enemy bombing led to a later change to a buried feeder system. A scheme was devised using two copper tubes laid in parallel with central wires and insulating discs, similar to the telephone coaxial cables and Heaviside's original patent. This formed a balanced shielded line that connected to the 600-ohm balanced feeder wires that ran up the tower and fed the multiple antenna arrays. In the final installations the STC telephone coaxial cable was utilised to feed the transmitter and receiver antenna arrays.



Chain Home transmitter antenna array

Flexible coaxial lines

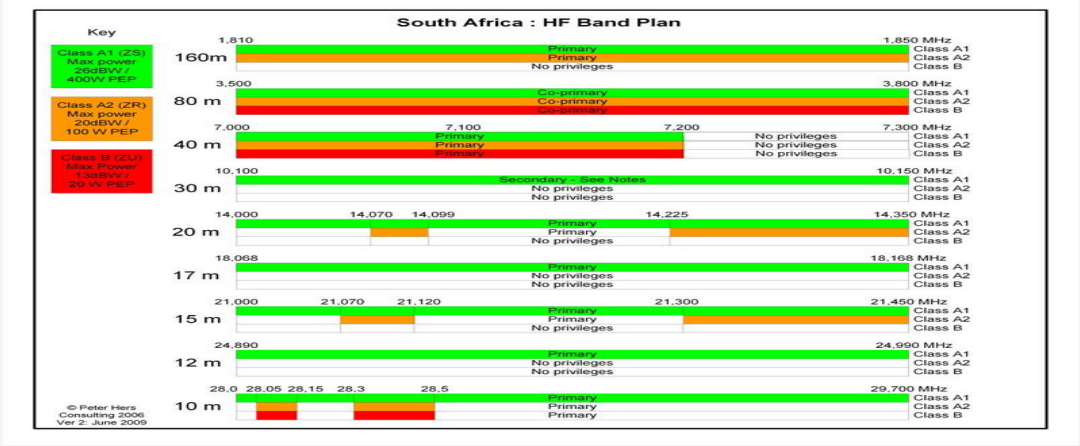
The next saga is the invention of what we know today as "*flexible coaxial lines*". Edward (Taffy) Bowen was a Welsh engineer working on the Chain Home radar system but left in late 1936 to take up the challenge of developing airborne radar for the allied night fighters. Bowen had been the transmitter designer for Chain Home but friction within the team and the overall supervisor Watson-Watt led Bowen to ask for a transfer to AI work (airborne intercept).

During this development in 1937 he needed a flexible coaxial transmission line. Bowen originally tried balanced wire feeders but this presented problems, the wing mounted dipole arrays were susceptible to damage, as were the feed lines. Where the lines passed through the aircraft skin arcing occurred at high altitude because of the high peak power required. Next Bowen tried rigid coaxial line but this suffered from fatigue fractures under the high vibration experienced in fighter aircraft.

Bowen had recently learnt of a new insulating material developed by Imperial Chemical Industries (ICI) which was called polyethylene. He asked the scientists at ICI whether it was possible to extrude a tubular layer of polyethylene with a constant diameter onto a stranded wire conductor. They replied it was possible and made a short length for Bowen. He then encased this with a sheath of copper braided wire bound on tightly with electrical insulating tape to form a concentric flexible coaxial line. Flexible coax cable was born!

Later in the war the British took to America with the Tizard Mission many secret devices to assist the Americans in making equipment vital to the war effort. Amongst these were the cavity magnetron, Bowen's coaxial cable and others as a bargaining tool in the final "*Lend-Lease*" agreement between Britain and America.

Connectors for this new type of coaxial cable did not exist and Burndept, a British company, came up with a suitable connector that was widely used on allied equipment. We find this connector on the WS-19, C-11, C-13 and many others. The American company Amphenol in the mean time invented the PL-259 connector which at the time was designated the "*UHF connector*" as at that time VHF was regarded to start at 30 MHz and UHF was regarded to start at 100 MHz, the connector was rated up to 300 MHz. Although this connector was not "*constant impedance*" it was used in many 400 MHz radar systems during the war and only later did Paul Neill of Bell Labs invent the "*N-type*", which is named after him, it being a constant impedance connector rated up to at least 11 GHz. The N-type connector, unlike the PL-259, was inherently waterproof and rapidly became the preferred connector. Even the Russians used the N-type towards the end of the war, although they had a different name for it.



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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 yester-days radio transmitters and receivers. 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.

Notices:

Wanted:

Richard ZS6TF, is looking for an antenna loading coil for a TCS12. If anyone can help him, contact number is: 0825668078

NET TIMES AND FREQUENCIES:
The following are times and frequencies for the AWA nets:

AM Net—Wednesday evenings from around 18:30 (depending on band cond and QRN): Saturday mornings from around 06:00 or when band conditions allow. Frequency—3615.

SSB Net—Saturday mornings from 08:30. Frequencies—7070 with a relay on 3615.

CW Net—Saturday afternoon from 14:00. Frequency—7020.
(Times given are CAT or SAST)