



A Member of the SARRL



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- \* KZN—Don ZS5DR
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# Newsletter

# 110

April 2015

## Reflections:

Its that time of year when things are starting to change. The leaves are all starting to turn yellow on the trees, some already falling to the ground. The grass is showing signs of slowing down, its been 2 weeks since I last had to cut.

The mornings are nice and fresh with a hint of cold in them and it feels like its time to be hibernating instead of getting up for work before the sun rises.

One of these days I will be heading out to the shack for the morning AM session and it will still be pitch dark and I will have to wear a warm top of sorts.

I often wonder if this kind of weather tends to drive more of us into the shack, or keep us away ?

I suppose the answer would be more around how snug

your shack is. Is it nice and warm in the winter months? Does it offer plenty of light and give you a warm feeling when you are there ?

I know that for my part, my shack is as col as the outside temperature in the mornings when I first go out there, but a simple single bar heater warms it up nicely in a very short space of time, the roof being well insulated with polystyrene sheets. Then, once the sun comes up, the shack warms up with natural sunshine and stays that way for the rest of the day as the sun moves over and shine on it for the whole day.

But that's my shack. If your shack offers warmth and snugness, it will be attractive enough to cause you to spend more time in it in the winter. There will be some-

thing that draws you to it and you will certainly look forward to spending time there.

I don't want to call it a "man cave", because it should be more than that. Our shacks should be attractive enough that we should be fighting to keep others out.

Jacques started a album on the website where you can post pictures of your shack, with an added incentive of a prize for the best judged shack. Post pictures of your shack on the website and lets see who have nice, warm, snug shacks.

Who knows, it may just be yours that walks away with the prize.

Best 73  
 DE Andy ZS6ADY

## WIKIPEDIA

**Teleprinters:**

Teleprinters were invented in order to send and receive messages without the need for operators trained in the use of Morse code. A system of two teleprinters, with one operator trained to use a typewriter, replaced two trained Morse code operators. The teleprinter system improved message speed and delivery time, making it possible for messages to be flashed across a country with little manual intervention.<sup>[3]</sup>

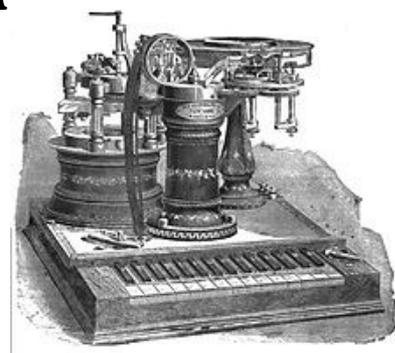
Early teleprinters used the ITA-1 Baudot code, a five-bit code. This yielded only thirty-two codes, so it was over-defined into two "shifts", "letters" and "figures". An explicit, unshared shift code prefaced each set of letters and figures.

By 1935, message routing was the last great barrier to full automation. Large telegraphy providers began to develop systems that used telephone-like rotary dialling to connect teletypewriters. These machines were called "Telex" (TELEgraph EXchange). Telex machines first performed rotary-telephone-style pulse dialling for circuit switching, and then sent data by Baudot code. This "type A" Telex routing functionally automated message routing.

Telex began in Germany as a research and development program in 1926 that became an operational teleprinter service in 1933. The service was operated by the Reichspost (Reich postal service) and had a speed of 50 baud - approximately 66 words-per-minute.

At the rate of 45.45 (±0.5%) baud — considered speedy at the time — up to 25 telex channels could share a single long-distance telephone channel by using *voice frequency telegraphy multiplexing*, making telex the least expensive method of reliable long-distance communication.

Automatic teleprinter exchange service was introduced into Canada by CPR Telegraphs and CN Telegraph in July 1957 and in 1958, Western Union started to build a Telex network in the United States.<sup>[4]</sup>



Phelps' Electro-motor Printing Telegraph from circa 1880, the last and most advanced telegraphy mechanism designed by George May Phelps

## SSB:

Conditions on SSB have certainly been fair to good the past months with some good activity taking place.

The nets on SSB have been well attended and this is certainly due to good conditions most of the time.

This month, the KZN SSB net started on 7145 at 07:00 in Saturday mornings and have had really good turnouts with a good few call ins taking place. Most mornings there have been anywhere up to 7-10 stations reporting in and what a pleasure it is to hear more of the Div5 stations coming up on frequency. The response has been so good, they are already planning the first AWA get together which will be sometime in June, depending on availability of a venue.

The Western Cape net continues on 7140 on a Saturday morning from 07:15, and when conditions aren't that great, they migrate to 3630 for improved comms. This net has been running now for just over 3 years and has become well established in the area.

The 20m relay on 14140 continues to give excellent results in getting the National net down to the Western Cape at times when 40m seems to start fading out, with good S9 plus signals both ways. We would like to encourage the guys in the Western Cape to make use of the 20m relay, as it does offer a good alternative to 40m and certainly offers a lot more than 40m. Even a good dipole or inverted V tuned to 20m will give good results.

A new addition to the SSB national net is the relay now being provided on Echolink. You can access the echolink page on the internet by downloading the software and then logging in to the ZS0AWA-L link. Those of you who have plenty of data available on your smartphones can download the program and listen in on your cellphone should you so want to. Its really a case of mixing the old with the new.

I am sure this will be a boon to those who receive our newsletters outside of SA and want to hear what we get up to on the nets. At the moment it is listen only.

Do join us on any one of the SSB nets and get involved in the AWA again. We look forward to hearing many more of you on frequency.



Collins Gold Dust Twins 1Kw transmitter.

## AM:

The AM group still meets regularly on a Saturday morning, and not so regularly on a Wednesday evening.

It always amazes me how the weekend can be clear of all QRN right up until Monday evening. Tuesday the clouds will start to form and by Wednesday the band is virtually unusable.

Although some of us are extremely stubborn when it comes to using AM, there is a large percentage of hams who aren't, and so, very often, the Wednesday evening groups are a miserable failure.

But let us take heart, the winter months will definitely show a lot of improvement in band use and until the cold fronts really start to affect us, there will be a period when band conditions will be extremely good, and we will be able to play AM to our hearts content.

There are a few new AM transmitters that have been resurrected down in Div5 by Bob ZS5AY and Roy ZS5RF and they have been heard on frequency already, pushing out good signals. Its always good to hear that there are still some of these fine old rigs that are able to be revived and have new life breathed into them. It is this that makes it so exciting to be an amateur.

The combination of being able to play musical transmissions here in SA make it that much more interesting as everyone involved tries their best to get out a fully modulated transmission without any distortion and at a decent level so that all can hear the music at a good audio level.

Of course the ham transmitters are not always perfectly suited to transmit music as they have been set up at voice levels, but there are still many of them that will produce a fine signal and a perfectly good audio output.

Don't be deterred by the fact that your AM rig only puts out 25 or 30 watts. Remember there is a 4 times multiplication factor for a fully modulated carrier on AM.

Dust off those AM rigs and fire them up. We look forward to hearing many more of you on frequency.



Johnson Viking Ranger Mk1

## AWA On the Go

A small group of the AWA enthusiasts have been getting around to the various flea markets and putting up displays of antique equipment and advertising the AWA as far as possible.

The East Rand fleamarket was attended, then the West Rand and a week or two ago the Pretoria Fleamarket. A word from Richard was “this was the best Pretoria fleamarket in while”.

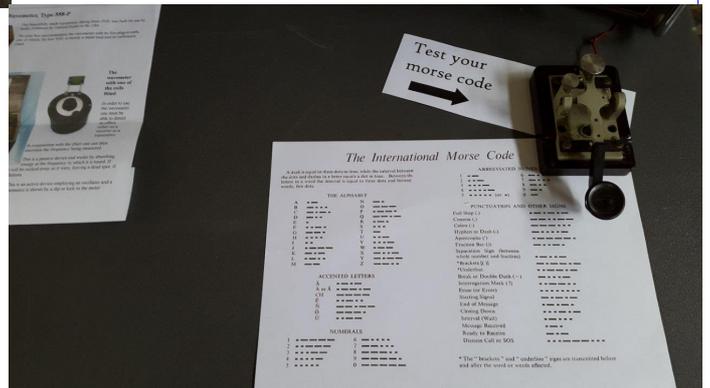
Below are some photo's of the display at the Pretoria market.



Our illustrious Historian peddling the display



The display with a Collins 51S-1 Rx; HRO-5; Eddystone 670A



A morse key with connected to a buzzer was there for those interested in testing their straight key skills.



Information pamphlets ready for the taking advertising the AWA.

Well done Jacques, Richard and all those who put in the effort to make sure this happens.



From then to now

Early day telegraphists ran the risk of Repetitive Stress Injury, better known as “glass fist” caused by the prolonged rapid up and down wrist movement when sending CW at fast speeds with a straight key. Not only was this painful, recovery from same was slow with corresponding inability to work.

With development of the bug then iambic keys, which, with their side to side to side operation eliminated RSI? Much faster speeds were also possible.

Worldwide there are many amazingly gifted operators that can send and copy at extremely fast speeds. What might sound like a group of drunken canaries with painful piles to the two words per week operators such as I, they can read and send at ease.

The Following table might give a comparison of key presses required on different keys for each letter of the alphabet.

	Straight	Bug	Non iambic	iambic
A	2	2	2	2
B	4	2	2	2
C	4	4	4	2
D	3	2	2	2
E	1	1	1	1
F	4	3	3	3
G	3	3	2	2
H	4	1	1	1
I	2	1	1	1
J	4	4	2	2
K	3	3	3	2
L	4	3	3	2
M	2	2	1	1
N	2	2	2	2
O	3	3	1	1
P	4	4	3	3
Q	4	4	3	2
R	3	3	3	2
S	3	1	1	1
T	1	1	1	1
U	3	2	2	2
V	4	2	2	2
W	3	3	2	2
X	4	3	3	3
Y	4	4	3	2
Z	4	3	2	2
Total	82	66	55	47

Now, consider the co-ordination required to send at anything from 30 to 65 **WPM** by our ZS giants in CW :- such as Barrie ZS6AJY – Monk ZS4SF – Mo ZS5BBW – Rudi ZS6DX – Roger ZS6RJ – Adrian ZS1TTZ – Raoul ZS1 C- and Vidi ZS1EL , apologies to the many more too numerous to include in this article

73 de John  
ZS6 JBJ

## AWA On Echolink

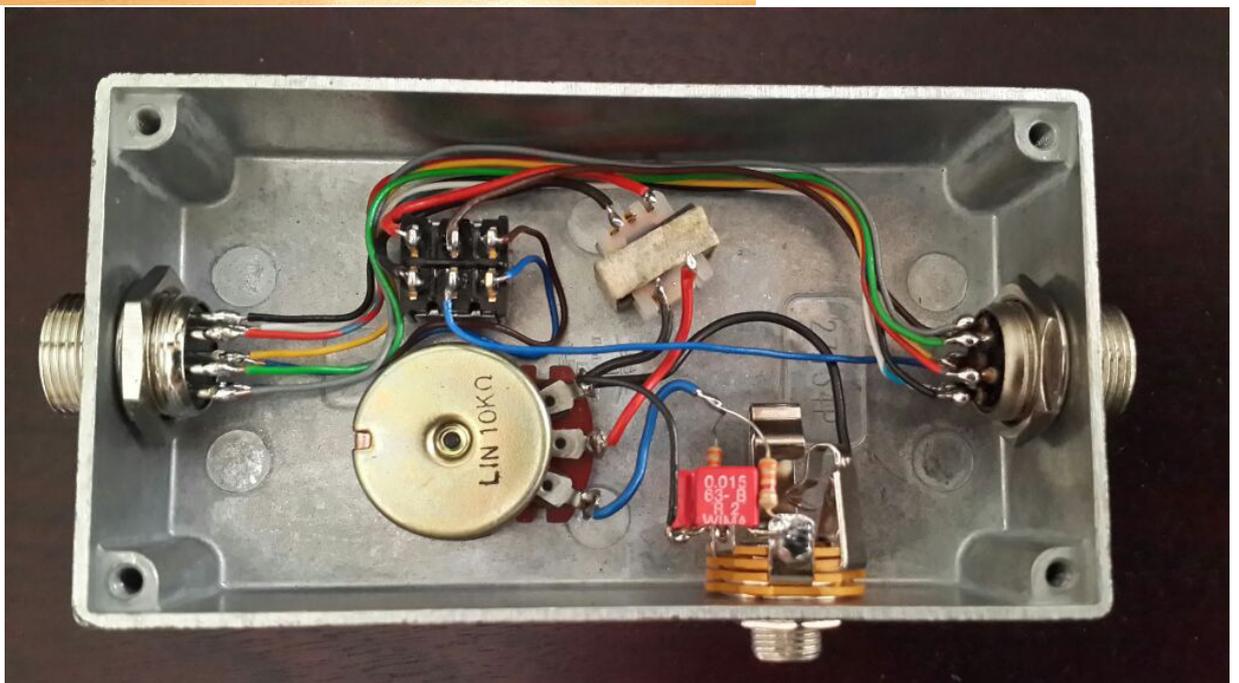
Kevin ZS6KAT has been busy setting up an Echolink connection to relay our SSB net on Saturdays over the internet, greatly expanding our reach by bypassing any limitations which propagation conditions may impose.

Echolink, which works via a small software package installed on one's PC or smartphone, utilizes streaming-audio technology over the internet, connecting thousands of users and repeaters worldwide. A user can select any "node" to connect to, be it another user or a repeater in some faraway place, all of which are neatly arranged by country and/or type. TX is possible and one can partake in discussions on, or transmit a message from, any repeater in the world which is connected to this service.

Kevin put in a great deal of effort over the past months, through various ongoing tests and trial-and-error settings changes. He completed the manufacture of a TX patch box on the 22nd of March (picture attached). To discuss various connection issues and settings, a WhatsApp group was used for communication between users partaking in the tests. On the 21st of March there were 5 users connected to listen to the net, one being from England. In the past, one could find oneself in quite a predicament when wanting to be part of the net but also having to be somewhere else on a Saturday morning, however this can now be changed as you can listen in on the net from your phone wherever you are. Kevin also tackled the process of registering the AWA with Echolink, and on the 26th of March we crossed a major milestone when he announced that we now have an approved Echolink callsign... ZS0AWA-L.

It is interesting to see how the radio technology of yesteryear has evolved into what we see around us today, and how the new-age technology assists in keeping the old alive by spreading awareness and making it easier for people to connect with the very ideas and knowledge which our association strives to sustain.

More information on Echolink can be found here: <http://www.echolink.org/>



## Instrumentation Heritage by Richard ZS6TF

The AWA mission statement provides for the location, acquisition, repair and use of yesterday's radios and associated equipment. Obsolete electrical and electronic test equipment is a valid inclusion and fortunately a few of our members are really enthusiastic about using and conserving collections of prime examples of this equipment. The need for measuring instruments goes back to the beginnings of electrical experimentation.

Electricity cannot be seen or touched and only small amounts can be stored. Lightning and the electric arc come close to a visual manifestation but what is seen in the visible spectrum is the energetic breakdown of the atmospheric gases into a plasma which emits a broad band of electromagnetic radiation from radio frequencies to ultra-violet light.

Often the analogy of water is used to explain the fundamentals of electricity because water is tangible to the senses, can be seen, and pressure and flow felt but the analogy breaks down the moment you introduce magnetism, especially permanent magnetism for which there is no analogy.

The invention of the voltaic pile by the Italian Alessandro Giuseppe Antonio Anastasio Volta in 1800, provided a reliable DC supply for the first time.

Professor Hans Christian Ørsted of the University of Copenhagen, noticed in 1820 that a compass needle deflected from magnetic north when an electric current from a battery was switched on and off. Subsequently he showed that an electric current produces a circular magnetic field as it flows through a wire. Ørsted's findings stirred much research into electrodynamics throughout the scientific community, influencing French physicist André-Marie Ampère who showed that two parallel wires carrying electric currents attract or repel each other, depending on whether the currents flow in the same or opposite directions. This led to Ampère's law published in 1827 which states that the mutual action of two lengths of current-carrying wire is proportional to their lengths and to the intensities of their currents.

In the same year Georg Simon Ohm, a German Physicist and mathematician published a book in which he stated his law for electromotive force acting between the extremities of any part of a circuit is the product of the strength of the current, and the resistance of that part of the circuit, now known as Ohm's law.

The operating principle of electromagnetic generators was discovered in the years of 1831 to 1832 by Michael Faraday His principle, called Faraday's law is that an electromotive force is generated in an electrical conductor which encircles a varying magnetic flux.

Heinrich Friedrich Emil Lenz was a Russian physicist of Baltic German origin He is most noted for documenting in 1833 what has become known as Lenz's law saying "An induced electromotive force always gives rise to a current whose magnetic field opposes the original change in magnetic flux." The symbol  $L$ , conventionally representing inductance, is chosen in his recognition and the unit of the Henry is an anglicised version of his first name.

All the electrical cats were out of the bag now and from this time on the pace of development of electrical machines and power systems gathered momentum. By the second half of the 19<sup>th</sup> century, mankind was receptive to practical applications. Discoveries were followed by inventions and patents. The lamp, the dynamo, the motor, the transformer, the meter, and wireless communication were invented in quick succession.

This created the need to measure electrical parameters. Then, the only way to infer their otherwise invisible magnitude, direction, or polarity was to create an analog, namely the movement of a pointer over a visible scale. The early experimenters measured currents with the tangent galvanometer where the restoring force which returned the pointer to the zero position was provided by the Earth's magnetic field.



This made these instruments usable only when aligned with the Earth's field. Sensitivity of the instrument was increased by using additional turns of wire to multiply the effect but they were only capable of low power laboratory measurements.

Early voltage measurements exploited electrostatic repulsion or attraction but the weak forces developed limited measurement to voltages above a kilovolt. Voltage, current and power levels required to be measured increased rapidly and inventors achieved early success with moving iron instruments which were robust but were non-linear with cramped scales, and absorbed considerable power from the circuit under test.

The accuracy of measurement of resistance was greatly improved by the development of the Wheatstone bridge which is an electrical circuit used to measure an unknown electrical resistance by balancing two legs of a bridge circuit, one leg of which includes the unknown component. It was invented by Samuel Hunter Christie in 1833 and improved and popularized by Sir Charles Wheatstone in 1843.

The largely unrecognised Jacques-Arsène d'Arsonval who was a French physician, physicist, pioneer in electrotherapy with high frequency currents, invented the D'Arsonval moving-coil galvanometer and the thermocouple ammeter in the nineteenth century. The invention of the former in 1882 came after he had studied muscle contractions in frogs using feeble currents from a telephone. His design became the basis for almost all panel-type pointer meters in use until the present day. His thermocouple ammeter predated the discovery of radio by 4 years but became a mainstay of high frequency current measurement for 80 years.

With ever increasing power levels, measurement range of instruments was extended with Shunts, current transformers, voltage transformers and accessories.



Top left clockwise: A Universal Galvanometer made by Siemens and Halske, Germany in 1897, a portable multi-range laboratory Ohmmeter circa 1900 manufacturer unknown. An FET multimeter by Philips circa 1975. 100k $\Omega$  per volt. A true RMS volt and current meter model 102 using vacuum tube technology manufactured by John Fluke & Co Seattle USA circa 1960. AVO multimeter the model 9 Mk 4 1960 20k $\Omega$  per volt which is sought after for its 3kV voltage range.

Apart from measurements of frequency, timing, and pulse parameters which are inherently digital, in the heart of all digital meters are A to D (analogue to digital) converters. The measurement of the electricity which we cannot see or touch is still sensed by analogue devices.



If you study the fine collection of instruments in the shack of Renato ZS6REN, you will be amazed to see how many moving coil meters are incorporated into radio frequency equipment of yesteryear.



THERE are a number of reasons why the "HQ-120-X" has won such universal approval among leading amateurs. From start to finish it was designed with one thought in mind—performance. Six bands are used to provide low C tuning circuits with maximum gain and uniform sensitivity. The antenna compensator provides maximum signal-to-noise ratio with a given antenna system. A Hammarlund patented variable selectivity crystal filter provides just the right degree of selectivity at all times. High stability is maintained with voltage regulation and drift compensation. There are, of course, a number of other features such as calibrated band spread dial, automatic noise-limiter, and the usual beat oscillator, send-receive switch, phone jack, etc. There is nothing fancy about the "HQ"—it's all receiver.



# RADIO AMATEUR NEWS

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**THE AUTO RADIO-PHONE**  
See Page 58

HOWARD BROWNE

**In This Issue:**

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- LOOP ANTENNA AND DIRECTION FINDERS FOR AMATEURS  
*By David S. Brown*
- FREE RADIO TELEPHONY AND TELEGRAPHY  
*By Major General Geo. O. Squier*
- LOW POTENTIAL RADIO FREQUENCY ARC  
*By Chaslee W. Noller*

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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. Join by logging in to our website: [www.awasa.org.za](http://www.awasa.org.za)

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**Notices:****Net Times and Frequencies:**

Saturday 06:00—AM Net—3615  
Saturday 07:15—Western Cape SSB Net— 7140 (Alternate 3630)  
Saturday 07:00—KZN SSB Net—7145  
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.

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**AWA Mid Year Swop Meet:**

Our Mid-Year meeting has been arranged in conjunction with the Kempton Park Amateur Radio Technical Society (KARTS) once again at the Venue in Kempton Park for Saturday 06 June 2015. More details on directions will be posted at a later stage, or visit the KARTS website for directions.

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**AWA KZN:**

On Sunday 28th June 2015, there will be a KZN AWA Gathering at Baynesfield Museum hosted by Bert ZS5MQ at his Wireless Shack. Gates open at 09:00 to the public and Bert has suggested they could also have a bring and braai as well as bringing any rigs for display. Directions will be posted on the AWA website as well as in the Newsletter.

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