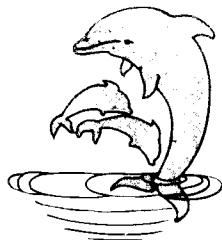




# Q S X P E



THIS NEWSLETTER IS PUBLISHED BY THE  
PORT ELIZABETH BRANCH OF THE SOUTH  
AFRICAN RADIO LEAGUE.

P.O. BOX 10402  
LINTON GRANGE  
6015



PORT ELIZABETH BRANCH  
NOTICE OF MONTHLY MEETING.

MEMBERS ARE REMINDED THAT THE MONTHLY GENERAL MEETING OF THE PORT ELIZABETH BRANCH OF THE SOUTH AFRICAN RADIO LEAGUE, WILL BE HELD AT ST. MARTIN'S CHURCH, GREAT WEST WAY, KABESA, ON FRIDAY 20TH MARCH, 1987.

ADVANCE NOTICE

DUE TO THE FACT THAT WE COULD NOT FRIDAY 19TH MARCH BEING ON GOOD FRIDAY, THE MONTHLY MEETING WILL TAKE PLACE ONE WEEK LATER ON FRIDAY 24TH APRIL.

COMMITTEE

<u>CHAIRMAN:</u>	OVEN WHEELER ZS248	303498
<u>VICE CHAIRMAN:</u>	EDWARD HUMPHREY DAVEN ZS250	321770
<u>SECRETARY:</u>	MARGE WHEELER ZS208	303498
<u>TREASURER:</u>	LENN VROUWEN ZS244	354671
<u>SPECIAL EVENTS AND SOCIAL ACTIVITIES:</u>	OVEN WHEELER ZS248	303498
<u>AWARDS:</u>	BILL HODGES ZS2-157	512580
<u>EDITOR QSOX-PE:</u>	MARGE WHEELER ZS208	303498
<u>MEMBERS:</u>	DICK SCHONSORN ZS261	322111
	BEAVAN GHILL ZS281	308911

LIBRARIAN COLIN ASHWELL ZS240 303498

BULLETIN ROSTER



40 METRES

2 METRES SA DISTRICT

29 MARCH	ZS244	MIDDLE UP	ZS248	ZS208
5 APRIL	ZS217	TOP DOWN	ZS244	ZS208
12 APRIL	ZS217	BOTTOM UP	ZS248	ZS208
19 APRIL	ZS217	MIDDLE DOWN	ZS244	ZS208
26 APRIL	ZS217	MIDDLE UP	ZS248	ZS208

SUNDAY BULLETINS

HF 40M - 7095KHZ (LOWER SIDEBAND)  
80M - 3640KHZ (LOWER SIDEBAND)  
VHF 145.700 AND 145.75MHZ

BRANCH MEMBERSHIPS  
P.E. REPIA/EP 145.05700  
GRAHAMSTOWN 145.15700  
LADY'S SLIPPER 145.10700  
BLACKSCOMB 145.00700  
RTTY MAILBOX 145.35  
VHF MAILBOX 144.910MHZ

WE LIKE BEING YOUR BRANCH

MINUTES OF GENERAL MEETING OF THE PORT ELIZABETH BRANCH OF THE SOUTH AFRICAN RADIO LEAGUE HELD AT ST. MARTIN'S CHURCH, KABEGA, PORT ELIZABETH ON FRIDAY 20TH FEBRUARY, 1987.

PRESENT: 19 MEMBERS AND VISITORS.  
APOLOGIES: ZS2- MM, LW, MG, MF AND ZR2AAA.

GENERAL: (1) BY NOW EVERYONE SHOULD HAVE RECEIVED THEIR LICENCE RENEWALS FROM THE P.M.G.

(2) BILL ZS2BY REPORTED THAT HE HAD DONE A FAIR AMOUNT OF MOBILE OPERATION RECENTLY IN VARIOUS REGIONS INCLUDING NATAL, WHERE HE HAD BEEN STOPPED SEVERAL TIMES AT ROAD BLOCKS. HE FELT THAT WHEN USING MOBILE RADIO EQUIPMENT, IT MIGHT BE A GOOD IDEA TO CARRY A COPY OF ONE'S LICENCE WHILE TRAVELLING. THERE WERE SEVERAL QUERIES AS TO THE REGULATIONS, BUT AS NO ONE SEEMED TO HAVE THE ANSWER, IT WAS FELT THAT IT WOULD BE A GOOD IDEA TO DISCUSS THE MATTER AT THE NEXT MEETING.

(3) BRIAN MENTIONED THAT IT HAD BEEN STATED ON H.Q. BULLETIN THAT THE POSTMASTER GENERAL HAD DECIDED THAT FUTURE EXAMINATIONS WOULD TAKE THE FORM OF MULTIPLE-CHOICE PAPERS. BRIAN HAD WRITTEN FOR FURTHER INFORMATION AS IT WOULD MAKE A DIFFERENCE TO HIS METHOD OF TEACHING AT THE TECHNICAL CLASSES. THERE WERE ALSO OTHER FACETS, ALTHOUGH IT WAS NOT A DISADVANTAGE, BUT CANDIDATES WOULD NEED TO HAVE A WIDER KNOWLEDGE AS QUESTIONS COULD BE SET THAT WERE VERY CLOSE TO CORRECT. IT WOULD HELP THOSE WHO FOUND IT DIFFICULT AND TIME-CONSUMING TO COMPLETE AN ESSAY TYPE QUESTION. THE ENTRANCE FEE WAS NOW R18 AND THE CLOSING DATE FOR THE MAY EXAM WAS 5TH MARCH.

(4) THE ST. VALENTINE'S PARTY HAD BEEN VERY SUCCESSFUL AND THANKS WERE EXTENDED TO COLIN AND MARLENE, OWEN AND TINA AND LYNN FOR THEIR HARD WORK AND THE USE OF THEIR HOMES. A VOTE OF THANKS WAS EXTENDED TO MARGE FOR THE ORGANISATION.

(5) THE 2M BEACON WAS RUNNING ON VERY LOW POWER AS IT HAD ONCE AGAIN BEEN STRUCK BY LIGHTNING. BRIAN HAD REPAIRED THE UNIT BUT WHEN HE WENT TO REPLACE IT, THE CARETAKER COULD NOT BE FOUND. LIGHTNING PROTECTION HAD NOW BEEN PROVIDED AND THE UNIT WOULD BE REPLACED AT THE EARLIEST OPPORTUNITY.

AT THIS STAGE THE FIRST TEN MOTIONS WERE READ AND VOTED ON. TEA WAS THEN TAKEN AND THE LIBRARY WAS OPENED. AFTER TEA THE REMAINDER OF THE MOTIONS WERE ATTENDED TO. THE VOTING WAS AS FOLLOWS:

1, 2, 3, 6, 7, 8, 9, 11, 15, 17, 19 WERE APPROVED.

4, 5, 10, 12, 14 WERE OPPOSED.

13, 16, 20 WERE LEFT TO THE DELEGATES DISCRETION.

10 - AFTER DISCUSSION, IT WAS DECIDED TO PROPOSE AN AMENDMENT THAT THE LIST OF NEW LICENCEES BE SENT TO THE BRANCHES WHO WOULD THEN APPROACH PERSONALLY OR WRITE TO THE PEOPLE IN THEIR AREAS.

DISCUSSION THEN TOOK PLACE AS TO WHETHER TO NOMINATE MIKE BOSCH FOR THE 5M TROPHY. THE QUESTION AROSE ALSO AS TO THE NOMINATION OF TREVOR ZS2AE, TOFF ZR2EY AND THE MEMBERS WHO CONSISTENTLY ATTEND TO THE COCKSCOMB REPEATERS FOR THE TWO METER TROPHY.

JOHN ZS2DO SAID THAT HE HAD BEEN APPROACHED TO PROVIDE COMMUNICATIONS AT A MARATHON RACE. BRIAN ASKED HIM TO GET A LETTER FROM THE SPONSORS SO THAT WE COULD APPLY FOR PERMISSION TO OPERATE. 4 STATIONS WERE NEEDED.

OWEN REMINDED MEMBERS OF THE VHF CONTEST TO TAKE PLACE ON 14/15TH MARCH.

THERE BEING NO FURTHER BUSINESS, THE MEETING WAS CLOSED.

SGD: B.A. WELLER ZS2AB  
CHAIRMAN

SGD: M.T. WELLER ZS2OB  
SECRETARY

**CONCLUSION**

SUFFICIENT HAS BEEN SAID TO ILLUSTRATE THE USE OF THIS SIMPLE INSTRUMENT. ANY WORK IN ELECTRONICS OR RADIO REQUIRES TEST EQUIPMENT, AND I CAN THINK OF NO OTHER AID TO A WORKSHOP THAT CAN SO QUICKLY PAY BACK THE TIME SPENT IN CONSTRUCTION AND CALIBRATION. EVERY RADIO SHACK SHOULD HAVE ONE.

RADIO AND ELECTRONICS WORLD - NOVEMBER 1974.

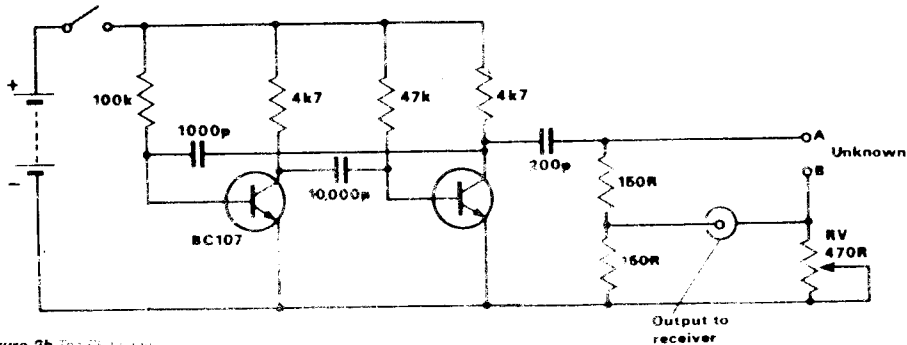


Figure 2b The fit photo

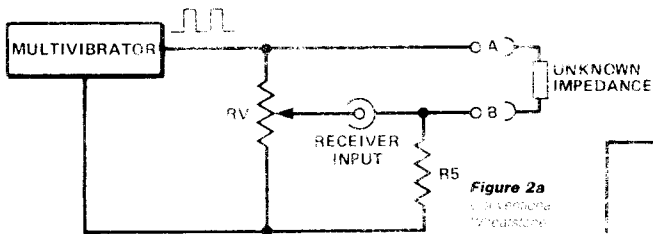
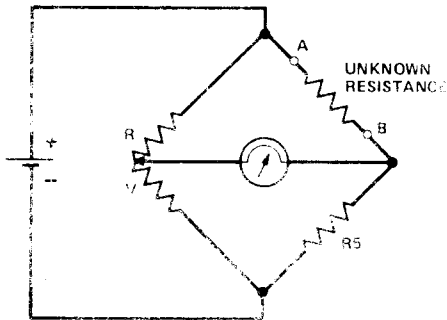


Figure 2a  
Unknown Impedance



SUPPORT  
OUR  
ADVERTISERS





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TELEPHONE 22614

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## SIX HUNDRED MILLION YEARS OF SOLAR CYCLES.

THE SOLAR CYCLE WHICH GOVERNS THE PROPAGATION OF RADIO WAVES IS THE SUBJECT OF INTENSE INVESTIGATION FOR MANY REASONS. THE ARTICLE BELOW, REPRINTED FROM THE "NEW SCIENTIST" 23 OCTOBER 1986, THROWS SOME FASCINATING NEW LIGHT ON THE SUBJECT.

STUDIES OF SEDIMENTS 680 MILLION YEARS OLD HAVE REVEALED A SOLAR RHYTHM THAT CAN BE USED TO CALIBRATE PRESENT-DAY SOLAR VARIATIONS WITH UNPRECEDENTED ACCURACY. THE TECHNIQUE PROVIDES A FORECAST OF THE YEAR AND THE SIZE OF THE NEXT PEAK OF SOLAR ACTIVITY, AND IMPLIES THAT SOME PULSE INSIDE THE SUN HAS MAINTAINED A STEADY RHYTHM FOR AT LEAST THE PAST 15 PER CENT OF THE STAR'S LIFE.

### PUZZLES

THE SOLAR CYCLE OF ACTIVITY IS ONE OF THE CONTINUING PUZZLES OF ASTRONOMY. DARK SPOTS ON THE SURFACE OF THE SUN, MORE COMMON IN SOME YEARS THAN OTHERS, ARE SIMPLY THE MOST VISIBLE FEATURES OF A PATTERN OF CHANGING SOLAR ACTIVITY. THE NUMBER OF SPOTS FOLLOWS A CYCLE THAT IS ROUGHLY 11 YEARS LONG, BUT SOLAR MAGNETIC CHANGES FOLLOW A CYCLE AVERAGING 22 YEARS, WHICH IS REGARDED AS MORE FUNDAMENTAL. GOOD RECORDS OF SUNSPOTS GO BACK ONLY TO ABOUT 1800, BUT EVEN OVER THIS SHORT STRETCH OF DATA, THERE ARE INDICATIONS OF OTHER RHYTHMS SUPERIMPOSED ON THE BASIC 22-YEAR CYCLE.

### ANCIENT SEDIMENTS

TO INVESTIGATE THESE LONGER-TERM EFFECTS, ASTRONOMERS NEED A LONGER RUN OF DATA. THEY WERE GIVEN ONE IN THE EARLY 1980'S THANKS TO STUDIES OF THE CHANGING LAYERS OF SEDIMENTS LAID DOWN IN ANCIENT LAKES.

THESE SEDIMENTS, CALLED VARVES, ARE LAID DOWN BY ANNUAL FLOOD WATERS AND FORM LAYERS AS DISTINCTIVE AS TREE RINGS. CHANGES IN THE THICKNESS OF THE VARVES INDICATE CHANGES IN LOCAL RAINFALL - AND SUCH CHANGES IN SOME VARVES FROM SEDIMENTS 680 MILLION YEARS OLD HAVE BEEN FOUND TO TRACE THE KNOWN SOLAR RHYTHMS. CHANGES IN CLIMATE AFFECT THE VARVES, AND AS THE VARVE PATTERNS EXACTLY MATCH KNOWN SOLAR VARIATIONS, THIS HAS INTERESTING IMPLICATIONS FOR THEORIES OF LINKS BETWEEN SOLAR ACTIVITY AND THE WEATHER. BILL R.N. BRACEWELL, OF STANFORD UNIVERSITY, CALIFORNIA, HAS GONE ONE STEP FURTHER. ACCEPTING THAT THE ANCIENT VARVE RECORD IS A TRACER OF SOLAR ACTIVITY, HE HAS PRODUCED WHAT MAY BE THE MOST RELIABLE GUIDE TO PRESENT-DAY SOLAR RHYTHMS.

### VARIATIONS IN THE CYCLES

THE VARVES COVER 1337 YEARS AND SHOW THAT THE BASIC 22-YEAR AND 11-YEAR RHYTHMS ARE MODULATED BY TWO CYCLES 314 AND 350 YEARS LONG. THE "11-YEAR" CYCLE ACTUALLY VARIES FROM 8 TO 15 YEARS BOTH IN MODERN TIMES AND IN THE OLD VARVES, AND BRACEWELL SHOWS THAT THIS SHIFT IS CAUSED BY THE 350-YEAR MODULATION. THE 314-YEAR CYCLE PROVIDES AN ENVELOPE WHICH SEEMS TO DETERMINE THE STRENGTH OF THE PEAK OF ACTIVITY REACHED IN THE 11-YEAR CYCLES.

### CALCULATIONS

BRACEWELL HAS CALCULATED THE EXPECTED SUNSPOT VARIATIONS FROM AN ASSUMED MINIMUM OF ACTIVITY IN MAY THIS YEAR BACK TO 1800. THE ZERO POINT IS DETERMINED FROM THE CONTINUOUS MONITORING OF SUNSPOTS CARRIED OUT BY ASTRONOMERS AT THE BELGIAN ROYAL OBSERVATORY AND DISTRIBUTED FROM THE SUNSPOT INDEX DATA CENTRE IN BRUSSELS. EVEN THOUGH THE PRECISE DATE OF THE MINIMUM JUST PAST WILL NOT BE KNOWN FOR CERTAIN UNTIL 1987, BRACEWELL'S SIMULATION OF THE PATTERN OF SUNSPOT ACTIVITY SINCE 1800 IS EXTREMELY GOOD. AS HE USES ONLY THE CYCLES DETERMINED FROM THE VARVES TO CALCULATE THE AMOUNT OF SUNSPOT ACTIVITY EXPECTED IN EACH YEAR, THIS IMPLIES THAT THE SAME RHYTHMS OPERATE IN THE SUN TODAY AS DID 680 MILLIONS YEARS AGO.

CONTINUED ON FOLLOWING PAGE.

## UNDERWATER COMMUNICATIONS A REPORT FROM THE DEEP

A SMALL COMPANY IN VANCOUVER SAYS IT HAS DEVELOPED THE MOST POWERFUL UNDERWATER RADIO FOR DIVERS. THE SYSTEM, CALLED SCUBAPHONE, ENABLES DIVERS TO TALK TO EACH OTHER OVER DISTANCES UP TO 1200 METRES AND TO A DEPTH OF 80 METRES. DIVERS CAN ALSO TALK TO PEOPLE ON THE SURFACE AND THEIR CONVERSATIONS CAN BE TAPED.

DIVERS WEAR A FULL FACE MASK WHICH CONTAINS A PLUG FOR THE MICROPHONE. THE HEADPHONES CONTAIN THE SPEAKERS, BATTERIES AND ELECTRONIC CIRCUITRY TO PROCESS THE SIGNALS. A TRANSDUCER FOR RECEIVING AND TRANSMITTING INFORMATION IS LOCATED ON TOP OF A BAND WORN ACROSS THE CROWN OF THE HEAD. THE KEY TO THE CLARITY AND POWER OF THE SYSTEM IS THE CIRCUITRY WHICH FILTERS OUT NOISE AND ENHANCES THE SIGNALS. SCUBAPHONE IS GENERATING IMMENSE INTEREST AMONG DEFENCE FORCES, POLICE DEPARTMENTS AND MARINE SCIENTISTS. ISRAELI SECURITY FORCES HAVE PURCHASED ABOUT 50 SETS.

THE LOS ANGELES POLICE DEPARTMENT RECENTLY TESTED SCUBAPHONE IN TURBULENT CONDITIONS BETWEEN WHARF PILING IN BUSY LOS ANGELES HARBOUR. "WE NEVER LOST COMMUNICATIONS ONCE WITH THE DIVERS," SAYS THOMAS MURDOCH, THE ENGINEER WHO DESIGNED THE SCUBAPHONE.

RECENTLY, DIVERS FROM THE CANADIAN NAVY USED THE SYSTEM WHEN LOCATING AND RETRIEVING THE BODIES OF TWO FISHERMEN WHO WERE DROWNED WHEN THEIR TRAWLER CAPSIZED. THE ROYAL CANADIAN MOUNTED POLICE USED THE DEVICE TO HELP RETRIEVE BODIES FROM A CAR THAT HAD PLOUGHED THROUGH ICE INTO A RIVER.

SCUBAPHONE ORIGINATED WITH TWO DANISH-BORN DIVERS, STEEN SALOMAN AND BENT LARSEN, WHO WERE FRUSTRATED BY THEIR INABILITY TO COMMUNICATE WITH EACH OTHER IN THE WATERS AROUND VANCOUVER. THEY TEAMED UP WITH MURDOCH AND FORMED ORCATRON MANUFACTURING. SCUBAPHONE WORKS ON MUCH THE SAME PRINCIPLE AS SUBMARINE COMMUNICATION, BUT ON A MUCH SMALLER SCALE. IT USES THE SAME TYPE OF SIGNAL - SINGLE SIDEBAND. UNLIKE AM OR FM, SSB IS NOT A CONTINUOUS SIGNAL. EARLIER PORTABLE UNDERWATER RADIO SYSTEMS HAVE USED AM AND FM, BUT THESE HAVE BEEN PLAGUED BY DISTORTION BECAUSE THE CONTINUOUS SIGNAL HITS OBJECTS AND IS REFLECTED BACK INTO SUBSEQUENT SIGNALS. "WITH A CONTINUOUS WAVE YOU END UP WITH A MISH-MASH OF SIGNALS," MURDOCH SAID. "SSB ONLY WORKS WHEN SOMEONE IS TALKING - THERE IS NOTHING TO BE REFLECTED OR DISTORTED."

THE DIVER HAS AN ON/OFF SWITCH TO CONTROL THE MICROPHONE. THE ELECTRONICS ENHANCE THE SPEECH AND PROPAGATE IT AS AN ACOUSTIC WAVE AT 30KHZ. AT THE RECEIVING END, THE ACOUSTIC SIGNAL IS CHANGED INTO AN ELECTRICAL SIGNAL AND THE NOISE IS FILTERED OUT.

THE CIRCUITRY IS DESIGNED TO ELIMINATE EXTRANEIOUS NOISE CAUSED WHEN THE DIVER INHALES AND EXHALES. THE SYSTEM IS ALSO SENSITIVE ENOUGH TO NULLIFY DISTORTIONS IN SOUND CAUSED BY VARIATION IN WATER TEMPERATURE, PRESSURE AND SALINITY. THE RECORDING FACILITY ENABLES DIVERS TO SEND DATA DIRECTLY TO THE SURFACE FOR LATER TRANSCRIPTION. IT SURE BEATS A GREASE PENCIL AND BOARD.

ACKNOWLEDGEMENTS TO "NEW SCIENTIST" JUNE 1986.

### PEAK IN 1991

IT IS NOW THE TURN OF THE THEORISTS TO COME UP WITH AN EXPLANATION OF THE EXISTENCE OF THESE RHYTHMS. MEANWHILE, BRACEWELL'S DISCOVERY FACES ITS FIRST REAL TEST IN THE NEXT FEW YEARS. HE PREDICTS A STEADY RISE IN SOLAR ACTIVITY FROM NOW UNTIL 1991, WITH A PEAK SUNSPOT NUMBER IN THAT YEAR OF RATHER MORE THAN 100. IF THE PATTERN OF EVENTS ON THE SUN DURING THE NEXT FIVE YEARS FOLLOWS BRACEWELL'S CALCULATED CURVE AS CLOSELY AS IT IS FOLLOWED BY THE CYCLES OF THE PAST 186 YEARS, IT WILL BE CLEAR THAT THE ANCIENT VARVES REALLY ARE TELLING US HOW THE SUN TICKS TODAY.

(ACKNOWLEDGEMENTS TO HAMS HAYWIRE NEWS P.M.B. BRANCH).

# Radio Frequency BRIDGE

RJ Harry describes an invaluable piece of equipment that can be built in just one night

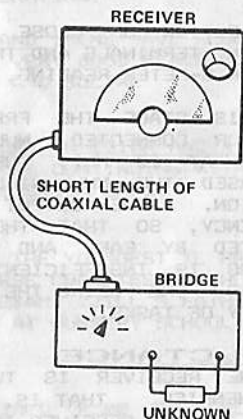


Figure 1 The RF bridge and associated receiver

ALTHOUGH SIMPLE IN DESIGN AND EASY TO CONSTRUCT, AN RF BRIDGE HAS MANY USES. IT CAN MEASURE UNKNOWN VALUES OF IMPEDANCE, INDUCTANCE AND CAPACITANCE. THE CIRCUIT CONSISTS OF A WHEATSTONE BRIDGE (FIGURE 2a) BUT INSTEAD OF A BATTERY AS A SOURCE OF CURRENT A TWO-TRANSISTOR MULTI-VIBRATOR IS USED AND THE CONVENTIONAL MOVING COIL BALANCE METER IS REPLACED BY A RADIO RECEIVER (FIGURE 2b). THE MULTI-VIBRATOR OPERATES AT AN AUDIO FREQUENCY BUT THE SQUARE WAVE OUTPUT CONTAINS MANY HARMONICS WHICH CAN BE DETECTED BY A RADIO RECEIVER UP TO 30MHZ AND BEYOND.

THE MULTIVIBRATOR ACTS AS AN RF SIGNAL GENERATOR, BUT UNLIKE CONVENTIONAL GENERATORS IT PRODUCES ALL ITS OUTPUTS AT THE SAME TIME. IT IS THIS COMBINATION OF BROADBAND SIGNAL GENERATOR AND SELECTIVE RECEIVER THAT MAKES THE BRIDGE SUCH A VERSATILE MEASURING INSTRUMENT.

## CONSTRUCTION

THE BUILDING OF THE BRIDGE SHOULD PRESENT NO PROBLEMS AND IT CAN BE BUILT IN AN EVENING. A SMALL METAL BOX IS AN IDEAL HOUSING. THE SHAFT OF THE VARIABLE POTENTIOMETER RV (FIGURE 2) SHOULD BE FITTED WITH A POINTER AND SUFFICIENT ROOM LEFT AROUND THE KNOB TO MARK A SCALE. THE CONNECTION TO THE RECEIVER SHOULD BE BY A SHORT LENGTH OF SCREENED LEAD. BECAUSE THE RECEIVER EARTH IS THEN CONNECTED TO TERMINAL B (SEE FIGURE 2b) NO OTHER PART OF THE CIRCUIT SHOULD BE ELECTRICALLY CONNECTED TO THE BOX.

## CALIBRATION

TO CALIBRATE THE SCALE, THE BRIDGE IS CONNECTED TO A RADIO RECEIVER WHICH IS TUNED TO ANY FREQUENCY BETWEEN 500 KHZ AND 2 MHZ. THE RECEIVER SHOULD HAVE AN INTERMEDIATE FREQUENCY (I.F.) WITH A PASSBAND OF AT LEAST 3KHZ, AND IT SHOULD PREFERABLY HAVE AN S-METER. IF THE I.F. IS TOO NARROW, THE INDIVIDUAL HARMONICS OF THE MULTIVIBRATOR WILL BE DETECTED AND BALANCING THE BRIDGE WILL BE DIFFICULT. THIS IS THE IDEAL APPLICATION FOR AN OLD RECEIVER WITH AN I.F. AS WIDE AS A BARN DOOR.

WHEN THE BRIDGE IS CONNECTED TO THE RX (FIGURE 1) AND SWITCHED ON A TONE SHOULD BE HEARD AND THE S-METER SHOULD READ. AS THE TUNING IS ALTERED THE TONE SHOULD REMAIN AT A CONSTANT LEVEL. TUNING SHOULD HAVE NO EFFECT. IF

THE TONE RISES AND FALLS AS THE TUNING IS MOVED THE RECEIVER SELECTIVITY IS SUFFICIENT TO DISTINGUISH BETWEEN THE INDIVIDUAL HARMONICS OF THE MULTIVIBRATOR. AT THIS POINT, EITHER USE A WIDER I.F., OR DOUBLE THE VALUE OF THE CAPACITORS C1 AND C2 IN FIGURE 3. CHANGING THESE CAPACITORS WILL LOWER THE FREQUENCY, BRING THE HARMONICS CLOSER IN FREQUENCY AND MAKE OPERATION EASIER. HOWEVER, THE HARMONIC ENERGY AT HIGHER FREQUENCIES MAY BE LESS AND THE HIGHEST WORKING FREQUENCY MAY BE REDUCED.

A SELECTION OF CLOSE TOLERANCE RESISTORS SHOULD BE CONNECTED ACROSS THE UNKNOWN TERMINALS AND THE BRIDGE BALANCED BY ADJUSTING RV FOR A NULL (I.E. A DIP) IN S-METER READING, THEN THE VALUE SHOULD BE MARKED ON THE SCALE P.

AT THIS STAGE THE FREQUENCY RANGE AND BALANCE CAN BE ASSESSED WITH A RESISTOR CONNECTED, NULL THE BRIDGE AT 1 MHZ. THE NULL SHOULD BE SHARP. REPEAT AT 10 MHZ, THE NULL MAY BE LESS PRECISE. AS THE FREQUENCY IS INCREASED THE NULL WILL BECOME LESS DEEP AND MAY BE AT A SLIGHTLY DIFFERENT POSITION. THE OUTPUT OF THE MULTIVIBRATOR WILL ALSO FALL WITH INCREASING FREQUENCY, SO THAT THE S-METER NO LONGER READS. THE NULL CAN STILL BE DETECTED BY EAR, AND THE BRIDGE USED AT FREQUENCIES WHERE THE S-METER READING IS INSUFFICIENT. THE HIGHEST USABLE FREQUENCY DEPENDS ON SEVERAL FACTORS, ONE BEING THE RECEIVER SENSITIVITY. THE BRIDGE IS NOW READY FOR A VARIETY OF TASKS.

### INDUCTANCE

IF THE RECEIVER IS TUNED TO 159KHZ THE SCALE CAN BE READ DIRECTLY IN MICROHENRIES. THAT IS, 10 OHMS MAY BE READ AS 10 $\mu$ H, 47 OHMS AS 47  $\mu$ H AND SO ON. IF THE RECEIVER IS TUNED TO 1,59MHZ THE RANGE OF INDUCTANCE IS ALTERED SO THAT 10 OHMS EQUALS 1 $\mu$ H AND 47 OHMS EQUALS 4.7 $\mu$ H, AND SO ON IN PROPORTION. THE SIMPLE RELATIONSHIP IS ACHIEVED BY A LITTLE MATHEMATICAL JUGGLING OF THE FORMULA  $X_L = 2\pi fL$  (SYMBOLS HAVE THE USUAL VALUES).

### CAPACITANCE

THIS IS HARDER TO MEASURE THAN INDUCTANCE AND THE EASIEST SOLUTION IS TO MARK ADDITIONAL SCALES FOR THE CAPACITANCE RANGES REQUIRED. INITIAL CALIBRATION SHOULD BE DONE WITH A SELECTION OF CLOSE TOLERANCE CAPACITORS. USING THE FORMULA  $X_C = 1/2\pi fC$  GIVES THE REACTANCE (IN OHMS) WHERE F = FREQUENCY IN HZ; C = CAPACITANCE IN FARADS.

### TUNED CIRCUITS

THE RESONANT FREQUENCY OF A PARALLEL TUNED CIRCUIT CAN BE FOUND BY CONNECTING IT TO THE BRIDGE AND SETTING RV TO A HIGH VALUE AND ADJUSTING THE RECEIVER FREQUENCY UNTIL A DIP IN THE S-METER IS FOUND.

### BALUNS AND RF TRANSFORMERS

THE EFFECTIVE FREQUENCY RESPONSE OF AERIAL BALUNS AND RF TRANSFORMERS CAN BE EASILY CHECKED WITH THE BRIDGE.

FOR A BALUN, THE BALANCED CONNECTIONS SHOULD BE TERMINATED IN THE CORRECT IMPEDANCE, SAY 50 OHMS. FOR A BALUN WITH A 1:1 TURNS RATIO, THE 50 OHMS SHOULD BE REFLECTED TO THE UNBALANCED TERMINALS WHICH SHOULD BE CONNECTED TO THE BRIDGE. AS THE RECEIVER IS TUNED OVER THE DESIGNED FREQUENCY RANGE OF THE BALUN THE NULL SHOULD REMAIN SUBSTANTIALLY IN THE SAME POSITION BUT A FALL IN EFFICIENCY OF THE BALUN WILL SHOW AS A FALL IN IMPEDANCE READING. INACCURACY OF THE BRIDGE AT HIGHER FREQUENCIES CAN BE CHECKED BY MEASURING THE 50 OHM RESISTOR ON ITS OWN. WHATEVER VARIATIONS IN VALUE THE BRIDGE INDICATES WITH THE RESISTOR ALONE SHOULD BE THE SAME AS THOSE WHEN THE BALUN IS INTERPOSED BETWEEN BRIDGE AND RESISTOR.

A BALUN OR TRANSFORMER WITH A TURNS RATIO OTHER THAN UNITY WILL BEHAVE IN A DIFFERENT WAY. IMPEDANCE IS PROPORTIONAL TO THE SQUARE OF THE TURNS RATIO, SO A 2:1 TURNS RATIO WILL REFLECT AN IMPEDANCE OF 200 OHMS (50 X 4) INTO THE PRIMARY WHEN THE SECONDARY IS CONNECTED TO A 50 OHM RESISTOR.



## THIS AND THAT

**WELCOME:** A WARM WELCOME TO THE FOLLOWING NEW MEMBERS TO THE BRANCH: PETRUS ETSEBETH, ROBBIE FROST, ROB SALMON, MIKE COPELAND, MARTIN SCHECKTER, LIONEL WRANKMORE, IAN MACKENZIE AND DONALD DYE. WE HOPE YOU HAVE A LONG AND HAPPY ASSOCIATION WITH THE LEAGUE AND THE BRANCH AND THAT YOU WILL SOON HAVE CALLSIGNS AND JOIN IN THE FUN OF OPERATING.

**WELCOME TO P.E.L.** CHARLES THWAITES ZS2PA AND IRENE HAVE RECENTLY MOVED FROM PORT ALFRED TO SETTLE IN LOVEMORE HEIGHTS. VERY GOOD PLACE FOR AN ANTENNA, CHARLES AND WE HOPE TO SEE YOU AT MEETINGS AND SOCIAL GATHERINGS.

**VISITORS:** RECENT VISITORS TO TOWN WERE PAUL JOHNSON ZS1BR AND XYL GLYNNIS. THEY STAYED WITH COLIN ZS2AO AND MARLENE BEFORE CONTINUING WITH THEIR TRIP OF SHOWING AN AUNT FROM ENGLAND AROUND THE EASTERN CAPE.

### THE YOUNG ONES!

JILL KRISTINE DIETRICH, KA9VEW, CLAIMS THAT SHE IS THE YOUNGEST YL HAM IN THE U.S.A. SHE IS ONLY 5 YEARS OLD AND PASSED HER MORSE CODE TEST WITHOUT A SINGLE FAULT AND HAD ONLY ONE MISTAKE IN THE WRITTEN EXAM. JILL'S FATHER IS ALSO A HAM WITH THE CALLSIGN WB9HZV. JILL IS STILL AT NURSERY SCHOOL. IT SHOWS IT CAN BE DONE!

### WHO DUN IT?

IN AUGUST 1986, HAROLD CRAWFORD, GM4VAN WAS FINED R500 BECAUSE HE IMPERSONATED ONE DAVID BOYD TO WRITE THE P.M.G. EXAM FOR HIM. BOYD FAILED THE EXAM TWICE BEFORE AND WAS FINED R400 FOR HIS PART IN THE DECEIT.

### ANOTHER YOUNG 'UN:

ON THE OCCASION OF THE BIRTH OF A DAUGHTER NAMED PRINCESS RAYA TO KING HUSSEIN JY1 AND QUEEN NOOR, JY2NH, SHE WAS GIVEN THE CALLSIGN OF JY2RBH. SHE MUST CERTAINLY BE THE YOUNGEST RADIO-AMATEUR IN THE WORLD.

### SELF DESTRUCT:

ZETA LABORATORIES PUT OUT A MANUAL WITH A DESCRIPTION OF VARIOUS SWITCH FUNCTIONS AND AMONG THEM WAS THIS ONE: "SWITCH 8 - SELF DESTRUCT - SWITCH CLOSED WILL DETONATE A SMALL ONE-TON NUCLEAR DEVICE LOCATED IN THE RS-232 INTERFACE CONNECTOR. THIS SWITCH IS INTENDED FOR THOSE WHO DO NOT BOTHER READING MANUALS BEFORE PLAYING WITH SWITCHES"

## RADIO FACTS and ODDITIES



THE DISTRESS CALL ..... IS SENT AS ONE LETTER !!! IT HAS NO MEANING, IT IS NOT REALLY SOS, NOR DOES IT MEAN "SAVE OUR SOULS"!! S \_ O \_ S. (FALLACY) ..... (THE DISTRESS CALL)

## MEN OF DEFINITION

- AMPERE - THE PRACTICAL UNIT OF ELECTRIC CURRENT THAT IS PRODUCED BY ONE VOLT ACTING THROUGH A RESISTANCE OF ONE OHM. NAMED FOR ANDRE-MARIE AMPERE (1775-1836), FRENCH PHYSICIST AND MATHEMATICIAN, WHO STUDIED THE RELATIONSHIP OF ELECTRICITY AND MAGNETISM.
- ANGSTROM - A UNIT OF WAVELENGTH EQUAL TO ONE HUNDRED-MILLIONTH OF A CENTIMETER. NAMED FOR ANDERS JONAS ANGSTROM (1814-1874), SWEDISH PHYSICIST, WHO STUDIED THE LIGHT AND ELECTROMAGNETIC SPECTRUMS.
- BEL - A DIMENSIONLESS UNIT USED FOR LOGARITHMIC EXPRESSION OF RATIOS OF POWER OR AS A RELATIVE MEASURE OF LEVEL. THE DECIBEL, ONE-TENTH OF A BEL, IS MORE COMMONLY USED. NAMED FOR ALEXANDER GRAHAM BELL (1847-1922), AMERICAN SCIENTIST, WHO INVENTED THE TELEPHONE.
- COULOMB - A UNIT OF ELECTRIC CHARGE EQUAL TO THE QUANTITY OF ELECTRICITY TRANSFERRED IN ONE SECOND BY A CURRENT OF ONE AMPERE. NAMED FOR CHARLES AUGUSTIN DE COULOMB (1736-1806), FRENCH PHYSICIST, WHO CONTRIBUTED TO THE THEORY OF ELECTROSTATIC AND MAGNETIC FORCES.
- FARAD - THE BASIC UNIT OF CAPACITANCE. A CAPACITOR HAS A CAPACITANCE OF ONE FARAD WHEN A VOLTAGE CHANGE OF ONE VOLT PER SECOND ACROSS IT PRODUCES A CURRENT OF ONE AMPERE. THE MICROFARAD EQUAL TO ONE MILLIONTH OF A FARAD, AND THE MICROMICROFARAD EQUAL TO ONE-MILLIONTH OF A MICROFARAD, ARE MORE COMMONLY USED. NAMED FOR MICHAEL FARADAY (1791-1867) ENGLISH PHYSICIST AND CHEMIST.
- FRESNEL - UNIT OF FREQUENCY EQUAL TO ONE MILLION MEGACYCLES. ALSO CALLED MEGAGEMACYCLE AND TERACYCLE. NAMED FOR AUGUSTIN JEAN FRESNEL (1758-1827), FRENCH PHYSICIST, WHO DEVELOPED LIGHT WAVE THEORIES.
- GAUSS - A UNIT OF MAGNETIC INDUCTION (CGS SYSTEM) EQUAL TO THE MAGNETIC-FLUX DENSITY THAT WILL INDUCE AN ELECTROMOTIVE FORCE OF ONE HUNDRED-MILLIONTH OF A VOLT IN EACH LINEAR CENTIMETER OF A WIRE MOVING ONE CENTIMETER PER SECOND AT RIGHT ANGLES TO A MAGNETIC FLUX. NAMED FOR KARL FRIEDRICH GAUSS (1777-1855) GERMAN MATHEMATICIAN, WHO PIONEERED IN APPLYING MATHEMATICAL THEORY TO ELECTRICITY AND MAGNETISM.
- GILBERT - THE UNIT OF MAGNETOMOTIVE FORCE (CGS SYSTEM) EQUAL TO THE LINE INTEGRAL OF THE MAGNETIC FIELD STRENGTH IN OERSTEDS AROUND THE MAGNETIC CIRCUIT. NAMED FOR WILLIAM GILBERT (1540-1603), ENGLISH GEOPHYSICIST, WHO INITIATED THE STUDY OF TERRESTRIAL MAGNETISM.
- HENRY - A UNIT OF INDUCTANCE, EQUAL TO THE SELF-INDUCTANCE OF A CIRCUIT OR THE MUTUAL INDUCTANCE OF TWO CIRCUITS, IN WHICH THE VARIATION OF ONE AMPERE PER SECOND RESULTS IN AN INDUCED ELECTROMOTIVE FORCE OF ONE VOLT. NAMED FOR JOSEPH HENRY (1797-1878), AMERICAN PHYSICIST, WHO IMPROVED THE ELECTROMAGNET AND DISCOVERED SELF-INDUCTANCE AND THE PRINCIPLE OF INDUCED CURRENT.
- JOULE - A UNIT OF ENERGY WORK (MKS SYSTEM) EQUAL TO ONE-WATT SECOND. NAMED FOR JAMES PRESCOTT JOULE (1818-1889), ENGLISH PHYSICIST WHO DETERMINED THE MECHANICAL EQUIVALENT OF HEAT.
- MAXWELL - THE UNIT OF MAGNETIC FLUX (CGS SYSTEM) EQUAL TO ONE GAUSS PER SQUARE CENTIMETER, OR TO ONE MAGNETIC LINE OF FORCE. NAMED FOR JAMES CLERK MAXWELL (1831-1879), SCOTTISH PHYSICIST, WHO DEVELOPED THE THEORY OF THE ELECTROMAGNETIC FIELD ON A MATHEMATICAL BASIS.
- OERSTED - A UNIT OF MAGNETIC FIELD INTENSITY (CGS SYSTEM) EQUAL TO THE INTENSITY OF A MAGNETIC FIELD IN A VACUUM IN WHICH A UNIT MAGNETIC NORTH

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POLE EXPERIENCES A MECHANICAL FORCE OF ONE DYNE IN THE DIRECTION OF THE FIELD. NAMED FOR HANS CHRISTIAN OERSTED (1777-1851), DANISH PHYSICIST, WHO ESTABLISHED THE RELATIONSHIP BETWEEN MAGNETISM AND ELECTRICITY.

OHM - THE UNIT OF ELECTRICAL RESISTANCE (MKS SYSTEM) THROUGH WHICH A CURRENT OF ONE AMPERE WILL FLOW WHEN A POTENTIAL DIFFERENCE OF ONE VOLT IS APPLIED. NAMED FOR GEORG SIMON OHM (1787-1854) GERMAN PHYSICIST, WHO ESTABLISHED THE MATHEMATICAL RELATIONSHIP BETWEEN ELECTRICAL RESISTANCE, ELECTRIC CURRENT AND POTENTIAL DIFFERENCE.

VOLT - THE UNIT OF VOLTAGE, POTENTIAL AND ELECTROMOTIVE FORCE. ONE VOLT WILL SEND A CURRENT OF ONE AMPERE THROUGH A RESISTANCE OF ONE OHM. NAMED FOR ALESSANDRO VOLTA (1745-1827), ITALIAN PHYSICIST, WHO INVENTED THE BATTERY AND PRODUCED THE FIRST SOURCE OF CONSTANT-CURRENT ELECTRICITY.

WATT - THE PRACTICAL UNIT OF ELECTRICAL POWER. POWER IN WATTS IS EQUAL TO VOLTS MULTIPLIED BY AMPERES. THERE ARE 746 WATTS IN ONE HORSEPOWER. NAMED FOR JAMES WATT (1736-1819), SCOTTISH INVENTOR, WHO DEVELOPED THE STEAM ENGINE.

WEBER - THE UNIT OF MAGNETIC FLUX (MKS SYSTEM) EQUAL TO THE AMOUNT THAT, WHEN LINKED WITH A SINGLE TURN OF WIRE, WILL INDUCE ONE VOLT IN THE TURN AS IT DECREASES UNIFORMLY TO ZERO IN ONE SECOND. NAMED FOR WILHELM EDUARD WEBER (1804-1891), GERMAN PHYSICIST, WHO CONTRIBUTED TO THE KNOWLEDGE OF TERRESTRIAL MAGNETISM.

(CGS = CENTIMETER-GRAM-SECOND MEASUREMENT)  
(MKS = METER-KILOGRAM-SECOND MEASUREMENT)

**LOOKING BACK**

THE OLDTIMER WOKE WITH A TEAR IN HIS EYE HE'D BEEN DREAMING AGAIN OF THE DAYS LONG GONE BY OF RACKS AND OF PANELS OF REGULAR SIZE AND BEAMS REACHING OUT TO SOME FOREIGN SKIES. THE SIGNALS WERE CRISP ON THE OLD COLLINS SET AND ALL HIS OLD BUDDIES WERE THERE IN THE NET HIS DXCC ON THE WALL WAS DISPLAYED AND MANY OLD CARDS NOW TATTERED AND FRAYED. THE HEAT AND THE GLOW OF THE BRIGHT 813 AND THE OPEN WIRE FEEDER OUTSIDE HE COULD SEE. THE DX A'PLENTY THE SUNSPOTS WOULD BRING AND ALL THAT WAS NEEDED - A PIECE OF WET STRING ON THE KEY OF BRIGHT BRASS A CQ HE'D SEND AND BACK WOULD COME CHINA AND DX NO END. THE NOTE WAS T 9 AND NO CHIRP COULD BE HEARD AT 35 SPEED HE'D MISS NOT A WORD. THEN HE LOOKED AT HIS NEW TRANSISTORISED SET WITH ITS MINIATURE DIALS AND THAT MODERN F.E.T. HE THOUGHT AGAIN OF THE DAYS LONG GONE BY AND DROPPED OFF TO SLEEP WITH MANY A SIGH. WHO WANTS ALL THIS BRIGHT NEWFANGLED GEAR WHERE ARE THE HOMEBREWS OF YESTERYEAR?

Z55NZ.



IN THE NEXT EDITION OF QSX-PE: HAVE AMATEURS BEEN THE VICTIMS FOR MANY YEARS OF A GIGANTIC HOAX? READ ALL ABOUT IT NEXT MONTH.

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