AWA Newsletter

#75

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A Member of the SARL

Antique Wireless Association of Southern Africa

Inside this issue:

AWA Committee:

* President—Richard ZS6TF
* Technical Advisor—Rad ZS6RAD
* Secretary/PRO—Andy ZS6ADY
* Western Cape—John ZS1WJ

Reflections:

"The time has come, the Walrus said, to speak of many things".

The topics one can hear on Amateur Radio Frequencies is so varied, it is absolutely amazing.

From the planting and harvesting of vegetables to space weather and its effect on the earths atmosphere.

It is no wonder then that the topic of valves can very often be heard on various frequencies. From discussions around the first valve radios to the most modern amplifiers still using valve technology because of the power they are capable of handling, and producing.

The variation in topics just around valve technology can be as varied as the topics from vegetables to space weather.

Be that as it may, the valve, tube, hollow state technology, whatever you would like to call it, has certainly made its mark in history and continues to improve all the time.

The unfortunate part is there are not many tube manufacturers anymore.

The majority come out of Russia Czechoslovakia and China, with a few still dripping out of the USA. The majority of these however are not being made for the RF industry either.

Never let it be said though that the vacuum tube did not make history. It certainly did and was responsible for many victories during the war years due to the advanced use of them in RF components and radios especially.

Today however, we celebrate the tube by using them in our Vintage rigs and keep the story of the vacuum tube alive and well by doing this. I recently found this story of the Vaccum Tube on You Tube.

You can use this URL to access the story from Mullard tubes in the UK and see all the components of the tube, how they were assembled and the various uses they had. Makes for some interesting viewing

The story comes in 2 parts, but by accessing the first one, you will have access to part 2 as well.

http://www.youtube.com/watch?v=HveUY7eivfI

De Andy ZS6ADY

WIKIPEDIA

Phase Relationship:

The phase of the voltage across a purely reactive device (a device with a resistance of zero) *lags* the current by $\pi/2$ radians for a capacitive reactance and *leads* the current by $\pi/2$ radians for an inductive reactance. Note that without knowledge of both the resistance and reactance the relationship between voltage and current cannot be determined.

The origin of the different signs for capacitive and inductive reactance is the phase factor in the impedance.

$$\tilde{Z}_C = \frac{1}{\omega C} e^{j\left(-\frac{\pi}{2}\right)} = j\left(\frac{-1}{\omega C}\right) = -jX_C \quad \tilde{Z}_L = \omega L e^{j\frac{\pi}{2}} = j\omega L = jX_L$$

For a reactive component the sinusoidal voltage across the component is in quadrature (a $\pi/2$ phase difference) with the sinusoidal current through the component. The component alternately absorbs energy from the circuit and then returns energy to the circuit, thus a pure reactance does not dissipate power.

CW Net:

The CW net continues to run along nicely with a regular turnout each Saturday afternoon.

It's always good to hear there will always be a bunch of guys willing to get together and play some CW.

As I have probably mentioned on many occasion, the CW groups from Europe and USA are always big, and the worldwide CW contests are something to behold.

Back home though, there are still enough interested parties to have some fun on CW.

Chatting the other day with a CW fan, I was quite amazed when he told me that he never had to do CW, but took an interest in it after getting his ZS licence and now is totally hooked on it.

So even today, there are still those who find some joy in learning CW and effectively putting it to use.

I often wonder what happened to the old CW interest group that was running for many years. There were many different operators in those days and CW was till extremely popular.

I remember joining the group shortly after starting on my CW path and it was thanks to that group that I managed to get my 200 CW contacts. I was determined in those days to keep working at my CW even after getting my full ZS, but alas, phone got the better of me.

It was only after many years a bit of coersion from Om Rod ZS5RK, that I started doing CW again to start the AWA CW net and I must say, that I thoroughly enjoyed it

getting back into it.

What is it that attracts one to trying to decipher a whole lot of dots and dashes and turn it into something legible, I have no idea, but it does have a magical attraction that is very difficult to describe.

Try it some time. You'll be amazed.

SSB activity:

The SSB net has been active these last few weeks and it has been good to hear all the stations that have called in on the net.

It was always Om Willem's wish to work what he termed as being "National" in having all of the divisions call in, and we have achieved this virtually every week over the last few weeks.

40m has been working, on some occasions, extremely well, while on one or two others, it has been like a lame duck.

For the most part conditions have been good and communications over distance good, division 1 right through to division 5.

The 80m relay is back on line and running in conjunction with the 40m net. Reports from division 5 have been 5/8 on 3615.

Although not necessary yet, with 40m giving such good results, we will continue to run the 80m relay and would appreciate any reports as the winter months approach.

I hope this winter wont become like previous years where Div 5 was only workable on 80m at the early morning and if you were lucky, maybe later on in the afternoon, but lets rather be prepared for it should it happen.

My old friend Rod always used to say, "It may not be the best band around, but its always dependable, you can work 80m at almost any time of the day."

Yaesu FT200

AM:

My Collins still seems to be pulling some real ugly shots as Don tries to sort out the problems on Tx. One would be quite surprised by the amount of faults that have appeared all of a sudden after it went belly up.

Not very easy with the 32V-3, as it weighs in at a solid 80lbs, or somewhere around there, but it sure is giving Don a hard time.

With that, I have to rely on feed back from the few AM operators that still come up on a Saturday morning and give it a bash to keep the band active with some old time modulation.

Reports from Barney ZS6BLL and Ted ZS6TED, tell me that the AM net is still operating on a Saturday morning and by the sounds of it, still producing some good MF for all to hear.

Dave ZS6MUS, always listens in on a Saturday with his little portable with the antenna tied to the window frame, and gives reports of received signals on a regular basis on the SSB net. Thanks Dave, we do appreciate the reports.

As with most amateur radio activity, the AM net seems to reach peaks and valleys as some come and go, but there is always the regulars that keep it running.

Like CW, there is something magical about using AM. One has to be a radio operator, no offence meant, but it is totally different to working SSB on a plug and play, as many have found out. Yet it is very simple, once you get the hang of it.

Do come along and join the AM net on a Saturday morning. Its for the early risers.

Hallicrafters SX28

What's that noise I hear on my radio ?

A common question asked by radio amateurs today. In the early days of radio you also heard the same question but from commercial operators. It was amazing that commercial operators had little knowledge what caused the "*pops, bangs and squeaks*".

> In 1928 Bell Telephone Labs decided to find out what all this unwanted noise was about, it was running commercial transatlantic radio telephone circuits and this dam noise was cutting into its profits. Enter a newly graduated electrical engineer Karl Guthe Jansky.

Karl Jansky was named after his fathers Dean at the University of Wisconsin, Dr Karl Guthe, an American of German descent. The Jansky family being from Checkslovakia immigrants a generation earlier.

Karl G. Jansky

The third of six children, Karl Guthe Jansky was born in Norman, Oklahoma, while that region was still a territory. His father, Cyril M. Jansky, was a college professor who taught electrical engineering and eventually became the head of the School of Applied Science at the University of Wisconsin. Jansky was named after Karl Guthe, a German-born physicist under whom his father had studied at the University of Michigan. Jansky attended the University of Wisconsin, where he played on the ice hockey team. He hoped to join the Reserve Officer's Training Program there but was diagnosed with a chronic kidney condition called Bright's disease; Jansky suffered from it all his life. He wrote his senior thesis on vacuum tubes and earned his B.S. in physics in June 1927. He stayed on at the University of Wisconsin for another year and supported himself by teaching while studying to complete the course work for his master's degree. He did not, however, write a thesis, and it would be years before he actually earned the degree.

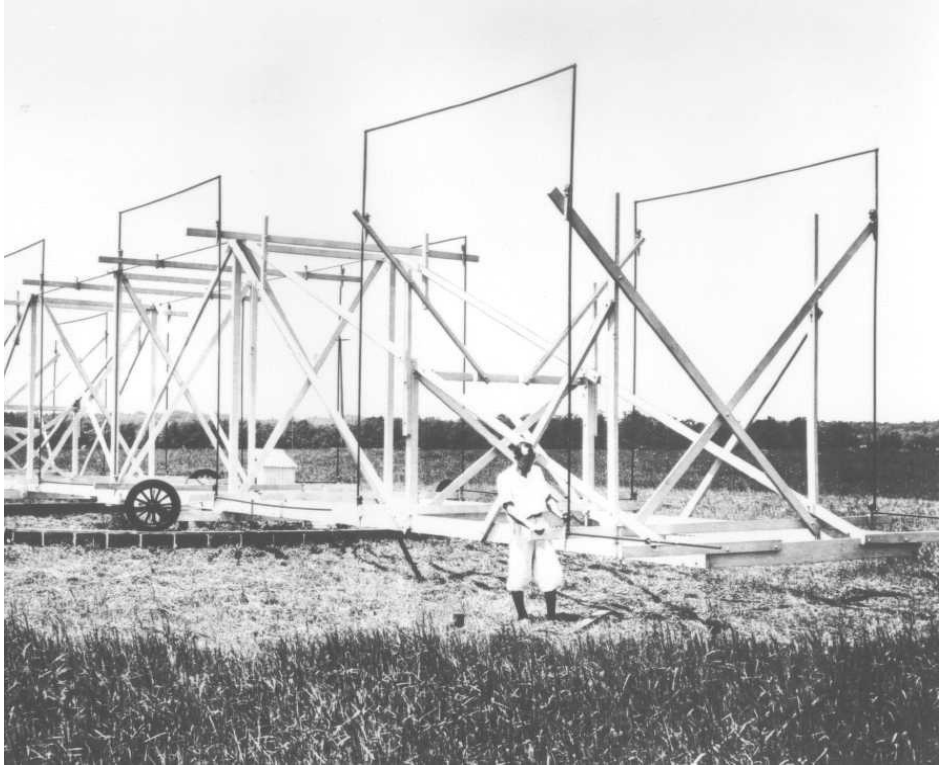
After leaving the University of Wisconsin, Jansky applied for work at the Bell Communications Laboratories. The company was reluctant to hire him because of possible complications from Bright's disease. But Jansky's older brother, a professor of electrical engineering at the University of Minnesota, knew many Bell personnel. He intervened on behalf of his younger brother and secured the job for Jansky. Fearful of the stress he might suffer if he worked at their headquarters in New York City, the company assigned Jansky to work at its facilities in New Jersey.

Although transatlantic radio communication was possible in the early 1930s, it was very expensive and poor in quality. It cost 75 dollars to talk for three minutes from New York to London, and the transmissions, which occurred not through cables but through radio waves, were routinely interrupted by static. There were clicking, banging, crackling, and hissing noises that sometimes obliterated the conversation. At Bell, Harald Friis assigned Jansky the job of determining what was causing the static. This was in the summer of 1931, and the first step Jansky took to resolve the problem was to design a new antenna, a Bruce array. He built a directional antenna that was capable of receiving a much wider range of wavelengths than conventional antennas of the time. He also developed a receiver that generated as little static as possible, to minimise its interference with his efforts to measure static from outside sources. Last, Jansky developed an averaging device for recording the variations in static. The antenna and the rest of the equipment were installed in Holmdel, New Jersey, a rural area where there would be very little interference from man-made radio signals. The field chosen had been used for growing potatoes.

The antenna that Jansky assembled at Holmdel was mounted on old Model T truck wheels and moved on a turntable. This allowed it to scan the sky in all directions once every 20 minutes; it could also be pointed at different heights above the horizon. Known as Jansky's "*merry-go-round*," the antenna is believed to have been the largest of its type at the time. It operated at 20 MHz or 14.6 meters. He categorised the static into three different types: local thunderstorms, distant thunderstorms, and steady static. Jansky was able to establish that thunderstorms were the source of clicks and bangs. But he observed of the last type of static, as quoted in *Mission Communications: The Story of Bell Laboratories*, that it was "*a very steady hiss type static, the origin of which is not yet known.*"

Jansky recorded the intensity of the hiss-type static, and he observed that it peaked when the antenna was pointed at a certain part of the sky. At first, Jansky thought that the point of peak intensity followed the Sun, and he initially assumed that the static was solar-generated. However, as he continued to make his observations, he saw that the peaks were moving further and further from the Sun. Indeed, he observed that the peak intensities occurred every 23 hours and 56 minutes. This was perhaps the first time that Jansky truly considered the idea that this static could have an extra-terrestrial origin.

Jansky knew little about astronomy, but after consulting some colleagues who did, he learned that while Earth takes 24 hours to rotate once on its axis in



Karl Jansky and his Bruce Array

relation to the Sun, its rotation with respect to the stars is four minutes shorter. Known as a sidereal day, this phenomenon was precisely what Jansky had observed: peak intensities in static readings that occurred at intervals of 23 hours, 56 minutes and 4 seconds. Although the existence of radio waves other than those generated by people on Earth had never even been considered as a possibility, Jansky did not doubt his findings. He had made a discovery that was entirely new, and he had done it by accident. He was also fortunate in another respect. His investigations were conducted at a time when the 11-year cycle of solar activity was at a minimum, which rendered the ionosphere transparent to 20 MHz wavelengths at night. If this had not been the case, solar flares would have drowned out the weak hisses from space, and Jansky would never have been able to measure them.

Jansky had observed that the static was most intense when his antenna was aimed at the centre of the Milky Way, the galaxy in which Earth is located. His measurements indicated a direction of 18 hours right ascension and 0 degrees declination. Such a location put the peak static emissions in the constellation of Sagittarius. These observations led Jansky to form two hypotheses concerning the origin of the static; either radio sources are distributed much as the stars are in the galaxy, or the radio emissions come from stars like our own sun. Since Jansky never did pick up such emissions from the Sun (weaker types were found by others), he rejected the second theory; his investigations during a partial solar eclipse in 1932 also seemed to support his belief that the Sun was not emitting radio waves. The first hypothesis was supported by the fact that radio emissions were most intense from the centre of the Milky Way, which contains the densest clusters of stars. Jansky also reasoned that the emissions from space would be found all along the electromagnetic spectrum, a hypothesis confirmed by later researchers.

It was in December 1932 that Jansky realised the extra-terrestrial nature of the static he was studying, and he issued his first report on the subject that same month in a paper entitled "*Directional Studies of Atmospherics at High Frequencies*." He presented it to the Institute of Radio Engineers, (IRE) but no one made much of his discovery. Indeed, Jansky's boss, Harald Friis, cautioned him against proposing that static came from extra-terrestrial sources in case he should be proved wrong. In April 1933, Jansky presented a second paper on these radio signals at a meeting of the International Scientific Radio Union in Washington, (URSI) D.C. On May 5, 1933, Bell Laboratories issued a press release on the subject, and the next day the *New York Times* headlined

Karl Jansky pointing to the constellation Sagittarius on a star chart. The paper chart recorder below was used to record the static received.

his work as "*New Radio Waves Traced to the Center of the Milky Way.*" On May 15, NBC's Blue Network broadcast a sample of Jansky's "*star noise*" to the nation. It was described by reporters as "*sounding like steam escaping from a radiator.*" Jansky presented his second paper again at the annual convention of the Institute of Radio Engineers (IRE) in June 1933, and it was published the following October.

While researching "*star noise*," Jansky worked on other projects. He designed a new receiver that could automatically change bandwidths, as well as studied the general effects of bandwidth on an incoming signal. When Bell realised that nothing could be done about the hiss-type static that Jansky was studying, they assigned him to a different project. Jansky wrote to his father in January 1934, as quoted in the Invisible Universe Revealed: "*I'm not working on the interstellar waves anymore. Friis has seen fit to make me work on the problems of and methods of measuring noise in general. A fundamental and necessary work, but not near as interesting as interstellar waves, nor will it bring near as much publicity. I'm going to do a little theoretical research of my own at home on the interstellar waves, however.*"

Although Jansky presented his findings to astronomers, they largely ignored the implications of his work. One reason was that they did not be-

lieve the Milky Way could possibly be such a giant and intensive radio source. Resources were also scarce during the Great Depression of the 1930s, and there was little money for equipment to pursue this discovery. But the primary reason Jansky's work was neglected was that astronomy was then an optical venture. No one had any idea what to do with radio measurements. Jansky was, however, able to use his papers on "*star noise*" as a thesis for his master's degree. The University of Wisconsin awarded him this degree on June 16, 1936.

Jansky made other contributions to the understanding of radio communications while he worked at Bell. He became adept at detecting the direction of arrival of short-wave transmissions from all over the globe, which led to a better understanding of the effects of radio propagation. The information Jansky gained helped refine the design of both transmitting and receiving antennas. He also conducted research on noise reduction in receivers and other circuits. The outbreak of World War II made it even more difficult for Jansky to pursue his research on "*star noise*." Still working for Bell Laboratories, he was assigned to a classified project concerning the development of direction finders for German U-boats or submarines. Jansky also worked on identifying particular transmitters by their "*signatures*," and his contributions led the military to issue him an Army-Navy citation. After the war, Jansky designed and developed high frequency amplifiers, which met the requirements of wide bandwidth and low noise.

Disappointed by the fact that he never had the time to investigate extraterrestrial radio waves further, Jansky applied for a teaching position at Iowa State University. He hoped that he would be able to use their facilities to further his research, but he was not hired. In 1948, the IRE made Jansky a fellow, but by this time Bright's disease was causing him to suffer from hypertension and heart problems. Although he tried to ward off the effects of his disease with specialised diets and health care, Jansky died at the age of 44 in 1950. He left behind his wife, Alice, to whom he had been married since August 3, 1929, and two children who were still teenagers.

The Karl G. Jansky Very Large Array in New Mexico is one of the most recognisable radio telescopes in the world, thanks to being prominently featured in such classic films as *Contact, Independence Day, Armageddon*, and *Terminator Salvation*, among others

Although never recognised for his contributions to radio astronomy during his lifetime, Jansky's work was honoured 23 years later. In 1973, the General Assembly of the International Astronomer's Union adopted the jansky as a unit of measurement. Defined as 10^{-26} watts per meter squared hertz, the jansky measures intensity of radio waves. More recently the Very Large Array (VLA) at Socorro, New Mexico has been renamed in his honour.

Seen at the TAC at the Open Day

AWA OPEN DAY
TAC—RAND AIRPORT

On Saturday morning of the 31st March, we had the Annual Open Day at TAC. Unfortunately this will be the last open day at this venue as we were told on the day, that the place was to being liquidated and closed down.

I'm not sure if it was only the Biggles restaurant, or the whole centre. The SAA museum is also centred at this venue and it would really be a pity if this was closed down too. I am sure there would be some intervention to ensure this is not lost to the public.

We did not have a great turnout, but the flea market started off as boot sale in the parking area and later moved in to the venue itself. There were quite a few bits and pieces that changed hands, as does always happen at these events, and of course it was all valve related equipment. Well mostly.

Suggestions for a new venue would be more than welcome from all interested parties, so lets try and find somewhere suitable before the AGM in October.

An Early Hallicrafters TV. Believe it !

Enjoying the Late Autumn Sunshine and a cup of Coffee.

Flea Market Goodies

AWA EXPO WESTERN CAPE

Despite inclement weather, the Expo of the Western Cape section of the AWA which was held over Easter on the farm Lochinvar near Stanford was an unqualified success. John and Judy Martin ZS1DI and ZS1JEG were gracious and accommodating hosts for the event and a large and varied display of radios of yesteryear and associated equipment were on show in John's aircraft hangar. A classic Kenwood radio station operated throughout the event and the main proceedings took place on the Saturday afternoon with 16 AWA radio amateurs attending to participate in discussions about members projects. The displays included radios by Collins, Rohde & Schwarz, Yaesu, Halicrafters, Heathkit, National, Marconi, Eddystone, an amazing homebrew SSB HF transceiver made and operated by Graham, ZS1GL and a wind up lifeboat transceiver. Organiser John ZS1WJ was recognized for doing a wonderful job in the first year of operation of the AWA in the western Cape and received a D104 from President Richard ZS6TF to encourage him to start an AM net. There was a consensus that this event should be repeated on an annual basis and the subsequent braai at the farmhouse and impromptu musical evening was a fitting finale to the day.

Rob ZS1FF

John ZS1DI/MM

RF Desiderata

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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 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.

Notices:

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

AM Net—Wednesday evenings from around 18:30: 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 14125.

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