



AWA Newsletter

97

February 2014

Affiliated
to the
SARL



Antique
Wireless
Association of
Southern Africa

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AWA Committee:

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

Reflections:

How sad it is when we hear of the passing of so many of our Ham friends who have made such an impact on the fraternity as well as commercial industry.

Unfortunately it seems this is the way we will eventually all have to go, whether or not we have made an impact on anything and whether or not we have reached what we ascribe to being the allotted time of man.

Very often, we feel like we are living on borrowed time when we have passed this so called time and some actually become quite paranoid about it.

Personally, my advice is to live life to the full no matter how much time you have. Some will have more and others will have less, but it really matters as to the quality of the life you have

led than the quantity of years one has been around.

It's the same with some of the radios we use. They have been around for a while and most of them have a built in quality that cannot be questioned. They have also made their mark in life and for some have become articles of endearment.

Each has a character of its own and will present each owner with a different problem to what others may experience.

Its almost as though they have a personality, but then they are just made of metal and plastic. How can they ever have a personality ?

We give names to our cars, our dogs our cats and various other items, but I have never heard of anyone giving their radio a name.

So how attached are we actu-

ally to these wonderful old bits of history that adorn the shelves of our radio shacks.

I Know for sure they can be the cause of quite a bit of frustration, heartache and indigestion. When something goes wrong, goes wrong. They can also be the cause of happiness, and euphoria when all goes well.

Whatever it is that you may feel for your radios and old friends, I am sure they sometimes fall in to the same category of affection.

The two actually go together.

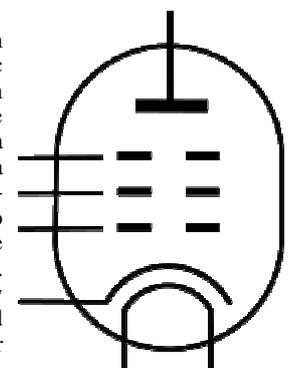
Here's to fine radio's, fine friends and a long, healthy life. Long may your glow penetrate the lives of those around you.

Best 73

DE Andy ZS6ADY

WIKIPEDIA

A **pentode** is an electronic device having five active electrodes. The term most commonly applies to a three-grid amplifying vacuum tube (thermionic valve), which was invented by the Dutchman Bernhard D.H. Tellegen in 1926. The pentode consists of an evacuated glass envelope containing five electrodes in this order: a *cathode* heated by a filament, a *control grid*, a *screen grid*, a *suppressor grid*, and a *plate* (anode). The pentode (called a "triple-grid amplifier" in some early literature) was developed from the tetrode tube by the addition of a third grid, the suppressor grid. This served to prevent secondary emission electrons emitted by the plate from reaching the screen grid, which caused instability and parasitic oscillations in the tetrode. The pentode is closely related to the beam tetrode. Pentodes were widely used in industrial and consumer electronic equipment such as radios and televisions until the 1960s, when they were replaced by transistors. Their main use now is in high power industrial applications such as radio transmitters. The obsolete consumer tubes are still used in a few legacy and specialty vacuum tube audio devices.



Pentode symbol
Electrodes from top to bottom:
:anode (plate)
:suppressor grid
:screen grid
:control grid
:cathode
:heater (filament)

CW Activity:

CW activity, seems to be a bit of a conundrum.

There is so little activity on the local bands these days, that one has no option but to turn to the DX bands to hear what is happening.

I suppose when one considers there are something like 70,000 hams in the US, there is bound to be much more activity on CW. Even if only 10% of them take part, its still 690 more than there are here in SA.

Europe of course is also very active, especially from the old USSR side, or the countries that came from that part of the world.

One can hear many Italian stations on the band too. You don't have to have good skills in English to do CW.

But back to the local stations. On the AWA CW activity day, we had a total of seven stations coming up.

Nearly all of them contacted everybody else, but there were only 3 stations who managed to contact all of them.

So to Adrian ZS1TTZ, Eddie ZS6BNE and Barrie ZS6AJY, well done and thanks, you all achieved the high points score, so we need to give all three of you certificates.

It would be great to hear more people up on the band, but how do we encourage people to use a mode that is effectively dead in the eyes of so many ?

How do we encourage so many who have the skill and ability to use CW to come back to a mode they feel has let them down locally.

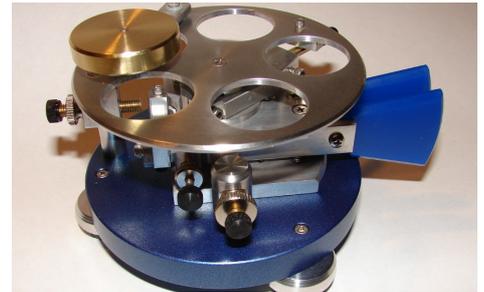
I know there are still some SA hams who are very active on CW, chasing DX and DXCC seems the most active areas.

Never let it be said that we give up easily.

I do believe there are those who are quite ardent about keeping CW alive on the local bands, as there are those who are quite ardent about keeping various other areas of our hobby alive.

No matter what it might be, lets do it together.

De ZS0AWA/CW



Rotobug

SSB activity:

There is never a shortage of people on SSB.

One can go on to any of the bands at almost any time and you are bound to hear somebody, somewhere chatting away on SSB.

Not that the bands are in great condition, but that there is always someone looking for call signs or looking for conversation.

40m these days is still not that good in the mornings for the SSB net and of course the Div1 stations tend to get lost fairly early on into the net.

The rest of the divisions seem to do quite well, but there is always a bit of QSB on the frequency, with stations coming and going.

Turnouts on the SSB net have been fairly good of late, even with bands not being

good. We still average around 18-20 calling in on the net.

The topics of conversation are still quite well discussed and do give many the opportunity to raise any points they have on various subjects, mostly relating to antique wireless.

Sometimes they can be quite controversial, but we have not had any major disagreements on the net concerning any of the topics, yet.

There still seems to be quite a bit of interest in the restoration of many of the different types of rigs, as could be seen from our visit to KARTS and the ER fleamarket.

We look forward to hearing many more of those who have been involved in the restoration

of rigs, coming up on the bands and joining in on the nets.

Do keep in touch and remember, winter is on its way. You may just need a valve rig in your shack.



Geloso G212

AM:

The Am nets are still going strong and still well attended. Its actually quite pleasing to hear the quality of the AM transmissions that so many of the stations are producing these days.

There are a few "New" AM rigs on the bands these days including 2 DX100's and a Viking Valliant. All producing great sounds on the bands.

The revival in these old faithful's is quite amazing and often on a Saturday morning one can hear anything from 7-8 stations on the net.

I know there are many more AM rigs out there that are capable of putting out good signals, and if everyone had to come up on the Saturday net, there would not be enough

time to let everyone have more than one full round, I am sure.

Wednesday evenings have started to improve already and we have had a few evenings where the band has opened up nicely giving full quieting on AM. This really makes it worthwhile and a good evening is had by those who are there.

Judging by the number of AM rigs we have moved in to the Ham Fraternity recently, it would nor surprise me to see many more AM stations coming up on frequency. The problem of course is to enthuse those who have taken over these rigs to get stuck in and refurbish them to working status.

Whatever the outcome, I am sure that AM will still be around for a long time to come,

with the enthusiasm that is being shown on our nets and the amount of people interested in playing AM, we can look forward to a long and happy relationship.



Hallicrafters SX28

A Response to the Article Published in last months Newsletter on Tuning Amplifiers.

Hi Andy,

Further to my comments this morning on the KK5DR article on linear amplifier tuning in the latest AWA newsletter.

This has got to be one of the worst articles I have ever seen on the subject. Apart from his comments on ALC which I partly agree with the rest is absolute rubbish.

He makes the suggestion that using a pulsed signal to tune up is the best method and to a point I agree with this. But he fails to give the correct procedure. If you use a CW keyer set to dots the duty cycle is about 50% if the keyer is correctly set for dot - space ratio. However, the anode meter will also read about 50% of the true level with a constant carrier.

Hence, using his figures of 900mA maximum anode current then the meter should only read about 450mA and not 900mA. The grid current meter reading should also be 50% of the normal reading. If you use his figures then the amplifier is loaded to 200% of the correct setting!

His understanding of the way a valve converts dc input to RF output is also flawed. The efficiency of a linear amplifier varies from 0% with no drive up to some maximum at full drive. By definition efficiency is the ratio of RF output power divided by the dc input power, both values being in watts.

For the case of the idle current state (where no RF output occurs) the efficiency must be 0%. For an amplifier with a idle current of 200mA at 3000V anode supply it is dissipating a dc input power of 600W with no RF output power. All of this power is being absorbed by the anode and no RF is generated. For full drive the figure will be around 50 to 60% at best in a true linear amplifier. Between these two extremes the efficiency will vary when SSB is used.

The pi tank circuit components will be more or less fixed by the manufacturer, although the anode and loading capacitor can be varied the inductor is not normally variable unless it is a roller coaster type which is quite a rare design today. The inductor value will be determined by the loaded Q the tank circuit is designed for. This loaded Q is derived from the anode load impedance, which in turn is determined by the power output required. The values to determine the anode load impedance (actually the resistive portion) is defined by the trans-conductance of the valve being used. By calculation we can arrive at a certain value for anode load to deliver the required amount of power to the antenna. However, the ARRL Handbook formulae for anode load are severely flawed and should be treated with much circumspection! The RSGB Handbook has a much more accurate formula but even this is only accurate to about 20% or so. The problem is the valve manufacturer do not give enough data to make an accurate estimate of the true anode load resistance, they have omitted certain vital bits of data we need. You can, if they supply a full set of constant current curves, extract the required data but often they only give partial curves which means one has to guesstimate some values.

If you take a typical anode load for the 3-500Z valve operating on 3500V and running maximum rated power (890W) the anode load value is given by Eimac as 5000-ohms, they know this because they have measured it in a test amplifier, so it is as accurate as you can get. To transform from the anode load of 5000-ohms to an antenna load of 50-ohms is a 100:1 step down ratio. This is right on the limit for a pi tank network capability, but do-able with care.

The chosen loaded Q determines the value of anode tuning capacitor required to resonate the pi tank network. The anode of the valve has some capacitance and this needs to be subtracted from the calculated value of the anode tuning capacitor. On the higher bands this might present a problem if the anode capacity is more than the tuning capacitor value required. If this is the case then the loaded Q needs to be raised to compensate.

Loaded Q is defined as the ratio between the anode load resistance and the reactance of the anode tuning capacitor, C1. For a loaded Q of 10 with a 5000-ohms anode load $XC1 = 500\text{-ohms}$. ($QL = Ra/XC1$). From the value of C1 we can then calculate the value of C2 (loading capacitor) and L (tank inductor). So the choice of loaded Q is quite an important factor to get a working circuit as everything else hinges on it. For a higher loaded Q the reactance of C1 goes down, meaning the capacitor needs to be a larger value, so cancelling out the anode capacity of the valve which would otherwise be a problem. If XC1 goes down then XL also goes down to keep the same loaded Q value, meaning we need less turns, so a fortuitous change mostly. It however also means XC2 must also decrease meaning a larger capacity, which we can cater for by switching in padder capacitors.

So the anode pi tank is only set up for one specific power level, that being the maximum desired power output. The values of C1, C2 and L are determined by the loaded Q, the anode load resistance and the load resistance. Change any of these and all bets are off!

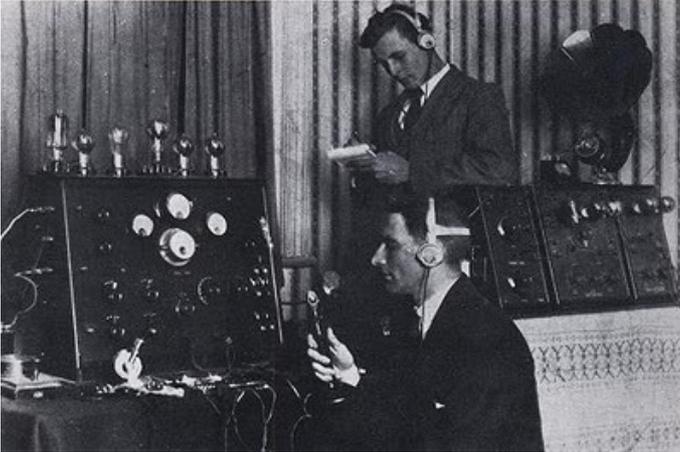
At lower power outputs it will be "off resonance" and consequently the efficiency will be much lower than it could be. Using the Eimac 3-500Z valve as an example, if we drive the valve to 50% of the normal anode current the pi tank is now presented with not 5000-ohms but 10k-ohms so none of the components are even close to that required to resonate. C1 and C2 need to be half the original capacitance and L needs to be twice the original, not a happy situation :(If you work the values back you will find the loaded Q with the original values for C1, C2 and L has doubled.

High loaded Q means more power is dissipated in the components, particularly L.

If you want to run at 50% of the RF output power then the best method is to lower the high voltage supply to 50% and tune for the same anode current as when on high power. If you choose this method you will find that the anode load resistance remains the same and the pi tank components are still the correct values for this lower power level, at the chosen loaded Q and the same efficiency - pretty neat ! Very simple to arrange with suitable switching in the power supply, but hardly any linear on the market use this obvious method, why is a mystery?

John ZS5JF

when none were evident. In 1919 after the first world war restrictions were lifted, he began experimental music transmissions. A relative played the piano into a carbon microphone of a newly constructed valve transmitter for which a morse test to obtain a licence was now required. His call-sign 2OB gave rise to his nickname "Toby" Innes. After upgrading of the transmitter to a 6-valve unit constructed by a Mr Alf Goodman (seen below) and a 45 ft high sausage aerial, he broadcast concerts and gramophone records nightly between 1922 and 1924, and his listener-ship grew to around 3000.

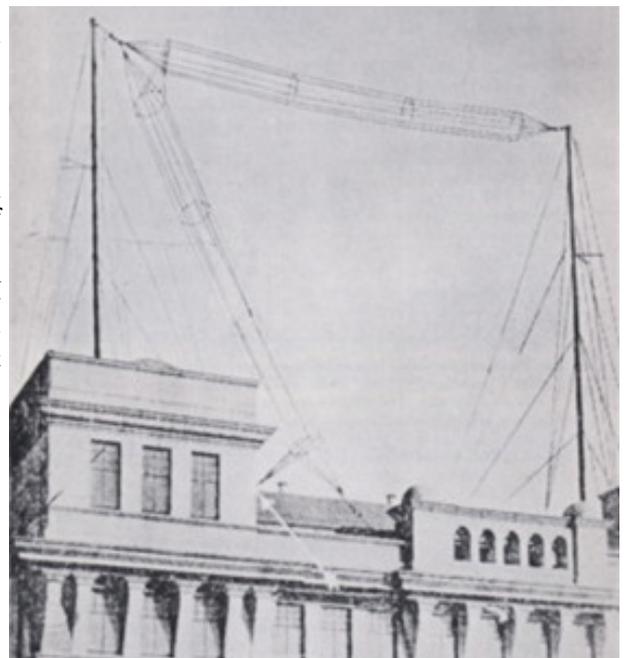


1924 was a watershed year when licensing of amateurs was properly regulated, and the previous often self-assigned call signs were prefixed with the country code for South Africa which was FO. The Scientific club (AS & TS) was granted a broadcast licence, the precursor to the SABC and commenced transmissions just two years after the BBC from a studio on the third floor of Stuttaford's Building in Rissik Street. The control room was located directly below the cage antenna on top of the building.

1925 saw the formation of The South African Radio Relay League (now known as The SARL) and on 31st November 1928 ZU, ZT, & ZS prefixes were allocated by the ITU and adopted.

The continued practice of MF transmissions on the AWA AM nets harks back to the very earliest days of amateur radio experimentation and is a proactive way of ensuring the maintenance and preservation of our heritage.

(Footnote: Your historian is collecting information about the people in the article and also about Alfred Jennings in PE who independently invented radio in the same year as Marconi in 1899. Any articles, news-clips, photographs, anecdotes, or other material relating to them that members may be able to pass on would be gratefully received.)



Richard ZS6TF Birthday

It was Richards 70th Birthday and a few of us received invites to attend the festivities with some of Richards friends in the Car Club, which is his other hobby, or one of them anyway.

Ted had taken some time and used up all his connectors in his shack and those he could source in Klerksdorp, to make this little RF Mannetje for Richard.

We were all quite intrigued by this, especially Richard, who enjoyed it immensely.

Of course, Richard does not miss out on the opportunity to talk to the masses and gave a very interesting background to his favourite interests in life these days.

Congratulations Richard on another milestone in your life, including another ring around the trunk.

Clandestine Radio During WWII

Compiled by agent Tim ZS61M

At the outbreak of the Second World War, Winston Churchill, instigated the formation of a single sabotage organisation, called the Special Operations Executive (SOE). The mission of the SOE was to conduct espionage, sabotage and reconnaissance in occupied Europe against the Axis powers, and to aid local resistance movements.



Sir Winston Leonard Spencer-Churchill

The SOE operated in all countries or former countries occupied by or attacked by the Axis forces, except where demarcation lines were agreed with Britain's principal allies (the Soviet Union and the United States). It also made use of neutral territory on occasion, or made plans and preparations in case neutral countries were attacked by the Axis.

During its hay day, the organisation directly employed or controlled just over 13,000 people, about 3,200 of whom were women. It is estimated that SOE supported or supplied about 1,000,000 operatives worldwide.

Churchill's order to the SOE was to "set Europe ablaze". The SOE, as an organisation, was dissolved officially on 15 January 1946.

The SOE developed among other things, radios, weapons, explosive devices and booby traps.

The Wireless Station 19 Designed in England 1940



Radio

The majority of the resistance networks which the SOE formed or liaised with, were controlled by radio, directly from Britain or one of the SOE's regional headquarters in Cairo and Delhi. The main transmitting and receiving stations in Britain were at Grendon Underwood and Poundon, both in Buckinghamshire (and near the Secret Intelligence Service-controlled Bletchley Park; the location and topography were suitable for all three sites). All resistance groups contained at least one wireless operator, and all drops or landings were arranged by radio, except for early exploratory missions which were sent "blind" into enemy-occupied territory.

This made the SOE highly dependent upon the security of radio transmissions. There were three factors involved in this: the physical qualities and capabilities of the radio sets, the security of the transmission procedures and the provision of proper ciphers.

3MkII "Berit" Suitcase Radio, 16-20 Watts output, making this the most powerful of the SOE suitcase sets



Early Radios

SOE's first radios were supplied by SIS. They were large, clumsy and required large amounts of power. The SOE also obtained a small quantity of much more suitable, sets from the Poles in exile, but eventually designed and manufactured their own, such as the Paraset.

Some of these, together with their batteries, weighed only 9 pounds (4.1 kg), and could fit into a small attache case, although larger sets were required to work over ranges greater than about 500 miles (800 km).

OP-3 Type 30/1 designed by the Polish in England 1943



Agent Radio Operation

During this time, the use of clandestine radio for agent communications was widespread. Literally hundreds of agent circuits were operated during the war. On the Axis side they ranged in type from highly organized nets involving German diplomatic installations, to single operations in such widely scattered places as Mozambique and isolated locations in the USA. On the Allied side there was no part of Axis territory where clandestine communications operatives did not operate.

It was almost impossible to tune a communications receiver on an evening, without running across signals which were so obviously not what they were trying to seem.

Signal Plans

On both sides the signal plans (call signs, frequencies, and times of transmission) and procedures used by agents were for the most part very simple. It was also easy to distinguish one service from another by their different characteristics. The random contact times and frequent changes in frequency that we consider essential today were represented by uncomplicated regular patterns simple to reconstruct. In many cases the rota -- the cycle in which the plan repeated itself -- was only a week's duration. Often only the list of call signs was carried out to a 31-day rota.

<u>LEPIDUS</u>				
<u>FIELD FREQUENCIES</u>			<u>BASE FREQUENCIES</u>	
A	5490.8		M	5370
B	6740.0		N	3155
C	6571.9		O	6175
D	3289.7		P	4805
E	5395.0		Q	6475
F	2727.9		R	4335
G	6164.9		S	3510
H	3525.1		T	6605
I	4313.1		U	7010
J	5732.5		V	5640
K	5852.2			
L	4741.7			
	6640.0			

<u>CONTACT TIMES</u>				
<u>DAYS</u>	<u>HOURL (GMT)</u>	<u>FIELD FREQ</u>	<u>BASE FREQ</u>	<u>ALT FIELD FREQ</u>
MONDAY	0730	A	M	I & E
TUESDAY	0945	F	O	C & J
WEDNESDAY	1200	L	T	B & C
THURSDAY	1500	C	Q	L & F
FRIDAY	1745	I	V	J & A
SATURDAY	1915	A	M	I & E
SUNDAY	0545	K	R	E & H

<u>TIME-FREQUENCY CHART FOR SUPPLEMENTARY CONTACTS</u>		
<u>HOURL (GMT)</u>	<u>FIELD FREQ</u>	<u>BASE FREQ</u>
0000-0559	D	N
0600-0759	A	M
0800-0959	F	O
1000-1159	C	Q
1200-1359	L	T
1400-1559	L	T
1600-1759	C	Q
1800-1959	I	V
2000-2159	H	R
2200-2359	G	S

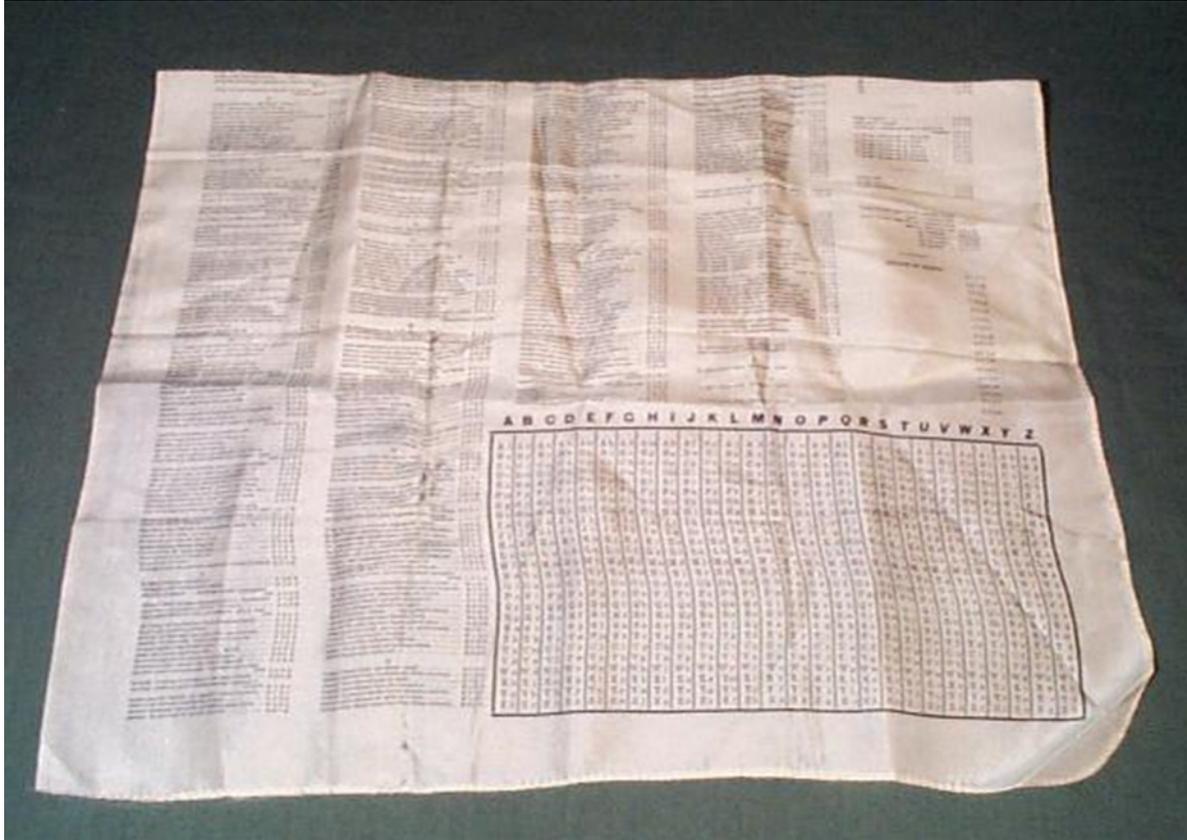
GUARD CHANNEL 0600-2000 (GMT):

FIELD -----5955.0 KC - - - C D J

BASE -----5570.0 KC - - - P U F

Frequencies

The agent was generally given a reasonably good range of operating frequencies, usually between five and ten, to help protect him from detection and arrest, but he was often his own worst enemy. Certain times and frequencies, because they afforded better operating conditions either radiowise or from a personal standpoint, became favorites. Almost nothing the base could say or do would convince an agent that he was endangering himself when he abandoned even the simple non-repetitive pattern of his signal plan in favour of the convenience of operating day after day on the same frequency at the same hour. It must be said, in all fairness, that in some cases this practice was almost unavoidable because of the agent's need to live his cover. In others, however, it was stupidity, laziness, or complete incomprehension of the need for good radio security. Security laxness was particularly foolhardy of those who operated alone and without benefit of "watchers" to warn when enemy personnel were approaching.



Codes for an agent, printed on Silk cloth

Types of Operators

Four basic types of agent radio operators can be identified -- those who operated in metropolitan areas in conjunction with well-organized watcher organizations; those who operated on their own in cities; those who were with the guerrilla groups; and those who worked alone in isolated rural areas.

The City Operative

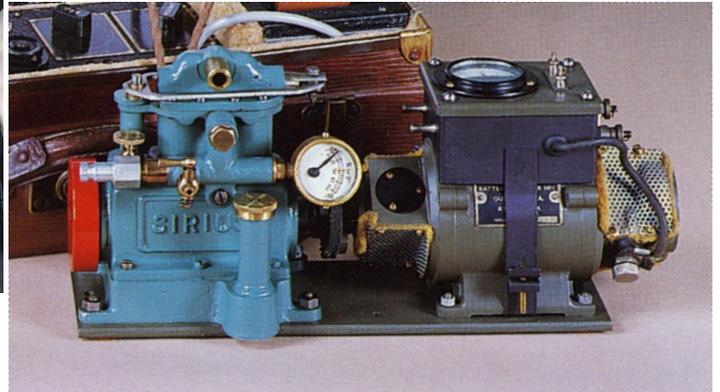
In cities a variety of techniques was employed to protect the operator. In one case as many as five operators in widely separated areas were geared to function as one station. All had transmitters on the same frequency and copies of the traffic for a given schedule. If the enemy approached the vicinity of a particular operator, he would stop transmitting when signalled by his watcher, and at the same time another operator in a remote part of the city who had been listening to his colleague would, with a hardly perceptible pause, continue the transmission. As necessary, a third would take over from the second and so on, much to the frustration of the opposition. In another instance long-abandoned telephone lines were used to key distant transmitters, whose remoteness from the operator greatly increased his security. These and other sophisticated devices were employed successfully in target areas where an extensive and highly organized underground was able to create the conditions for them.

Generally, however, a less imaginative but equally effective means of protecting the operator was used -- teams of watchers were strategically placed in the streets around or on the roof of the building in which the agent was working his set. When enemy direction-finding trucks or personnel with portable sets were spotted approaching, a signal would be sent to another watcher either in the room with the operator or close enough to warn him to stop transmitting. Usually the warning was enough; but one agent

was so intensely anxious to get the traffic off that he repeatedly ignored the warnings of his watcher on the roof above him. A string had to be fastened to this man's wrist, with the roof watcher holding the other end, so that he could literally yank the operator's hand away from the key!



Alco Power Generator in carry case, was a steam generator heated by wood or coal



Alco Power Generator used on B2 suitcase radio set

The Lone Operative

Less is known about the lone operatives in cities. They lived lonely, frightened lives, particularly tense during their transmissions. Frequently they had the feeling that the enemy was just outside the door waiting for the right moment to break in, and sometimes he was. The most grateful moment in the lone operative's day came when he heard the base say "Roger. Nothing more." Sometimes the base operator would impulsively end with the letters GB ES GL -- "Good bye and good luck" - even though he knew it was against the rules.

The lone agents who survived owed their lives to a highly developed sense of security and intelligent use of the resources available to them. They went on the air only when they had material they considered really important and they kept their transmissions short. They either were or became such good operators that they approached the professional level in skill. Sometimes they were able to change their transmitting procedure from what they had been taught to one which enabled them to reduce greatly their time on the air. They took advantage of unusual operating locations and moved frequently.

In addition, they undoubtedly owed something to good fortune: many who were caught were victims as much of bad luck as of enemy action. One German agent in Italy who had most skilfully and successfully evaded Allied capture over a long period was caught only with the casual help of an Italian woman. After watching with curiosity the efforts of a DF crew in the street for some time, she finally approached the officer in charge and diffidently offered the suggestion, "If you're looking for the man with the radio, he's up there."

Some lone agents who were unable to live alone with their secrets were spotted because of their inability to keep their mouths shut. Their compulsion to tell a sweetheart or a friend or to draw attention to themselves by living or talking in a manner out of keeping with their covers resulted in their capture.

(Continued in next issue)

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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'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:**

Saturday 06:00—AM Net—3615
Saturday 07:00—Western Cape SSB Net—7080
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.

WANTED:

Looking for a Frequency Crystal for a Hallicrafters HT40 for 40m.
Looking for a power supply for a Hallicrafters SR160/SR500.
Looking for a Hallicrafters SX140 receiver.

Contact Andy ZS6ADY—082 448 4368
