



Antique Wireless Association of Southern Africa Newsletter



196

November 2022

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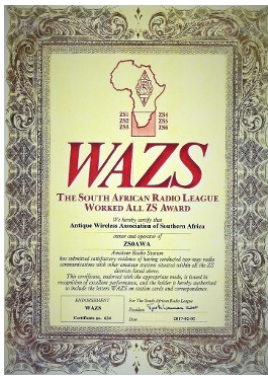
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Inside this issue:

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- * Vice President—Jacques ZS6JPS
- * Technical Advisor—Rad ZS6RAD
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- * WC—John ZS1WJ
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Reflections:

My first recollections of seeing valve radio's, were not the greatest things on earth. I had been subjected to nice modern small compact CB radio's that, some of them had good looks, whilst others were quite bland and very uninteresting.

My first set of amateur band radios, well they were in storage for a number of years and although the receiver was just full of dust and needed a good clean out, the transmitter was very much worse off. It had been left out of it's cover in a barn that was well infested with bats. Need I say more.

At that stage I was not well read about ways and means to clean these things up and the internet was not born then.

So it was a case of paint brush, soap and as little water as possible. After all it was an electrical unit, and many hours of scrubbing, wiping and cleaning.

Once cleaned up, the

receiver took shape and it really had something that caught my attention. It was a Hallicrafters SX100, and one of my biggest regrets ever, was selling it.

The HT37 transmitter, well that was not as much of an eyecatcher as the SX100 and was big bulky and heavy.

After cleaning up and getting everything operational, Hallicrafters became a kind of infatuation. They just appealed to me as there were so many different types and models.

Could it be that the first impressions were the lasting ones?

I found too that with my first hybrid rigs, which were Yaesu, made the first impression and although they may be out-classed by things like the IC7300 today, I Still like my Yaesu rigs more.

I know there is a lot to be said about performance, sensitivity, filtering and all those things, but the Yaesu still appeals more to me. It all

goes around aesthetics and not performance.

Maybe it's because my grounding was not in the electronics field, that these are more important to me than the performance issues, but I have yet to get a better audio report than that produced by my FT102.

Of course there will always be the Icom/Yaesu/Kenwood controversy, but that's why I have Hallicrafters. Dependable, durable and long lasting.

What is your choice, the modern clinical touch screen with its bar graphs and little waves jumping up and down, or the majestic analogue face with all its knobs and meters and smooth colouring of silver and black.

I make it sound like something out of a comic book, but you can see where my taste lies.

I love analogue.

I love valves.

Best 73

DE Andy ZS6ADY

Wikipedia

Solar Flares:

Terrestrial

X-rays and extreme ultraviolet radiation emitted by solar flares are absorbed by the daylight side of Earth's atmosphere and do not reach the Earth's surface. Therefore, solar flares pose no direct danger to humans on Earth. However, this absorption of high-energy electromagnetic radiation can temporarily increase the ionization of the upper atmosphere, which can interfere with short-wave radio communication, and can temporarily heat and expand the Earth's outer atmosphere. This expansion can increase drag on satellites in low Earth orbit, which can lead to orbital decay over time.

Radio blackouts

The temporary increase in ionization of the daylight side of Earth's atmosphere, in particular the D layer of the ionosphere, can interfere with short-wave radio communications that rely on its level of ionization for skywave propagation. Skywave, or skip, refers to the propagation of radio waves reflected or refracted off of the ionized ionosphere. When ionization is higher than normal, radio waves get degraded or completely absorbed by losing energy from the more frequent collisions with free electrons.^[1] The level of ionization of the atmosphere correlates with the strength of the associated solar flare in soft X-ray radiation. The NOAA classifies radio blackouts by the peak soft X-ray intensity of the associated flare.

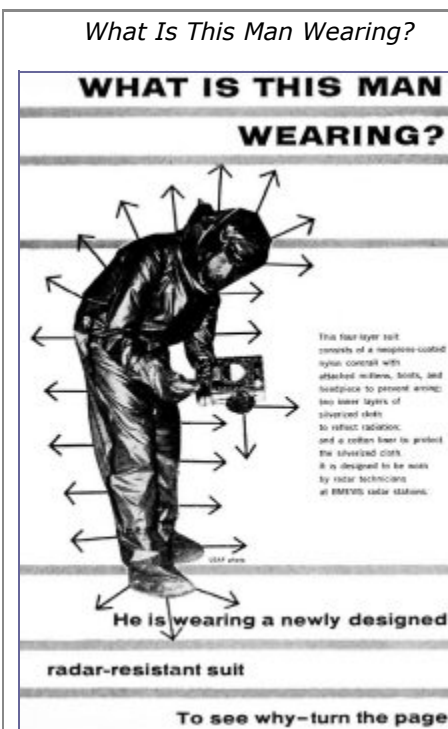
The Danger of Radar Waves

March 1961 Popular Electronics

Having worked on S-band and X-band radar as a maintenance technician for a four-year hitch in the U.S. Air Force, articles like this one from a 1961 issue of *Popular Electronics* magazine always piques my interest. A lot of ground is covered here regarding some history on documented cases of unintentional human exposure to microwaves and laboratory experiments on animals exposed to microwave radiation. Author Ken Gilmore points out the difference between ionizing radiation from nuclear actions and reaction, and non-ionizing radiation from microwave generators. In today's political environment, facilities in Ukraine, China (Wuhan in particular), etc., would need to be secretly paid to do the animal experiments described herein. Some pretty incredible scenarios are described where radar technicians would stand in front of radiating antennas to keep themselves warm in cold climates, and one guy would stick his hand into an antenna horn to check whether the transmitter was on by noting if his hand got warm (probably causing a wickedly high VSWR on the output amplifier). A lot of similar research has been performed on radio frequency effects on humans since the advent of cellphone operating in the UHF and into S-band regions. The term "specific absorption rate" (SAR) has become common parlance in the industry since the mid-1990's. This is a good historical read.

The Truth About the Danger of Radar Waves - Exclusive Report

By Ken Gilmore



He is wearing a newly designed radar-resistant suit.

This four-layer suit consists of a neoprene-coated nylon coverall with attached mittens, boots, and headpiece to prevent arcing; two inner layers of silverized cloth to reflect radiation; and a cotton liner to protect the silverized cloth. It is designed to be worn by radar technicians at BMEWS radar stations.

Shortly after radar was introduced during World War II, rumors about its dangerous side effects swept through the armed services. Men working around radar, the story went, would never have children.

The rumors were officially denied and discredited, and eventually the furor died down. Everyone became so complacent, in fact, that until a few years ago it was common practice for men working around radar in cold climates to stand directly in the beam to warm themselves.

Recently we've been hearing again that radar waves are dangerous. The armed services and industries which manufacture, test, or operate radar and other powerful microwave equipment are going to a lot of trouble to keep workers away from the business end of high-powered microwave transmitters.

With such shifts in opinion and attitudes over the years, it is no wonder that many people are confused. And the continued circulation of claims, counter not helped. Less than two years ago, for example, a popular national news magazine reported that a radar technician had been killed by radar. True or false? To this day, not even the experts agree.

When it was announced that a powerful radar station would be installed in northern England as part of our Ballistic Missile Early Warning System, a storm of protest broke loose. British newspapers, citizens groups, and individuals claimed that the mammoth transmitter would do everything from killing people in the area to frying bees and thus ruining agriculture by preventing pollination of crops.

Adding to the general misunderstanding, microwave radiation has become widely confused in the public mind with ionizing radiation. The fact is, the two are completely unrelated. Microwave radiation - the kind we are talking about - is energy generated by radar and other electronic equipment operating roughly between 200 and 30,000 megacycles. Ionizing radiation, on the other hand, is produced by radioactive materials and X-ray machines - it is the radiation we think of in connection with atom bombs, fallout, and the Van Allen radiation belt.

But what of microwave radiation? Is it dangerous, too? Should experimenters, hams, and others working with high-frequency electronic equipment be very careful?

Although much remains to be learned, intensive research over the past few years has pretty well answered these questions. Summarized briefly, here is what we now know about microwave radiation and the way it can affect us:

- Microwave radiation definitely can affect human tissue and cause damage.
- Only high-powered equipment, usually found either in military or industrial service, generates radiation sufficiently intense to be harmful to anyone.
- Even this high-powered equipment, if its hazards are understood and proper precautions taken, can be used in complete safety and confidence.

- And, most surprising, recent research indicates that microwaves, under certain conditions, can have beneficial effects that may some day be used in the treatment of disease.

Heat Causes the Trouble

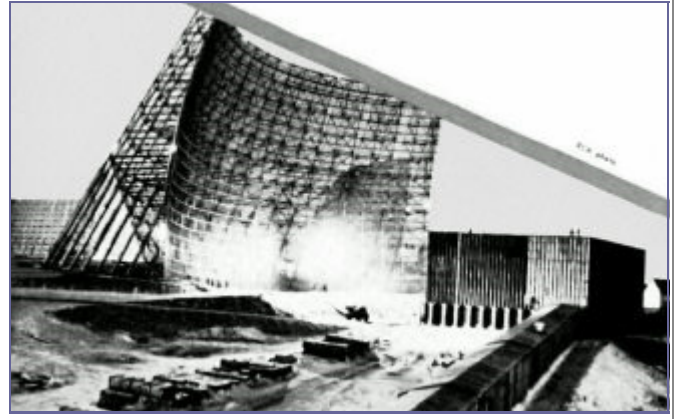
Microwaves can cause damage by generating heat in human tissue. Diathermy machines used by doctors apply this heat-generation principle in a controlled way. It also accounts for the fact that technicians can stand in radar beams and get warm. But this is a mighty dangerous way to chase a chill. Recent experiments show why.

Not long ago, scientists at the National Institute of Neurological Diseases put monkeys directly in the output beam of a 200-watt u.h.f. transmitter operating at various frequencies between 225 and 400 mc. In each case the animals were dead within five minutes. The diagnosis: death by "hyperthermia" excessive internal temperature. In further experiments, rats, mice, and other animals have proved that microwaves can kill.

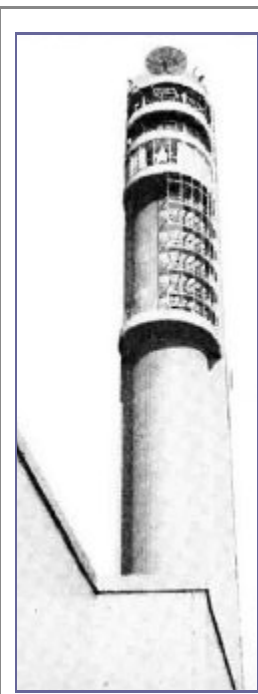
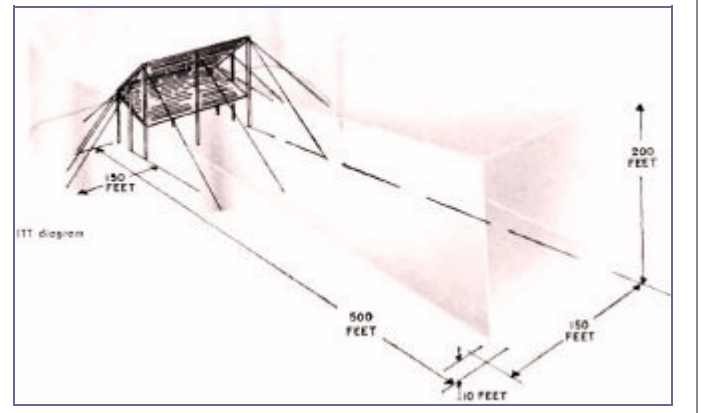
Man, of course, can take more. His heat-regulating system is far more effective than those of the lower animals. So he can absorb far more microwave radiation and get rid of the heat. But there is a limit.

Have microwaves actually killed anyone? Scientists do not agree.

About four years ago, a 42-year-old radar technician in Glendale, California, was working about ten feet in front of a radar antenna. He felt a sensation of warmth in his abdomen, and moved quickly away. Nevertheless, he was taken ill a few minutes later. Doctors rushed him to a hospital and found he had a ruptured appendix. He was operated on, but shortly afterwards went into shock and died a few days later. The doctor in charge diagnosed the case as death from exposure to microwave radiation.



To make this Thule, Greenland, radar installation safe for the men who operate it, special passageways (visible at the lower right) were constructed. The peak r.f. power radiated exceeds 10,000,000 watts.



This ITT tower in Nutley, N. J., is used for microwave experiments. To prevent the possibility of dangerous radiation, a trapdoor interlock shuts down the transmitters whenever a technician goes on the roof to service the antennas.

But many questions remained. One frankly skeptical Air Force doctor, also an expert in the field of microwave radiation, asked: "Why have thousands of men worked with the same or more powerful radars without even minor injury or discomfort, let alone fatal consequences?"

Many authorities feel that the man died from the results of his ruptured appendix, the operation, shock, or a combination of the three. The case remains unsettled.

Microwaves and the Eyes

Although the danger is clearly present, cases of actual injury from radiation are hard to find. One doctor in Albuquerque, New Mexico, reported that a patient of his developed cataracts from exposure to microwave energy. The technician was in the habit of shoving his hand into a microwave horn to see if the transmitter was operating. If his hand got warm, the power was on.

In making this check, he had to look into the horn, and thus also put his eyes directly in the beam. One day, after spending a longer than normal time at work, he found that he could not see clearly. His doctor diagnosed the difficulty as several small cataracts resulting from r.f. radiation.

Can r.f. really cause cataracts? Tests with animals show conclusively that it can. Rabbits, whose eyes are very much like human eyes, have developed cataracts after exposure to intense radiation.

Tests have shown, as a matter of fact, that the eyes are the body's most radiation-sensitive organs, since they have the poorest heat dissipation system in the body. Elsewhere, blood circulation and perspiration can quickly get rid of excess heat. But our eyes tend to retain it and get hotter and hotter until damage is done.

Other Strange Effects

Next to the eyes, the most radiation-sensitive organs are the testes. Excessive exposure to microwave radiation, can, as the old rumors had it, make a man sterile. But the situation is not as bad as it seems: the effect is only temporary. Sperm cells are extremely sensitive to heat. Thus, those already manufactured by the body may be killed by a temperature rise of only a few degrees. But radiation does not interfere with the body's ability to make more sperm cells. One

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researcher in the field estimates that a dose of radiation strong enough to permanently sterilize a man would also probably kill him.

All radiation damage to experimental animals so far noted is attributable to the effects of heating. But scientists have recently noted other strange effects that seem to have nothing to do with heat. Researchers at the University of Miami, for example, exposed chickens to a radar beam too weak to kill them. At certain frequencies the chickens began to stagger, lose control of their muscles, and turned off, they recovered immediately. Rats reacted the same way.

No one is certain why this strange behavior takes place, but here's the best theory devised to explain it so far. At certain frequencies, signals apparently resonate with certain nerve paths, or the spinal cord, "short-circuiting" the normal electrical signals the brain sends the muscles to control them. The case clearly points up the fact that there are still many unanswered questions about how microwaves affect us.

Safety Pays Off

The fact that only two known cases of death or injury have been reported in this country - and even these are not confirmed - is testimony to the fact that adequate precautions are being taken where hazards exist. Air Force scientists at Rome Air Force Development Center have concluded that no microwave damage of any kind has ever been observed unless the experimental animal was absorbing at least 0.2 watt of microwave energy for every square centimeter of surface area. To put it another way, to be in danger, they had to absorb more than a watt per square inch of exposed skin.

Since 0.2 watt/sq.cm. is the danger level for animals, and man can probably stand more, the Air Force plays it extra safe by specifying that personnel shall be exposed to radiation fields no greater than one-twentieth that amount, or 0.1 watt/sq.cm.

Most companies observe the same standards but a few are even more conservative. Operators of the Distant Early Warning radar network which stretches across northern Canada, for example, have set 0.001 watt/sq.cm. - one-tenth as much as the Air Force - as the exposure limit.

Industry and the armed services go to great lengths to protect personnel from radiation exceeding these limits. International Telephone and Telegraph Company, for example, interlocks all dangerous areas. The radar antenna on top of the ITT tower in urban Nutley, N. J., is not dangerous from the ground - but it would be from the radar platform. So the trap door on the roof leading to the antenna is interlocked: open the trap door and you automatically kill the antenna power.

BMEWS Protection System

Undoubtedly the most elaborate preventive measures ever taken are now in effect at the Air Force's BMEWS station in Thule, Greenland. Its huge radars put out pulses of microwave energy at the incredible power level of ten million watts.

The transmitter building is especially shielded to protect technicians from the tremendous radiation. The covered passageways are also solidly shielded-ceiling, walls, even floors - so that crews can go from one building to the other with the radars in operation.

Shielding of the buildings and passageways presented quite a few problems during construction. Even though the walls were made of galvanized steel sheeting, too much radiation energy got through. So first all joints were welded to eliminate cracks. Then, two layers of copper screen were added inside where necessary. And this was topped off in particularly troublesome spots with concrete.

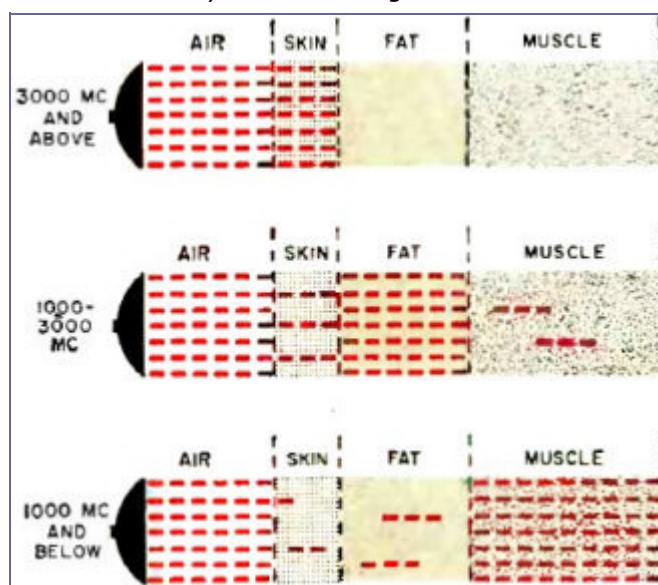
Even small holes in the screen let in too much radiation. Every one of them had to be patched and soldered. Special ventilators that would let in air but not radiation had to be designed and tested.

With all buildings carefully shielded only one more serious problem remained. Sub-zero temperatures and howling arctic blizzards are prevalent during winter in Greenland. No equipment can stand up forever under such punishment, and outside repairs must be made from time to time. The problem was to figure out a way to make repairs without turning off the radar or cooking the personnel.

The answer: radiation suits designed and built by the Wright Air Development Command especially for BMEWS workers. With this modern-day armor, technicians are able to work safely in r.f. fields that would kill an unprotected man in minutes.



A dosimeter developed by Dr. A. W. Richardson of Saint Louis University is used to measure r.f. radiation. Worn by a maintenance technician, it sounds an audible tone when r.f. intensity becomes dangerous.



Beneficial Uses

While most of the problems of protecting electronic workers from radiation have now been pretty well solved, scientists are vitally aware that there is a great deal they don't know about radiation and its biological effects. But this knowledge gap is fast being bridged. Both military and civilian scientists are pressing forward at top speed trying to unravel a few of the mysteries still surrounding the subject.

At the Fourth Annual Tri-Service Microwave Conference held in New York last summer, researchers made some startling disclosures. Lt. Col. Sven A. Bach of the Army Medical Research Laboratory in Fort Knox, Kentucky, for example, told how he had discovered a "profound molecular change" in human gamma globulin which had been subjected to microwave radiation at certain frequencies. Said Bach, the gamma globulin molecules showed "at least a fourfold increase in biological activity."

What does this mean to you? Gamma globulin plays an important part in the body's defences against disease. Speed up its activity fourfold and it may be four times as effective a disease fighter. Some day your doctor may give you "a shot of microwave" to keep you well.

Dr. Joe Howland of the University of Rochester found that dogs which had been exposed to microwaves were able to withstand heavy doses of X-rays far better than dogs not so treated. No specific application for this technique is now known, but such discoveries frequently lead to undreamed-of advances.

And, finally, some evidence has been gathered to indicate that certain kinds of cells, under the right conditions, will simply disintegrate - fly to pieces - in the presence of the right radiation. But surrounding cells are unaffected. Could such a selective beam ever be used to destroy cancer cells while leaving healthy tissue unaffected? Scientists don't yet know.

Said Col. George M. Knauf, one of the foremost experts on the biological effects of microwaves, speaking of these recent advances, "Our work has progressed sufficiently for us to be fairly certain that the beneficial uses to which this energy may be put will greatly outweigh any harmful results it may produce in men."

All this, of course, does not mean we should forget that uncontrolled microwave energy can be dangerous. But like fire or X-rays, microwaves can, when used intelligently and with understanding and respect for the hazards involved, be among man's most valuable tools.

Results of the AWA Valve QSO Party

The following are the results of the AWA valve QSO party held on the 01st and 02nd of October 2022

According to the number of call signs recorded, there were 33 participants in the SSB and 9 in the AM Section.

There was only one log submitted in the AM section and 5 in the SSB section

AM:

ZS4DZ Johan

No other logs were submitted

SSB:

ZS4DZ Johan 56 points using an FT101

ZS4N Nico 40 points using an FT101zd

ZS2TL Jerry 32 points using an FT101

ZS2EC Theunis 19 points

ZS2MAC Dylan 7 points

The Z0AWA station scored 20 points in the AM and 44 in the SSB section.

Our thanks to all who took the time to participate and to the high scores, your certificates are on the way.

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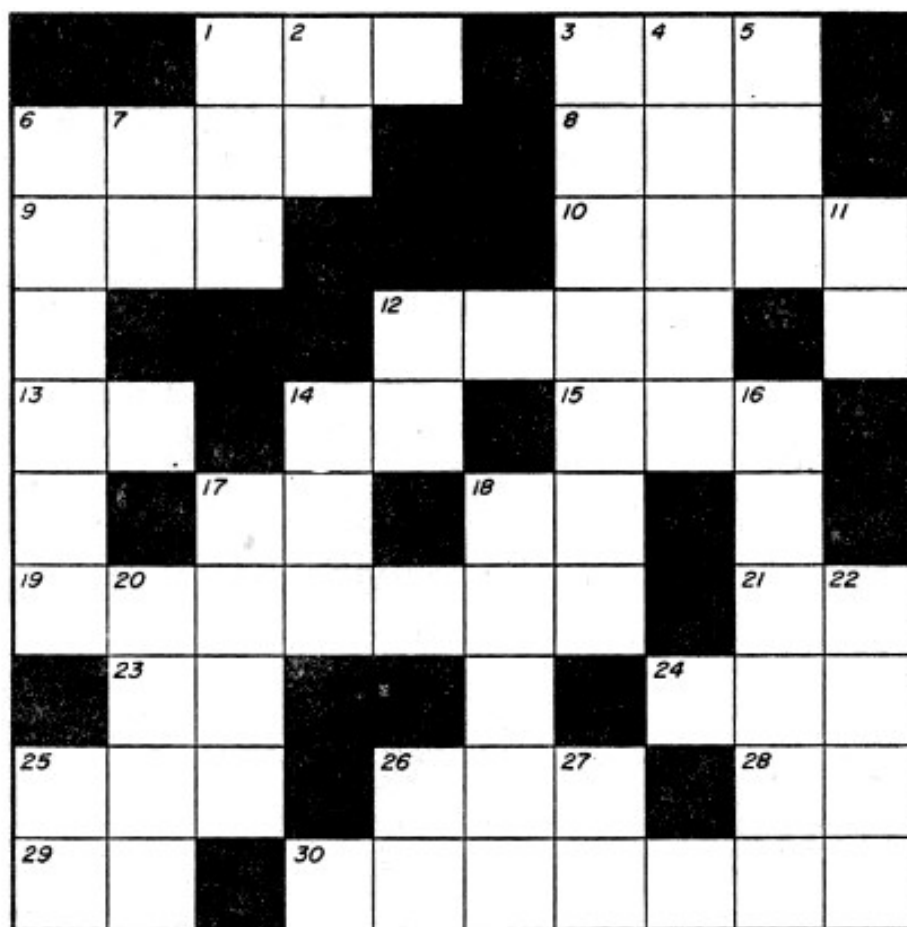
Electronics Crossword

CROSSWORD PUZZLE*By Arthur L. Branch***ACROSS**

- 1 Impedance unit.
- 3 Snake.
- 6 Electrical conductor.
- 8 Conductance unit.
- 9 Number represented by brown in the color code.
- 10 Places.
- 12 Type of oven.
- 13 Frequency modulation.
- 14 Type of current used in a transformer.
- 15 Belonging to it.
- 17 Chemical symbol for tin.
- 18 Frequency in audio output transformer.
- 19 What a diode does.
- 21 Power formula: d.c.
- 23 Current unit: Abbr.
- 24 To terminate.
- 25 Part of a tube.
- 26 Color that represents a multiplier of 100 in color code.
- 28 Man's nickname.
- 29 Pronoun.
- 30 Vapor used in tubes.

DOWN

- 1 Unrefined metal.
- 2 That man.
- 3 To increase power.
- 4 Type of circuit connection.
- 5 Cooking utensil.
- 6 Part of a hi-fi system.
- 7 Within.
- 11 Chemical symbol for a photosensitive element.
- 12 Broadcast frequency: Abbr.
- 14 Insect.
- 16 Black eye.
- 17 Look for.



- 18 At a later date.
- 20 To give off electrons.
- 22 Useless current in a transformer.
- 25 Greek letter used as a mathematics constant.

- 26 Prefix denoting restoration to a previous state.
- 27 Rectified current.

(See page 121 for solution)

Oct puzzle answers:



Notice of the Antique Wireless Association of Southern Africa 2022 AGM

Notice is hereby given for the Annual General Meeting to be held on Saturday 12th November 2022.

The AGM will be held at the premises of the SAIEE in Observatory from 09h00.

The Museum will be opened for those wishing to browse and fleamarket tables will be available for those wishing to bring any excess items to dispose of.

The Meeting will commence at 10h00 in the main auditorium of the SAIEE and all Covid protocols will be observed.

Items for discussion:

1. Presidents report.
2. Membership Figures
3. Financial Report
4. Donations
5. Feedback on QSO parties
6. Nets
7. Museum
8. Geoff Wright SK Floating Trophy
9. Election of President and Office bearers for the next two years
10. Open Discussion

A bring and braai will be held after the meeting for those wishing to stay and socialise for a while. Braai packs and cold drinks will be available for those who wish @R75 per braai pack, or bring your own. (Please confirm with Andy ZS6ADY should you want braai packs - 0824484368)

Directions to the SAIEE are available on the AWA website www.awasa.org.za under "Museum".



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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. Join by logging in to our website.

Notices:**Net Times and Frequencies (SAST):**

Saturday 07:00 (05:00 UTC) — Western Cape SSB Net— 3.640; Every afternoon from 17:00—3.640

Saturday 08:30 (06:30 UTC)— National SSB Net— 7.125; Sandton repeater 145.700

Echolink—ZS0AWA-L

Relay on 10.125 and 14.135 (Try all and see what suits you)

Saturday 14:00 (12:00 UTC)— CW Net—7025

AWASA Telegram group:

Should you want to get on the AWA Telegram group where a lot of technical discussion takes place, send a message to Andy ZS6ADY asking to be placed on the group. This is a no-Nonsense group, only for AWA business. You must download Telegram App first.+27824484368