AWA Newsletter

#48

December 2009

A Member of the SARL

Antique Wireless Association of Southern Africa

Inside this issue:

AWA Committee:

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

Reflections:

Things are really warming up, the bands, the weather and even the shops, as all start to gear themselves up for the "silly season".

I call it this because it just seems to me this is the time of year when everyone who was at least a little bit sane, tends to lose it all.

We've reined ourselves in up until now. Not overspent or maxed out the credit card. Kept the spending of extra cash to a minimum. Now comes that time of year when we spend all that hard earned money on things like trips to Mauritius, the Seychelles, or maybe even Europe. We buy the most exorbitant presents for those nearest and dearest to us. Look for a good, brand new plug and play rig that has all the bells and whistles and can even switch the kettle on for us.

We get with it, a fully synthesised 1Kw linear which will be programmed to only put out 400w maximum (Ha Ha) and buy a log periodic beam that does all the frequencies.

We get on the air, switch in the graphic equaliser, speech processor and DSP with automatic noise blanking and signal enhancement like you have never seen, and call CQ. Even the lights in the house dip.

We call CQ again and a station comes back "ZS6XYZ, this is ZS1XYZ, you're running a 5/9 here in to Cape Town". You go back and tell him he's running a 5/9 to your QTH as well and then proceed to give him the run down of all the equipment you're using. "That sounds pretty impressive," the voice on the other end says. "This side using a homebrew QRP rig running 1 watt into a inverted V at 6m". Who do you think is getting the most enjoyment out of his hobby ?

That's what I love about valve rigs and old Boat Anchors. They give you as much enjoyment as the QRP homebrew rig because you got it up and running after a long arduous struggle of cleaning and refurbishing. Then you still had to tune it properly so it gives you maximum power out.

Whatever your need, whatever your preference, do have a happy "Silly Season".

Best 73

De Andy ZS6ADY

Wikipedia—The Resistor

Carbon composition resistors consist of a solid cylindrical resistive element with embedded wire leads or metal end caps to which the lead wires are attached. The body of the resistor is protected with paint or plastic. Early 20th-century carbon composition resistors had uninsulated bodies; the lead wires were wrapped around the ends of the resistance element rod and soldered. The completed resistor was painted for colour coding of its value.

The resistive element is made from a mixture of finely ground (powdered) carbon and an insulating material (usually ceramic). A resin holds the mixture together. The resistance is determined by the ratio of the fill material (the powdered ceramic) to the carbon. Higher concentrations of carbon, a weak conductor, result in lower resistance. Carbon composition resistors were commonly used in the 1960s and earlier, but are not so popular for general use now as other types have better specifications, such as tolerance, voltage dependence, and stress (carbon composition resistors will change value when stressed with over-voltages). Moreover, if internal moisture content (from exposure for some length of time to a humid environment) is significant, soldering heat will create a non-reversible change in resistance value. These resistors, however, if never subjected to overvoltage nor overheating were remarkably reliable.

They are still available, but comparatively quite costly. Values ranged from fractions of an ohm to 22 megohms.

CW Net:

With the change coming about in the bands and some rather improved conditions, we have seen a few of the old CW enthusiasts return to the frequencies. How wonderful it has been to hear John ZS6JBJ coming back with 599 reports from Witbank after a long dry period of no contacts at all.

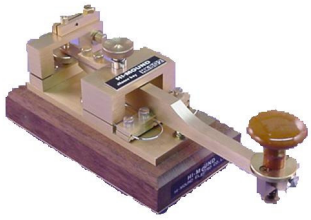
John ZS5JON in Durban has also been absent for a while as have a few others who now come up regularly. Forgive me if I don't mention all the call signs, but it is so nice to go and sit in the shack on a Saturday afternoon now, at least knowing there will be a few of us up on the CW net.

I cannot help but thank those old Faithfull's who have sat through this dry period every Saturday, even if just to come up and say hello. Now of course we want to encourage those who have been waiting for some change in the bands, that it has happened. If you don't get on the air now, you're going to miss it.

I wonder if there are any stations out there thought of trying to get WAZS in the CW mode ? I was looking at it the other day and thinking this will be quite a challenge. Especially today, not using all the previous contacts on CW from 10 and 15 years ago.

Are there still 50 plus CW operators in Div 6 ? This would be a challenge on it's own.

Early in February we have the AWA CW activity day over a period of 24 hours. This would be a good time to try and gather as many call signs as possible towards the illusive "WAZS CW". The last one, which actually was the first one, only netted a total of 29 entrants. Lets hope the next one will be much better attended.



HK 802

To coin a phrase "CW, the gentleman's art of communication". (Thanks Ian)

De ZS0AWA/CW …-.-

SSB activity:

Although the bands are slowly improving on further stations, the closer stations don't seem to be able to break the back of it. Div 5 and 2 are certainly working well on 40m, but stations closer to home are not making the S5 levels. If you can't work them on ground wave, then you can't hear them properly.

Willem and myself have been finding it increasingly difficult to hear each other on 40m. Dave ZS6MUS is quite readable to Rad in Midrand, yet to Willem and myself, we have difficulty copying him. No offense to you Dave, just using it as an example.

So what is the solution ? Once again, we need to encourage the local guys, Gauteng region, to use 80m (3615). It doesn't help that you can hear the Div 2 and Div 5 stations or even Z2 stations. If the control station can't hear you, then we can't call you in, nor can we relay you for the rest of the guys who can't hear you.

It makes sense, well to us anyway, to use 80m if you are close enough for it to work for you. The 80m relay was put in place specifically for that reason, and it does work. Just ask those who do use it.

Yes we are all hoping the 40m band will improve so well that we will all be able to work on it without having to relay. But at the moment that is not possible.

So come on guys, work with us on this one and use the 80m relay.

Drake TR-4C

AM:

The AM net has had a few surprise visits during the month which have been quite welcome. Om Derrick ZS5DM, and Garth ZR6SUN, have been heard with good reports on the net. Basil ZS6BDS popped in one morning to say hello too.

We have had a request to take reports on SSB after the AM net on a Saturday morning. We just could not think why we had not thought of this before, but if you listen in on the AM net and you don't have an AM transmitter, then feel free to come back after the net and give us some reports, when asked to do so.

We know there are listeners who tune in to the net, so now here's your opportunity to give us some feed back. We know the guys will all appreciate some reports and find out what their signals are like out there.

Om Dave ZS6AAW, listens to the net most Saturday mornings a on a little portable receiver that has general coverage and then gives us a report on the SSB net from his favourite haunt at ZS6MUS from Swartkops Airbase.

If you have an AM rig and want to join in the fun on AM, please do. Om Garth has proved that it doesn't take a terribly strong AM signal to be heard. Garth runs a QRP rig with only about 10w out. Yes there are times that we cannot hear him too well, but there are also times when he is heard with a good Q5 readability.

Do come up on 3615 AM on Saturday morning from around 05:30 and join us.

Collins 200A AM Tx

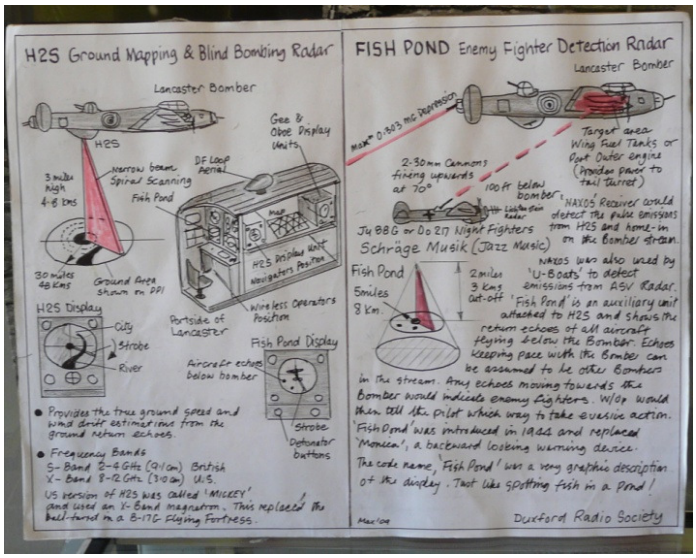
DUXFORD

By Richard ZS6TF

My first visit to Duxford near Cambridge was in March 2008. It had snowed since early morning and when the doors opened at 10am we were greeted with the good news that entry was half price and the bad news that only the Aerospace hangar would be open. The Lancaster bomber and the stand alone displays of the Radio op and navigators are housed in there so I had the opportunity to study and photograph the latter as a reference for my R1155/T1154 project. By midday the weather had improved and the other hangars were opened which made the visit very worthwhile, but on that day the radio huts remained firmly locked and no amateur radio activities in evidence. I had another opportunity to visit in August 2009 and this time I contacted one of the GB2IWM station operators, OM Max G3MEZ a few days before and this really made the difference. Max is ex-British Army, Royal Electrical and Mechanical Engineers (REME) and ex-Pye Telecommunications/Philips Telecom. He was the perfect host and I was able to achieve everything on my wish list.

I operated the GB2IWM main station to get my callsign and signature in the logbook and also operated the R1155/T1154 equipment which is neatly housed in a case of the type fitted to high speed recovery launches. DRS member Ken kindly gave me a guided tour of the exhibits in “Buildings 177 & 178” where a lot of conserved equipment is displayed

Of particular interest to me was the Fishpond indicator usually mounted alongside the R1155 receiver in the Lancaster so that the RO could watch out for enemy night fighters coming up from below, and processed and displayed images from the cone of view of the H2S (Height to surface) radar.



During the afternoon Max talked me through the activities that they run for the visitors with an emphasis on the youngsters. Exercises at various levels of difficulty in encryption, coding and morse practice with a certificate for those who succeed in sending their name in morse from the simulated Lancaster RO position, specially adapted for disabled access. Also supplied was copies of documentation for recording equipment details for conservation, and useful publications to assist the efforts at ZS1MUS and ZS6MUS. I also joined the DRS to get updates on their activities through their magazine. The day ended with a saunter past the apron to see a Mustang and a Spitfire parked there, and a DC3, a B19 bomber and a Dragon Rapide in the air over the museum.

Edward George Bowen

By R. Hanbury Brown, Harry C. Minnett and Frederick W.G. White
This memoir was originally published in *Historical Records of Australian Science*, vol.9, no.2, 1992. It also appeared in *Biographical Memoirs of Fellows of the Royal Society of London*, 1992.

Introduction
Edward George Bowen was one of the most dynamic and influential of the wartime generation of British physicists. Having completed his doctorate under Professor E.V. Appleton at King's College, London, he was recruited by Robert Watson-Watt in 1935 and played an important part in the early development of radar in Britain. He went to the United States with the Tizard Mission in 1940 and helped to initiate the tremendous enterprise that marked the evolution of microwave radar as a fighting weapon in the war. He was invited to join the CSIR(O) in Australia in 1943 and became the Chief of the Division of Radiophysics in Sydney. There he encouraged the greatest research effort that emerged from the war – the new science of radioastronomy – and brought about the construction of the 210ft radio telescope at Parkes, New South Wales. Following the initiation of cloud and rain physics by Langmuir and Schaefer in the United States, he mounted a remarkable effort to improve the rainfall in dry Australia which began in 1947 and continued after he retired in 1971. Throughout his Australian career, he remained a devoted Welshman, rejoicing in the name of 'Taffy'. He had a strong and independent view of his science which occasionally involved conflicting views with others, but this was balanced by an enthusiastic and engaging manner which won him many friends.

Early years

Edward George Bowen was born on 14 January 1911 in the village of Cockett near Swansea, Wales, to George Bowen and Ellen Ann (née Owen). He was the youngest of four children: Gwladys, Richard, Olwen and Edward George. Both their grandfathers had served apprenticeships on clipper ships sailing around the Horn to Pacific ports in Chile and Peru, there to load ore for the busy refineries of Swansea. George Bowen himself was a steelworker in a Swansea tinplate works, where he folded and flattened red-hot plates into the thin sheet steel needed, a task which required considerable skill and strength. He satisfied a love of music as the organist in the Congregational Chapel in nearby Sketty.

Edward Bowen had a keen mind and, at an early age, developed a lively interest in radio and also in sport, particularly cricket. At the primary school in Sketty, he won a scholarship in 1922 to the Municipal Secondary School in central Swansea. His senior years there coincided with the onset of bleak economic times in South Wales, but fortunately he was successful in again winning a scholarship which enabled him to enter Swansea University College. At first Edward's intention was to concentrate on chemistry, his top subject, but he soon changed to physics and related subjects, a decision he never regretted. He graduated with a First-Class Honours degree in 1930 and went on to post-graduate research on X-rays and the structure of alloys under the direction of the Senior Lecturer, Dr W. Morris Jones, and Professor J.V. Evans, an excellent teacher and physicist. This work earned him an MSc in 1931.

At the University he had met his future wife Enid Vesta Williams from nearby Neath, who graduated in geology and became a science teacher. They were later to marry (in 1938) and bring up a family of three sons: Edward, David and John.

The war years Ground radar

It was Professor E.J. Evans who, recognising Bowen's intense interest in radio, arranged for him to take a PhD in the Physics Department of King's College (London University) under the direction of Professor E.V. Appleton. As part of his research, Bowen spent a large part of 1933 and 1934 working with a cathode-ray direction finder at the Radio Research Station at Slough and it was there that he was noticed by R.A. Watson-Watt and so came to play an important part in the early history of radar.

The first significant event in that early history was the proposal by H.E. Wimperis, then Director of Research at the Air Ministry, that a Committee for the Scientific Study of Air Defence should be established under the chairmanship of H.T. Tizard. Prior to the first meeting of that committee on 28 January 1935, Wimperis enquired from the Superintendent of the Radio Research Station (Watson-Watt) whether it would be possible to incapacitate an enemy aircraft or its crew by an intense beam of radio waves, or in more popular language by a 'death ray'. In two memoranda Watson-Watt showed that such a 'death ray' was impracticable, but made the immensely valuable suggestion that radio waves might be used to detect, rather than destroy, enemy aircraft.

Following a successful demonstration in February 1935 of the reflection of radio waves by an aircraft, the development of radar went ahead, and on 13 May 1935 a team of five people set out from Slough for Orfordness. Their ostensible purpose was to do ionospheric research but their real purpose was kept secret: it was to set up an experimental ground radar. Bowen, now aged 24, was one of that team; he had been recruited by Watson-Watt as a Junior Scientific

Officer. While the two senior members (A.F. Wilkins and L.H. Bainbridge-Bell) took care of the antennas and the receiver, Bowen's job was to assemble a transmitter from a miscellaneous collection of parts collected together in a hurry at Slough. Before the end of May he had the transmitter working, and by using 5,000 volts on the anodes of a pair of NT46 valves he persuaded them to produce a power output of about 20 kilowatts at 6MHz with a pulse width of 25 microseconds. In the course of the next few months he increased the anode voltage to over 10,000 volts, well beyond the rated limits, and managed to raise the pulse power to over 100 kilowatts.

The first detection of an aircraft, so Bowen claims, was made on 17 June 1935 when a clear radar echo was detected from a Scapa flying boat at a range of 17 miles. This was only the beginning; many improvements, such as shorter working wavelengths, larger antennas, greater transmitter power, and systems for measuring the height and direction of the target were soon introduced, and by early 1936 aircraft were being detected at ranges of up to 100 miles.

The success of this work prompted the decision to start work on a chain of radar stations (CH) to give warning of enemy aircraft approaching the coast, and in December 1935 the funds were made available for five stations covering the approaches to London. This ambitious project made it urgently necessary to enlarge the small team at Orfordness and to establish the programme on a more suitable site. The Air Ministry bought a large and isolated country house, Bawdsey Manor, into which the original team, including Bowen, moved in March 1936.

Towards the end of 1935 Watson-Watt decided that when the move to Bawdsey Manor took place Wilkins would take responsibility for the chain of radar stations and that Bowen, at his own request, would tackle the highly speculative – and at that time unique – venture of putting radar in an aircraft. As part of the deal, Bowen was to remain responsible for his original transmitter, which would be left at Orfordness, unused but untouched, while a new transmitter was constructed at Bawdsey Manor.

In the event it proved a wise decision to leave Bowen's old transmitter untouched. The first major Air Exercise to demonstrate the use of radar in air defence was held in September 1936 using large numbers of aircraft and the new radar station at Bawdsey Manor. It was watched not only by members of Tizard's committee but also by important members of the Air Ministry and the RAF notably the Commander in Chief of Fighter Command, Sir Hugh Dowding. The first day of the Exercise was an absolute shambles; the incoming aircraft were not detected until they were so close to the coast that their engines could be heard – a sound locator would have done just as well. Urgent enquiries showed that the new transmitter at the Manor was not putting out enough power.

Bowen helped to save the day in two ways. Before a disgruntled Sir Hugh Dowding returned to London, Bowen gave him an impromptu demonstration of an experimental radar, built as part of the airborne radar programme, which was detecting the aircraft engaged in the Exercise at ranges of up to 50 miles. This, so Bowen tells us cheered Dowding up immensely. Bowen then travelled to Orford with one assistant (A.G. Touch) and, working all night, made his original transmitter work satisfactorily in time for the Air Exercise on the morning of the second day. The old transmitter at Orford held the fort until the new transmitter at Bawdsey was put right.

The rest of the Exercise went reasonably well and the plans for the construction of a chain of coastal stations survived; which was just as well, otherwise they might not have been ready to play a vital part in the Battle of Britain four years later.

Airborne radar

The problems of installing radar in an aircraft that Bowen faced in the spring of 1936 were, to put it mildly, challenging. The principal application envisaged for airborne radar was night interception and at that stage the principal problems were not operational but technical; it is easy to underestimate how difficult they looked in 1936. The most obvious difficulty was to reduce the size and weight of the equipment; the existing ground radar's would fill a small house, weighed several tons and took many kilowatts of power. Bowen decided that a viable airborne radar should not exceed 200 lbs in weight, 8 cubic feet in volume and 500 watts in power consumption and that, to reduce the aerodynamic drag of the antenna, the operating wavelength would have to be about one metre – a very short wavelength in those days.

These targets were very difficult to meet. In those days most radio components were large, heavy and unsuitable for use in the extremes of vibration, temperature and atmospheric pressure met with in military aircraft. The aircraft power supply was DC, variable in voltage and very limited in capacity. There were a number of other troublesome problems; for example, there were no solid dielectric cables to connect the radar equipment to the antennas. But the greatest difficulty of all was to generate enough power at short wavelengths in a transmitter that could be carried in an aircraft.

Over the next few years, Bowen and his group tackled and solved most of these problems. To take two

important examples, in 1938, with the help of Metropolitan Vickers, he solved the problem of the power supply in aircraft by introducing an engine-driven alternator which gave an 80 volt, 1,000 Hz, voltage-stabilised supply. In 1939 he encouraged ICI to produce the first radio-frequency cables with solid polythene dielectric, a most important advance.

Faced with the difficulty of fitting a sufficiently powerful transmitter into an aircraft, Bowen's first move was to leave it on the ground and carry only the receiver and indicator in the air. He erected a powerful (30 Kw) 6,7 metre wavelength transmitter on the roof of Bawdsey Manor and installed a receiver and cathode-ray indicator in a Heyford aircraft with a simple half-wave dipole strung between the wheels. Flying from Martlesham Heath in the autumn of 1936, he detected aircraft at ranges of up to 12 miles.

This hybrid system had the advantages that the transmitter could be large and powerful and that, unlike later metre-wave airborne radar's, its maximum range was not limited to the height of the aircraft above the ground; nevertheless it had the obvious limitation that the range of the target aircraft, as seen by the fighter, was only correct when the fighter was in a direct line between the transmitter and the target. Although Bowen argued hard for its further development, he failed to persuade Watson-Watt; so he dropped it and pressed on with the construction of a complete airborne radar.

In early 1937 he acquired some Western Electric 316A valves that were capable of delivering a pulse power of a few hundred watts at a wavelength of about one metre. A complete radar system, using these valves, was built at a wavelength of 1,25m and installed in an Anson. On 17 August 1937 it was tested in the air by two of Bowen's group, A.G. Touch and K.A. Wood; although they detected no aircraft, they obtained clear echoes from ships off the coast at Felixstowe at ranges of two to three miles. Following this flight the performance was greatly improved by increasing the wavelength to 1,5m, which subsequently became the standard wavelength for metre-wave airborne radar.

In September 1937, hearing that an exercise was planned during which Coastal Command would search for the Fleet, Bowen gave a dramatic, uninvited, demonstration of the application of radar to aerial reconnaissance. Together with K. A. Wood he used the experimental 1,5m radar to search for the Fleet in the North Sea under conditions of low visibility and, much to the astonishment of the Navy and Coastal Command, he found the aircraft carrier *Courageous,* the battleship *Rodney* and the cruiser *Southampton.* It was during this flight that they detected radar echoes from the aircraft of *Courageous* – the first detection of an aircraft by a complete airborne radar. This demonstration was, so Bowen tells us, *'a landmark in the history of airborne radar'*; it was followed by many demonstrations to senior officers of the RAF.

The airborne radar group now had two major projects, the detection of ships (ASV – Air to Surface Vessels) and the interception of aircraft (AI – Aircraft Interception). Although there were many other applications in Bowen's lively and fertile mind, there was never enough time to explore them properly. He did, however, manage to experiment briefly with the use of airborne radar to detect features on the ground such as towns and coastlines, to detect falling bombs in a scheme to attack bomber aircraft from above, and as an aid to navigation in which the contours of the ground beneath an aircraft were compared with a map.

ASV (Air to Surface Vessels)

During 1938, most of the work of Bowen's small group was devoted to the development of improved components for both AI and ASV, and to the design of a practical system of ASV. The principal question was whether the radar should scan the sea for ships by looking forward, sideways or all round. The three modes required different antennas and displays.

The design of the forward-looking mode was technically the simplest and was fairly well established by mid-1938; as we shall see later, this was the first form of ASV to be adopted by the RAF.

To test the sideways mode, Bowen had two six-element Yagi antennas fitted to an Anson so as to project a beam at right angles to the direction of flight. Using a photographic recorder to record the returns from objects scanned by this beam, he demonstrated the system to the Services by showing them *'radar pictures'* of ships of the Home Fleet as they passed from Spithead to Portland in May 1938.

To test the all-round-looking mode, Bowen arranged to fit a rotating dipole to an Anson and to display the signals on a cathode-ray tube using what is now called a B-scan. Although one of his group (P.L. Waters) made this system work, its maximum range was unsatisfactory, probably due to losses in the rotating joint. Following extensive tests and demonstrations, in which Bowen played a major part, it was eventually decided that the first ASV system in service would be forward-looking. In this system the power from the aircraft transmitter was radiated in a wide beam forward, and the returns from the target were received on two simple antennas mounted on each side of the aircraft to give overlapping beams in the forward direction. The receiver was connected in rapid sequence to these two antennas by a fast rotating switch, and the signals were displayed as deflections to the right and left of a vertical time base on a single cathode-ray tube.

The first installation of ASV Mk I was made in a Hudson aircraft in December 1939. It could detect a 10,000 tonne ship at a range of about 20 miles and coastlines at 30 to 40 miles. About 300 sets were made and were fitted in Hudsons and Sunderlands of Coastal Command. In practice its main use was to aid navigation, not to find enemy shipping; it helped patrols to rendezvous with convoys *(The Battle of the Atlantic* [1946]), provided navigational assistance by detecting coastlines and, more popularly, helped aircraft to return to base using transponder beacons.

> When war was declared in September 1939, Bawdsey Research Station, now called the Air Ministry Research Establishment (AMRE) was 'evacuated' to Dundee and the airborne group to Perth aerodrome. Bowen was then faced with the extremely awkward problem of carrying on the development of airborne radar at an aerodrome which had neither laboratory space nor adequate hangars. That did not last long; in late October his group was moved to 32 Maintenance Unit at St Athan which, although it had adequate hangars, was too far from Dundee and a most unsuitable place in which to do laboratory work. However the main task of Bowen's group at St Athan was to help the RAF to fit radar's to their aircraft, and in doing this they were entirely successful; within a few months, aircraft were being fitted with AI or ASV at the rate of about one per day. It is very much to Bowen's credit that this was achieved in such difficult circumstances.

One of the first things that Bowen did at St Athan, in response to an urgent enquiry from Admiral Somerville, was to try to detect a submarine by radar. In the first week of December 1939, Bowen and I (RHB) carried out flight trials using ASV Mk I in a Hudson to look for submarine L27 in the Solent. On the first flight at 1,000 feet we detected the submarine in a fairly rough sea at a range of 3 miles; on a subsequent flight at 6,000 feet, with a calmer sea, we detected it at a range of up to 6 miles. In our report on these trials we pointed out that although these ranges were short, they had been obtained with simple dipole antennas and could be doubled by using high gain directional antennas in a sideways-looking system.

Following these results it was agreed to introduce a sideways-looking system (Long Range ASV, LRASV) for anti-submarine patrol and, as a start, Bowen arranged that a Whitley should be fitted with high gain directional antennas. The first Whitleys with LRASV went into service at Aldergrove in December 1940. At a height of 2,000 feet they could detect coastlines at about 60 miles, a 10,000 tonne ship at 40 miles, a destroyer at 20 miles and a submarine at 8 miles; at 5,000 feet their range on a submarine increased to between 10 and 15 miles.

The engineering of the equipment, to make it more rugged and reliable, was carried out at the Royal Aircraft Establishment (RAE) under the supervision of a senior member of Bowen's original group (A.G. Touch). The set which they developed (ASV Mk II) was produced in far greater numbers than Mk I; in the UK alone, 6,000 sets were made, and many thousands were produced in the USA and Canada. It was fitted to patrol and reconnaissance aircraft all over the world and used in anti-submarine patrols, anti-shipping strikes, convoy escort and many other duties. Its principal value was in the first phase of the Battle of the Atlantic when the Germans were using the captured French ports to give their U-boats easy access to the Atlantic. In April 1941 Coastal Command was operating anti-submarine patrols with about 110 aircraft fitted with ASV Mk II, and the use of radar by these aircraft increased the daylight sightings of submarines significantly. More importantly, it made it possible to attack submarines at night as they travelled on the surface; in 1941-1942 over 90 per cent of night attacks were made as the result of ASV contact. However, very few of these attacks were lethal until the introduction in mid-1942 of a powerful searchlight (Leigh Light) that illuminated the submarine. The combination of this light with ASV Mk II was so effective that the submarines tended to submerge by night and surface by day, thereby increasing their destruction by daytime patrols. This satisfactory state of affairs lasted for a few months until the Germans introduced a listening receiver – Metox – which warned the submarine of the approach of an ASV-equipped aircraft so that it could dive. As far as metre-wave ASV was concerned the introduction of this listening device marked the end of the first phase of he Battle of the Atlantic; the second phase was taken up by centimetre-wave radar. (to be continued in next Issue)

Acknowledgements

We wish to acknowledge the generous and invaluable assistance received throughout from Miss Sally Atkinson BEM, secretary to E.G. Bowen from 1946 to 1971 and now Honorary Archivist in the Division of Radiophysics. For material on Bowen's family and early years in Wales, we are indebted to his sons Edward and David and to W.S. Evans now living in Nelson, New Zealand. Thanks are due also to Dr E.K. Bigg, who contributed materially to the account of Bowen's work on cloud seeding and rainfall.

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R. Hanbury Brown, AC, FRS, FAA, (wrote the section entitled 'The war years'), Emeritus Professor of Physics, University of Sydney.
Harry C. Minnett, OBE, FAA, FTS, former Chief of the CSIRO Division of Radiophysics, 1978-1981. Frederick W.G. White, KBE, FRS, FAA, former Chairman of CSIRO, 1959-1970

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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 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:

Valve Testing:

John ZS5JX, has contacted me offering his services to any AWA members needing to have valves tested. He also has an assortment of replacement valves for anyone in need of such. I only have an email address for John which could be used to get in contact with him : zs5jx@darc.org.za

Committee for 2010:

It's time to vote in a new committee for 2010. Nominations received at the AGM at Rand Airport will stand as there have been no further nominations for positions on the committee.

Nominations received:
President—Don ZS5DR
PRO/ News editor—Andy ZS6ADY
Technical Advisor—John ZS5JF; Rad ZS6RAD; John ZS6ABJ
Net Controller—Willem ZS6ALL

The only area where a decision needs to be taken is on the Technical advisor. We will advise.