



# Q S X P E



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

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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. MARTINS CHURCH, GREAT WEST WAY, KABEGA ON FRIDAY 20th NOVEMBER 1987 AT 8.15 PM.

### COMMITTEE

CHAIRMAN:	BRIAN WELLER ZS2AB	30-3498
VICE CHAIRMAN:	LIONEL COOMBE-DAVIS ZS2DD	32-1770
SECRETARY:	MARGE WELLER ZS2OB	30-3498
TREASURER:	LYNNE CROTHALL ZS2MM	35-4671
SPECIAL/SOCIAL EVENTS:	BEAVAN GWILT ZS2RL	30-6968
AWARDS:	BILL HODGES ZR2AAN	51-2580
EDITOR QSX-PE:	MARGE WELLER ZS2OB	30-3498
MEMBERS:	DICK SCHONBORN ZS2RS	32-2111
LIBRARIAN:	COLIN ASHWELL ZS2AO	31-2471
(NON-COMMITTEE POST)		

### BULLETIN ROSTER.

DATE	COMPILER	40M NET	80M NET	2M NET
22 NOV.	MARGE ZS2OB	ZS2AB	ZS2DD	ZR2AAN
29 NOV.	LYNNE ZS2MM	ZS2MM	ZS2RL	ZS2DD
6 DEC.	BEAVAN ZS2RL	ZS2RI	ZS2AB	ZS2MM
13 DEC.	BILL ZR2AAN	ZS2AB	ZS2DD	ZS2RL
20 DEC	DICK ZS2RS	ZS2RS	ZS2RL	ZS2AB

### Sunday Bulletin Information.

PRIMARY FREQUENCIES FOR BULLETINS AT APPROXIMATELY 08:40  
 H.F. 7098 KHZ IN 40 METRE BAND  
 V.H.F. 145,650 MHZ VIA TOWN REPEATER  
 RELAYS PROVIDED:

H.F. 3640 KHZ BY STATIONS AS LISTED IN BULLETIN ROSTER

#### BRANCH V.H.F. SERVICES PROVIDED

TOWN REPEATER (P.E. CENTRAL)	145,050 / 145,650 MHz
GRAHAMSTOWN REPEATER	145,150 / 145,750 MHz
LADY'S SLIPPER REPEATER	145,100 / 145,700 MHz
COCKSCOMB REPEATER	145,000 / 145,600 MHz
R.T.T.Y. BULLETIN BOARD	145,150 / 145,750 MHz
BEACON (C.W. ID ZS2PE)	144,910 MHz

\*\*\*\*WE LIKE BEING YOUR BRANCH\*\*\*\*

MINUTES OF GENERAL MEETING OF THE PORT ELIZABETH BRANCH OF THE SOUTH AFRICAN RADIO LEAGUE HELD AT ST. MARTINS CHURCH, KABEGA PARK, PORT ELIZABETH ON FRIDAY 16TH OCTOBER, 1987.

PRESENT: 35 MEMBERS AND VISITORS.

APOLOGIES: ZS2sFM, CZ, RG, DT AND ZR2EY.

THE CHAIRMAN WELCOMED ALL TO THE MEETING AND EXTENDED A SPECIAL WELCOME TO JIM ZS2LR, OUR NEWEST MEMBER AND HIS SON DONOVAN WHO HAD TRAVELLED FROM UITENHAGE, TO STEVE ZS2AAB, BARRIE ZR2AAB, STOFFEL ZS2C, VIC ZS2SZ, DOLLY AND CELIA.

MINUTES: THE MINUTES OF THE MEETING HELD 21ST AUGUST, 1987, HAVING BEEN PUBLISHED AND CIRCULATED IN QSX-PE, WERE TAKEN AS READ, PROPOSED BY LYNNE ZS2MM AND SECONDED BY FRED ZS2JS.

FINANCE: 112 MEMBERS HAD REPAID SUBS TO DATE. ALL MONIES DUE TO HQ HAD BEEN PAID AND THE BALANCE WAS R2476,23. R2078 WAS IN SPECIAL SAVINGS ACCOUNT. LYNNE SAID SHE HAD DONE SOME RESEARCH INTO ACCOUNTS PAYING HIGHER INTEREST RATES AND MENTIONED THE EXPANDING RATE CERTIFICATE. THE BRANCH DECIDED TO TAKE A CERTIFICATE TO THE VALUE OF R1500. THE NEXT EXPENSES TO BE INCURRED WOULD BE THE DELEGATES TRAVEL TO THE A.G.M. AT EASTER.

CORRES: THREE CARDS OF THANKS WERE RECEIVED FOR CARDS SENT BY THE BRANCH.

GENERAL: (1) CONDOLENCES WERE EXTENDED TO CLIVE ZS2RT ON THE DEATH OF HIS FATHER.

(2) THERE WERE STILL TWO BANNERS OUTSTANDING - ANYONE WHO KNEW OF THEIR WHEREABOUTS TO PLEASE CONTACT BRIAN OR RETURN THEM FORTHWITH.

(3) AS OWEN ZS2HZ HAD NOT BEEN PRESENT AT THE A.G.M. TO RECEIVE HIS VETERAN TROPHY, THIS WAS PRESENTED TO HIM AT THIS STAGE.

(4) A SOCIAL GET-TOGETHER WAS BEING ARRANGED FOR MEMBERS, WIVES AND FRIENDS AT THE "LITTLE SWALLOW" CHINESE RESTAURANT FOR 24TH OCTOBER AND ABOUT 10 WOULD BE ATTENDING. MARGE ZS2OB WOULD DO THE BOOKING. THE RESTAURANT WAS NOT LICENSED.

(5) J.O.T.A. WOULD BE TAKING PLACE ON 16TH AND 17TH OCTOBER AND BEAVAN ZS2PL AND DICK ZS2RS WOULD BE MAKING ARRANGEMENTS FOR THE ANTENNA AT THE (OUTSIDE) SCOUT HALL. OPERATION WOULD START AT 8A.M. IN A ROOM SEPARATE FROM THE MAIN HALL WHERE THE BULK OF THE ACTIVITIES WOULD TAKE PLACE. THE BRANCH RIG WOULD BE USED, OWEN WOULD LEND HIS ANTENNA AND SEVERAL MEMBERS VOLUNTEERED THEIR HELP. BEAVAN ASKED THAT BRIAN SHOULD BE THERE TO RECEIVE THE NATAL/KWAZULU AWARD WHICH WOULD BE HANDED OVER BY TINY PACKWOOD.

(6) THE UITENHAGE HOBBIES FAIR WOULD BE TAKING PLACE OVER THE WEEKEND 30/31ST OCTOBER AND KEVIN ZS2KE WOULD BE ORGANISING THIS, ASSISTED BY SEVERAL OTHER MEMBERS IN UITENHAGE.

(7) IT WAS DECIDED THAT THE BRANCH WOULD GIVE A DONATION OF R100 TO THE NATAL DISASTER FUND AND BRIAN WOULD INFORM THE ORGANISERS OF THIS. INDIVIDUALS WHO WISHED TO MAKE DONATIONS OF CLOTHING OR OTHER ITEMS COULD LEAVE THESE WITH MARGE AT HER 8TH.

(8) COLIN ZS2AD MENTIONED THAT WE SHOULD TRY AND MAKE A CONCERTED EFFORT TO HAVE SSTV AT THE NEXT J.O.T.A. AND THAT WE SHOULD ASK HQ TO PUBLICIZE THIS WELL IN ADVANCE AND THAT OTHER BRANCHES AND INDIVIDUALS BE ASKED TO MAKE SKEDS. PERHAPS THIS COULD ALSO BE MENTIONED ON THE CHAIRMANS NET.

THERE BEING NO FURTHER BUSINESS, THE MEETING WAS CLOSED AND TEA WAS TAKEN, FOLLOWED BY A RAG-CHEW.

SGD: B. A. WELLSER ZS2AB  
CHAIRMAN

SGD: M. T. WELLER ZS2OB  
SECRETARY

# THIS AND THAT.

## WELCOME

A HEARTY WELCOME TO JIM VAN LOGGERENBERG ZS2LR OF UITENHAGE WHO REJOINED THE BRANCH RECENTLY AND TO ANDREW GRAY ZS2G AND STOFFEL CARR ZS2C WHO BECAME SOCIAL MEMBERS AND WE WISH THEM ALL A LONG AND HAPPY ASSOCIATION WITH THE BRANCH AND THE LEAGUE.

## THANKS

TO KEVIN EASTWOOD ZS2KE AND THE OTHER MEMBERS IN UITENHAGE WHO ORGANISED THE STAND AND WERE IN ATTENDANCE AT THE RECENT UITENHAGE HOBBIES FAIR.

## OUTING TO ADDO

ON SATURDAY 21ST NOVEMBER, MEMBERS ARE INVITED TO COME ALONG TO THE DECCA STATION AT ADDO FOR THE CONDUCTED TOUR AND TO HAVE A BRAAI FOR LUNCH AT THE STATION AFTERWARDS. PLEASE BRING ALONG YOUR OWN MEAT AND SALADS AND WHATEVER ELSE YOU WANT. THE BRANCH WILL PROVIDE THE WHEREWITHALL FOR THE FIRE. WE WILL BE TRAVELLING IN CONVOY LEAVING AT 10.30A.M. AND WE CAN ALL MEET ACROSS THE SETTLERS BRIDGE. THERE WILL ALSO BE COMMS ON 2 METERS FOR THE LATECOMERS. FINAL DETAILS WILL BE GIVEN AT THE NEXT BRANCH MEETING.

## FOR SALE

ENTIRE STATION, SELDOM USED, IN MINT CONDITION, OFFERED AS ONE UNIT ONLY. FULL DETAILS TO BONA FIDE BUYERS. TELEPHONE 72-1532, JIMMY LEVAY, ZS2MK.

## J.O.T.A.

WE ARE HAPPY TO SAY THAT THE BRANCH WAS PRESENTED WITH TWO CERTIFICATES AT THE RECENT J.O.T.A., ONE FOR THE KWAZULU AWARD AND THE OTHER IN APPRECIATION OF THE EFFORTS OF THE BRANCH TOWARDS PROMOTING SCOUTING ACTIVITIES. WE WERE ALSO SUCCESSFUL IN WORKING ALL THE STATIONS NECESSARY TO ACHIEVE ALL THE AWARDS OFFERED THIS YEAR, I.E. THE J.O.T.A. AWARD, THE FRIENDSHIP AWARD, THE WORKED 50 AND THE KWAZULU, AND THESE WILL NO DOUBT BE PRESENTED AT THE NEXT J.O.T.A. MANY THANKS TO THOSE WHO DID THE SETTING UP OF THE STATION AND ALSO TO THE OPERATORS.

## WANTED

AS MANY OF YOUR ARE AWARE, THE BRANCH IS MAKING A PHOTOGRAPHIC RECORD OF SOCIAL AND OTHER ACTIVITIES HELD OVER THE YEARS AND WE NOW HAVE SIX FULL ALBUMS OF PICTURES WITH CAPTIONS. IF ANYONE HAS ANY PHOTOS THEY WOULD NOT MIND PARTING WITH, WE WOULD BE EXTREMELY HAPPY TO ADD THEM TO THE COLLECTION, AND IF YOU CAN LET US HAVE DETAILS FOR THE CAPTIONS, THIS WILL BE VERY MUCH APPRECIATED.

## SPECIAL EVENT

DURING THE MONTH OF NOVEMBER SEVERAL SPECIAL EVENT STATIONS WILL BE OPERATING IN THE U.K. WITH SPECIAL CALLSIGNS. THE SUFFIXES OF THE CALLS WILL MAKE UP THE WORDS "GLORIOUS CHANOCK CHASE" WITH THE MAIN STATION BEING G05CC. ALL SEVEN STATIONS WILL NEED TO BE WORKED, E.G. G02CK, G06SE, ETC. ALSO TAKING PART WILL BE G6SW, THE OLDEST CLUB STATION IN THE U.K. WHICH HAS BEEN ALLOWED TO KEEP THE G6 CALL, ALTHOUGH THERE ARE NO LONGER G6 CALLS BEING USED.

## SICK LIST

WE WERE SORRY TO HEAR THAT SEVERAL OF THE WIVES OF MEMBERS OF THE BRANCH WERE NOT TOO WELL LATELY AND HAD TO VISIT THE WHITE HOUSE, VICKY ANSELL WHO FORTUNATELY IS BACK FROM CAPE TOWN AND FEELING FIT, JOAN KNAPP AND LIL ERANZ WHO WE SINCERELY HOPE ARE MAKING GOOD PROGRESS.

## NEW HOME

IT WAS GOOD TO HEAR TO GORDON ZS6AFL AND JOAN KNAPP HAVE MOVED OUT OF THEIR FLAT TO A SMALL HOLDING WHERE THEY WERE ABLE TO PUT UP SOME ANTENNAS AND GORDON CAN BE HEARD ONCE AGAIN ON BULLETIN CALL-IN.

## INFORMATION ON QSL'S

DURING A RECENT COUNCIL MEETING, IT WAS DECIDED THAT MEMBERS WILL BE GIVEN A TIME OF 2 YEARS TO CONFORM TO THE STANDARD SIZE OF QSL CARD AS RECOMMENDED BY THE I.A.R.U., I.E. 90 X 140MM WITH A WEIGHT OF 190 TO 250 GRAM PER METRE SQUARE. HAVING A STANDARD SIZE QSL CARD THROUGHOUT THE WORLD WILL MAKE PARCELLING AND SORTING (MANY BUREAUX HAVE AUTOMATIC SORTING MACHINES) EASIER AND QUICKER AND WILL BENEFIT ALL IN THE END. SO WHEN YOU HAVE YOUR QSL CARDS PRINTED, REMEMBER TO CONFORM TO THE CORRECT SIZE.

IF YOU ARE GOING TO SEND YOUR QSL CARDS TO THE BUREAU THIS YEAR, SEND THEM BEFORE THE END OF NOVEMBER TO AVOID THE CHRISTMAS RUSH. THE BUREAU WILL NOT BE POSTING OFF QSL CARDS TO MEMBERS OR DX BUREAUX BETWEEN THE MIDDLE OF DECEMBER 1987 AND THE MIDDLE OF JANUARY 1988. DURING THE PAST MONTH 2690 QSL CARDS WERE DESPATCHED TO DX COUNTRIES AND MEMBERS WHO HAVE PAID THEIR SUBS WILL BE RECEIVING THEIR QSL CARDS SHORTLY. THOSE MEMBERS WHO HAVE NOT PAID TO DATE WILL BE REMOVED FROM THE QSL BUREAU'S LIST.

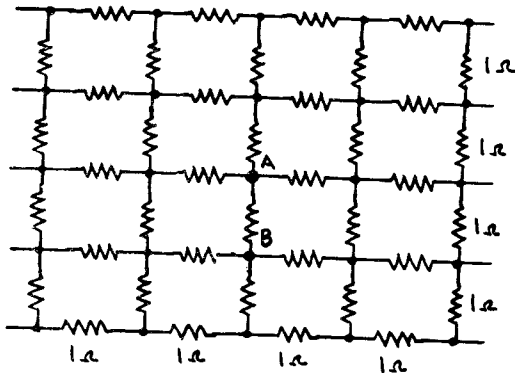
### KEEN ON DX?

IF YOU ARE REALLY KEEN ON DX, YOU CAN NOW BUY YOUR OWN ISLAND WHICH IS RECOGNISED FOR DXCC PURPOSES. THE ISLAND IS PALMYRA WITH THE PREFIX OF KHE. AS OWNER YOU CAN NATURALLY CHOOSE YOUR OWN SUFFIX. THE PRICE IS AROUND ABOUT 10 000 000 AMERICAN DOLLARS AND THE ESTATE AGENT IS SAVIO REALTY IN HONOLULU.

### MONEY FOR JAM?

AND TALKING ABOUT AMERICAN DOLLARS, IT IS QUITE SURPRISING THE VERY HEAVY PENALTIES WHICH ARE IMPOSED ON AMERICAN AMATEURS. RECENTLY, LARRY KACZMARCZYK W3UDW WAS FINED 1000 DOLLARS FOR 'MALICIOUS JAMMING' AND HIS LICENCE WAS PERMANENTLY CANCELLED.

## SOMETHING TO SCRATCH YOUR HEAD ABOUT



(1) FISH NET GRID MADE UP OUT OF 1 OHM RESISTORS.  
WHAT IS THE RESISTANCE BETWEEN ANY TWO ADJACENT KNOTS?  
(THANKS TO DUDLEY Z52AW FOR THIS)

(2) DIVIDE 13 IN HALF TO GET THE ANSWER 8.  
(BLAME CLIVE Z52RT FOR THIS ONE!)

ANSWERS AT THE NEXT BRANCH MEETING.

"CAREFULL" IT ISN'T A CRIME TO BE RICH ANY MORE, IT'S A MIRACLE.

# DOTS, DASHES.....AND ALL THAT JAZZ !

## CODES AND THEIR PROGRESS THROUGH TIME

MORSE CODE WAS ONE OF THE FIRST TO BE INTRODUCED TO TRANSFER INFORMATION VIA A COMMUNICATION LINK BY WIRE, LIGHT OR RADIO. IT IS STILL WIDELY USED TODAY DUE MAINLY TO THE NUMBER OF PEOPLE WHO HAVE MASTERED THE ART OF DECODING THE DIFFERENT LENGTH BEEPS, VARYING LENGTH CHARACTERS AND THE DIFFERENT MAKE UP OF DOTS AND DASHES FOR EACH CHARACTER. IT DOES STILL PROVE ITSELF AS ONE OF THE MOST EFFICIENT MAN TO MAN MODES OF COMMUNICATION. (SOMETIMES EVEN WOMAN TO WOMAN).(OSX ED.)

MORSE IS AN ASYNCHRONOUS MODE OF COMMUNICATION MEANING THAT THE RECEIVER HAS NO METHOD OF INDICATING TO THE TRANSMITTER WHETHER OR NOT IT IS READY TO RECEIVE OR WHETHER IN FACT THE MESSAGE IS BEING RECEIVED CORRECTLY. THIS PROCEDURE IS CALLED "HANDSHAKING" AND IS OVERCOME IN MORSE BY USING SOME FORM OF PROTOCOL NAMELY, IF I WERE TO SEND A MESSAGE TO ZS6XYZ, THEN I WOULD ANNOUNCE THAT THE MESSAGE FOLLOWS BY SENDING...ZS6XYZ DE ZS2XYZ...(MESSAGE.)

THE BAUDOT CODE USES 5 STANDARD LENGTH BITS FOR EVERY CHARACTER AND IS USED STILL TODAY FOR TEXT TRANSMISSION (TELEX) USING PREDOMINANTLY ELECTRO-MECHANICAL TYPEWRITER KEYBOARDS AND PRINTERS. FIVE BITS ONLY ALLOW 32 COMBINATIONS HENCE A FIGURES AND LETTERS CODE ARE DEFINED WHICH TELL THE RECEIVER WHAT TO EXPECT NEXT AND THUS ALLOWS 60 DIFFERENT CHARACTERS TO BE SENT. IT IS ALSO AN ASYNCHRONOUS CODE ALTHOUGH THE RECEIVER AND TRANSMITTER ARE SYNCHRONISED IN THE RESPECT THAT THEY BOTH SEND AND DECODE AT THE SAME SPEED.

DIGITAL COMPUTERS HAVE PUT SOME SEVERE CONSTRAINTS ON THE WHOLE SCENE THOUGH. AS THEIR REPUTATION WOULD HAVE US BELIEVE, THEY DO NOT MAKE MISTAKES! THIS MEANS DOING SOME ERROR CHECKING AT THE RECEIVER TO IDENTIFY OBVIOUS ERRORS IN A MESSAGE AND EVEN CORRECT THEM.

FIRSTLY, IT IS POSSIBLE TO COUNT THE VALUE OF EACH CHARACTER SENT AND ADD A CHARACTER TO THE END WHICH IS THE SUM OBTAINED. THE RECEIVER THEN DOES THE SAME CALCULATION AND COMPARES THE LAST CHARACTER TO THE SUM IT OBTAINED ITSELF. THIS IS KNOWN AS THE CHECKSUM AND ONLY INFORMS US THAT THE MESSAGE HAS MISTAKES SOMEWHERE!

THEN WE HAVE THE ERROR CHECKING CODES WITH SIMPLE PARITY. IN THESE A PARITY BIT IS ADDED TO MAKE THE NUMBER OF HIGH BITS AN EVEN OR ODD NUMBER I.E. (0)0011001 = ODD, WHILE (1)0011001 = EVEN. IN THIS CASE THE RECEIVER KNOWS IMMEDIATELY WHEN A CHARACTER IS WRONG, BUT THE METHOD IS NOT FOOLPROOF. MANY SUCH CODES HAVE HAD PARITY BITS ADDED TO THEM FOR THIS PURPOSE, THE MOST COMMON BEING ASCII AND EBCDIC (EXTENDED BINARY CODED DECIMAL INTERFACE CODE) USED BY THE PCs WE KNOW TODAY.

AS THESE ARE MAINLY USED BY COMPUTERS THEY CAN BE SENT SYNCHRONOUSLY FROM MACHINE TO MACHINE AS DONE IN NETWORKS ALTHOUGH THEY ARE GENERALLY USED IN THE ASYNCHRONOUS FORMAT WHERE THE SENDER ONLY LISTENS TO WHETHER THE RECEIVER IS BUSY OR NOT BEFORE COMMENCING TRANSMISSION.

HOWEVER, TODAY WE LEAVE IT ALL UP TO THE COMPUTER TO GET THE MESSAGE ACROSS CORRECTLY. PACKET COMMUNICATION HAS THUS COME ABOUT WHERE THE COMPUTER ACCUMULATES A GROUP OF CHARACTERS WHICH MAY BE PART OR THE WHOLE MESSAGE (PACKET). THIS IS SENT TOGETHER WITH A DESTINATION AND ORIGINATION ADDRESS - SO THAT IT GOES AUTOMATICALLY TO THE CORRECT RECEIVER - AND IT ALSO HAS A UNIQUE CHECKSUM ADDED TO THE MESSAGE. IN THIS CASE THE RECEIVER THEN TELLS THE TRANSMITTER THAT THE MESSAGE WAS RECEIVED OK. IF NOT, IT IS RETRANSMITTED UNTIL CORRECT.

THE TABLE BELOW SHOWS SOME COMPARISONS OF DIFFERENT CODES:

<u>ALPHABET</u>	<u>MORSE</u>	<u>ASCII</u>	<u>(HEX)</u>	<u>(DECIMAL)</u>	<u>BAUDOT</u>	<u>EBCDIC</u>	<u>BCD</u>
			( <u>ODD PARITY</u> )				
LETTERS	NONE	NONE	-	-	11111	NONE	NONE
A	..	11000001	C1	193	00111	11000001	NONE
a	.-	01100001	61	97	NONE	01000001	NONE
FIGURES	NONE	NONE	-	-	11011	NONE	NONE
1	.....	00110001	31	49	10111	11110001	0001
2	..----	00110010	32	50	10011	11110010	0010
3	...---	10110011	83	179	00001	11110011	0011

(ACKNOWLEDGEMENTS TO FARRELL ZS6RW FOR THIS ARTICLE.)

## THE FEATHERLESS WOODPECKER.

BY SIMON BATTMAN.

HIGH ENERGY PULSES FROM RIGA - A MYSTERY STORY!

MIND CONTROL FROM THE SOVIET UNION? CAN THE SCHUMANN RESONANCE EFFECT BE USED AS THE ULTIMATE WEAPON? WE STILL HAVE NO ANSWERS TO THE QUESTIONS SURROUNDING THE MOST POWERFUL TRANSMITTER ON EARTH!

FOR A DECADE OR SO, AMATEUR RADIO BUFFS HAVE BEEN AGGRAVATED BY MYSTERIOUS INTERFERENCE. TRIANGULATION HAS SHOWN THESE HIGH ENERGY PULSES TO COME FROM RIGA, IN THE NORTH WESTERN PART OF THE SOVIET UNION. ACCORDING TO SHORT WAVE LISTENERS, THESE INFURIATING BROADCASTS SOUND LIKE A HAMMER. THEY HAVE NICKNAMED THEM "WOODPECKER".

THE FREQUENCIES USED BY INTERNATIONAL SHORTWAVE BROADCASTS GENERALLY LIE BETWEEN 4,5 AND 30 MEGAHERTZ. MOST RADIO STATIONS ARE GROUPED INTO BANDS OF FREQUENCIES BETWEEN THESE TWO LIMITS. IN WAVELENGTH TERMS, THESE ARE NORMALLY 11, 13, 16, 19, 25, 31, 41, 49 AND 60 METRES.

ON THE OTHER HAND, MOST AIRCRAFT AND RADIO ENTHUSIASTS USE A SIGNIFICANTLY LOWER RANGE, OF BETWEEN 1,6 AND 4,4 MEGAHERTZ. FOR AM TRANSMISSIONS, THIS CAN BE LOWER STILL.

OUR STORY HAS ITS ORIGINS BACK IN EARLY 1976, WHEN HEAVY INTERFERENCE WAS FIRST DETECTED IN BOTH EUROPE AND NORTH AMERICA. DISTURBANCES OCCURRED BETWEEN 3 AND 10 MEGAHERTZ. IN SOME CASES THE EFFECTS WERE SO GREAT THAT INTERNATIONAL COMMUNICATIONS ON CERTAIN SPECIFIC FREQUENCIES WERE BLACKED OUT FOR PERIODS RANGING FROM A FEW MINUTES TO SEVERAL HOURS.

IT WASN'T LONG BEFORE WESTERN MONITORING GROUPS DISCOVERED THAT THE OFFENDING SIGNALS EMANATED FROM BEHIND THE IRON CURTAIN. PROTESTS RAINED IN ON MOSCOW FROM BRITAIN, UNITED STATES, CANADA AND SEVERAL OTHER COUNTRIES. AT FIRST, THE DIPLOMATIC NICETIES SEEMED TO HAVE LITTLE EFFECT. THEN SUDDENLY, TOWARDS THE END OF 1976, THE SOVIETS ADMITTED THEY WERE CONDUCTING EXPERIMENTS LIKELY TO CAUSE SUBSTANTIAL INTERFERENCE.

AS ONE MIGHT EXPECT, THE SOVIET GOVERNMENT DID NOT REVEAL THE NATURE OF THEIR TESTS, THOUGH THEY DID AGREE TO REDUCE BROADCASTS TO SHORTER PERIODS OF TIME.

### MIND CONTROL?

THE LOWER THE FREQUENCY OF A RADIO WAVE, THE LONGER ITS WAVELENGTH. UPON EXAMINATION, WAVES OSCILLATING AT JUST A FEW HERTZ CAN BE SHOWN TO HAVE A WAVELENGTH THE SAME SIZE AS PLANET EARTH. ANY WAVE WHICH FITS EXACTLY

AROUND OUR GLOBAL HOME WOULD SET UP A MASSIVE RESONANCE, AND WOULD, THEREFORE, BE ABLE TO TRAVEL GREAT DISTANCES. THIS IS CALLED THE SCHUMANN RESONANCE - THE FREQUENCY AT WHICH THE EARTH RESONATES WITH ELECTRICAL ENERGY.

SOME TIME AGO IT WAS REPORTED THAT THE SOVIETS HAVE BOMBARDED THE AMERICAN EMBASSY WITH HIGH ENERGY MICROWAVES. THESE REPORTS CLAIMED THAT EMBASSY PERSONNEL WERE TAKEN ILL AS A DIRECT RESULT OF THE BOMBARDMENT. SOME HAVE EVEN DECLARED THAT PEOPLE DIED FROM THE EFFECTS, WHILE OTHERS SAY THE TRANSMISSIONS WERE ATTEMPTS AT MIND CONTROL. WERE THE EARLY WOODPECKER EXPERIMENTS A PRELUDE TO THE MICROWAVE ASSAULTS. IN ALL PROBABILITY, THOSE OF US OUTSIDE GOVERNMENT CIRCLES WILL NEVER KNOW THE ANSWER. ALTHOUGH MIND CONTROL DOES SEEM A BIT UNLIKELY, IT IS WORTH NOTING THAT THE SCHUMANN RESONANCE ITSELF IS WELL WITHIN THE FREQUENCY RANGE OF HUMAN BRAIN WAVES. FOOD FOR THOUGHT PERHAPS!

#### WOODPECKER TODAY.

WOODPECKER IS STILL TRANSMITTING TODAY IN STARTS AND STOPS. THERE APPEAR TO BE NO SPECIFIC PATTERNS TO ANY OF THE TRANSMISSIONS, WHICH USUALLY LAST ABOUT HALF AN HOUR. DURING THIS TIME THE FREQUENCY CHANGES, PROBABLY IN ORDER TO MAKE USE OF THE MAXIMUM FREQUENCY AND SHORTEST POSSIBLE WAVELENGTH, DEPENDING ON RECEPTION CONDITIONS. BUT EVEN THIS IS BY NO MEANS CERTAIN.

TRANSMISSIONS TEND TO OCCUR AROUND 7 MEGAHERTZ, WHICH EASILY INTERFERES WITH AMATEURS ON 40 METRES. IT IS, HOWEVER, STILL RECEIVED AT 20 MEGAHERTZ, AS IN THE PAST.

WOODPECKER IS WITHOUT DOUBT, THE MOST POWERFUL BROADCASTER ON EARTH. IT SEEMS TO BE A NUMBER OF TRANSMITTERS, EACH TURNING OUT AN AVERAGE OF 50 MEGAWATTS. THE WOODPECKER CAN GENERATE A CONSTANT POWER ACROSS A BANDWIDTH OF UP TO 200 KILOHERTZ. TO PUT THIS INTO PERSPECTIVE, THE BBC'S MOST POWERFUL RADIO OPERATES AT 1/250TH OF WOODPECKER'S.

IT IS POSSIBLE TO OPERATE IN THE WOODPECKER BAND, BY MAKING USE OF MUTING CIRCUITS. THESE WORK BY TRANSMITTING AND RECEIVING IN THE GAPS BETWEEN THE HIGH ENERGY PULSATIONS. UNFORTUNATELY, AS WITH MOST CLEVER SOLUTIONS, THERE IS A DRAW-BACK. IF WOODPECKER DECIDES (AS IT OFTEN DOES) TO TRANSMIT ON A CONTINUOUS WAVEFORM, THEN MUTING CIRCUITS ARE ABOUT AS MUCH USE TO THE RADIO HAM AS A CAR WOULD BE TO A GOLDFISH. ALL COMMUNICATION WITHIN THE TARGETED BAND WOULD BE WIP'ED OUT.

#### SPECULATIONS.

IT IS WELL KNOWN THAT THE SOVIETS AND THEIR ALLIES SPEND MILLIONS EACH YEAR TRYING TO PREVENT WESTERN BROADCASTS FROM REACHING THEIR PEOPLE. IT IS QUITE POSSIBLE THAT WOODPECKER IS JUST PART OF THEIR JAMMING NETWORK, THOUGH IT DOES SEEM LIKE AN AWFUL LOT OF WORK FOR SUCH PUNITIVE REWARDS. SO, ARE THERE ANY OTHER USES FOR SUCH A POWERFUL SOURCE OF RADIO ENERGY?

IF THE POLITICIANS EVER FEEL COMPELLED TO PRESS THE DREADED RED BUTTON, NORMAL RADIO COMMUNICATIONS DURING A NUCLEAR WAR WOULD BECOME GARBLED BECAUSE OF THE INTENSE IONIZING RADIATION. GIVEN THAT THE BULK OF THE WORLD'S NUCLEAR WEAPONS ARE ON SUBMARINES, HOW WOULD A COUNTRY KEEP IN TOUCH WITH ITS DOOMSDAY FLEET?

ONE POSSIBLE WAY OF DOING THIS WOULD BE TO BUILD RADIOS WHICH OPERATE AT VERY LOW FREQUENCIES OF PERHAPS JUST A FEW HERTZ. SUCH LOW FREQUENCIES TEND TO BE ALMOST TOTALLY RESISTANT TO IONIZING INTERFERENCE AND WOULD CERTAINLY REACH NUCLEAR SUBS BURIED DEEP IN THE WORLD'S OCEANS.

MANY MOONS AGO, THE UNITED STATES INSTIGATED SUCH A PROPOSAL CALLED PROJECT SANGUINE - AN ANTENNA, ONE MILLION METRES LONG, WHICH FOR OBVIOUS REASONS WOULD BE LOOPED. A NUMBER OF PEOPLE HAVE SUGGESTED THAT WOODPECKER IS JUST



ANOTHER VERSION OF PROJECT SANGUINE. THIS MAY WELL BE THE CASE, BUT UNLESS THE SOVIETS HAVE BEEN EXPERIMENTING WITH A NEW FANGLE-DANGLE MODULATION EFFECT, THE FREQUENCIES WOULD BE VERY LOW, AND NOT IN MEGAHERTZ LIKE WOODPECKER. SO ONCE AGAIN WE FIND OURSELVES BACK AT THE PROVERBIAL SQUARE ONE - SPECULATING ON THE UNKNOWN.

#### NOT WHAT THEY SEEM.

APPARENTLY WHEN WOODPECKER IS OFF THE AIR, SOVIET RADIO OPERATORS MATERIALIZE, CLAIMING TO BE AMATEURS. THEY ASK WESTERN RADIO BUFFS IF WOODPECKER IS BEING RECEIVED AND REQUEST DETAILS OF THE TIME, FREQUENCY RECEPTION POINTS AND SIGNAL STRENGTH TO BE SENT TO A POST BOX IN MOSCOW.

THERE ARE JUST TWO OTHER ANOMALIES IN THE WOODPECKER STORY. FIRST, FOR SO CALLED AMATEURS, THE SOVIETS SEEM TO BE USING SOME HIGH CALIBRE EQUIPMENT, WITH POWER RATINGS OF 10 KILOWATTS OR MORE. IN MOST COUNTRIES AMATEURS ARE RESTRICTED TO JUST 400 WATTS.

SECONDLY THEY SPEAK REMARKABLY GOOD ENGLISH AND YET, NEVER SEEM INTERESTED IN THE RUN OF THE MILL CHIT-CHAT USUALLY EXCHANGED BETWEEN AMATEURS. AFTER THEY HAVE DISCOVERED HOW WELL THEIR SIGNALS ARE BEING RECEIVED, THEY SIGN OFF INTO OBSCURITY.

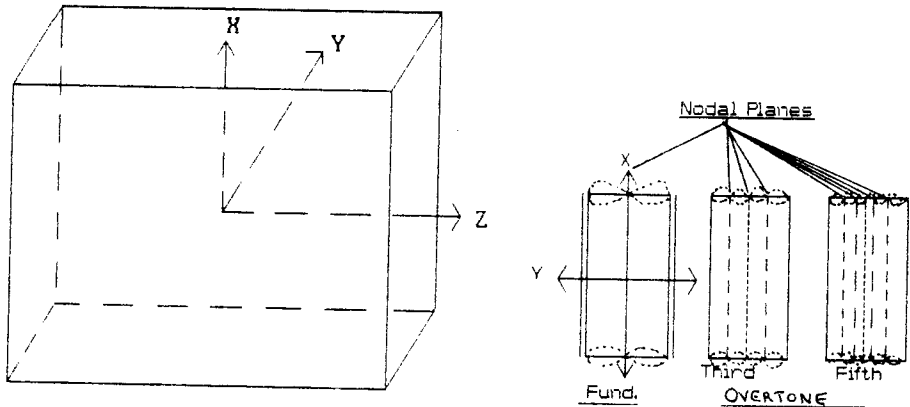
WHAT ARE THEY UP TO? ANY IDEAS?

(REPRINTED FROM "PRACTICAL ELECTRONICS" SEPTEMBER 1986)

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## WHAT IS A QUARTZ CRYSTAL ?

A QUARTZ CRYSTAL IS CUT FROM A BAR OF MANUFACTURED QUARTZ. IT IS CUT VERY PRECISELY IN RELATION TO THE CRYSTALLOGRAPHIC AXIS OF THE CRYSTAL AND IS FORMED INTO A THIN DISC, RATHER LIKE AN OPTICAL LENS. TWO ELECTRODES ARE SECURED TO IT, ONE ON EACH SIDE, BY VACUUM DEPOSITION OF SILVER, GOLD OR ALUMINIUM. WHEN A VOLTAGE IS APPLIED TO THE ELECTRODES THE CRYSTAL CHANGES ITS SHAPE DUE TO ITS PIEZOELECTRIC PROPERTIES, THUS CAUSING A STRESS TO BE APPLIED TO THE CRYSTAL. IF THIS STRESS IS VARIED BY REVERSING THE APPLIED VOLTAGE, THE CRYSTAL WILL BE SUBJECTED TO AN ALTERNATING STRESS AND WILL TEND TO VIBRATE AT ITS NATURAL FREQUENCY. THUS RESONANCE IS INITIATED. THE FREQUENCY OF RESONANCE IS SO PRECISE WITH QUARTZ CRYSTALS THAT THEY CAN SERVE AS A FREQUENCY DETERMINING DEVICE, AND THEY ARE CONSIDERABLY MORE PRECISE THAN A TUNING FORK BECAUSE OF THE HIGH PURITY OF THE QUARTZ MATERIAL. A QUARTZ CRYSTAL MAY OPERATE AT ITS FUNDAMENTAL MODE - GENERALLY UP TO 30MHZ - OR AT THE THIRD, FIFTH, ETC., OVERTONES. THE MODE OF VIBRATION IS IN THICKNESS SHEAR, SO THE CRITICAL DIMENSION CONTROLLING THE FREQUENCY IS IN 'Y', I.E. THE THICKNESS OF THE PLATE. THE VIBRATIONS ARE SHOWN EXTENDING TO THE END OF THE PLATE, BUT IN PRACTICE THE PLATE IS DESIGNED TO CONFINE THE VIBRATIONS TO THE CENTRE, IN THE AREA OF THE EXCITING ELECTRODES. STRICTLY SPEAKING, THIS UNIT IS A RESONATOR. WHEN IT HAS BEEN ENCAPSULATED IN ONE OF SEVERAL WAYS, IT THEN BECOMES WHAT IS GENERALLY CALLED A "QUARTZ CRYSTAL" OR JUST A "CRYSTAL" IN RADIO USE. IF THE CRYSTAL IS THEN BUILT INTO AN APPROPRIATE ELECTRONIC CIRCUIT IT BECOMES A QUARTZ CRYSTAL OSCILLATOR, I.E. A COMPLETE FREQUENCY CONTROLLING SYSTEM. CRYSTALS ARE COMPLEX COMPONENTS, SELDOM PROPERLY UNDERSTOOD EVEN BY THOSE WHO SPECIFY THEM FOR USE IN ELECTRONIC CIRCUITS. FAILURE TO SPECIFY THE CORRECT TYPE OF UNIT FOR A SPECIFIC TASK CAN RESULT IN UNNECESSARY COST AS WELL AS FAILURE IN PERFORMANCE. IT PAYS TO BE VERY SPECIFIC ABOUT THE TEMPERATURE RANGE WITHIN WHICH THE UNIT WILL OPERATE AND FAILURE TO DO SO MAY RESULT IN A CRYSTAL EXHIBITING UNWELCOME ERRORS IN SERVICE. CRYSTAL HOLDERS ALSO VARY IN SIZE AND THE CORRECT TYPE MUST ALSO BE SPECIFIED WHEN ORDERING CRYSTALS. NOTHING MUST BE LEFT TO THE SUPPLIER TO GUESS.



## THE HISTORY OF CRYSTAL OSCILLATORS.

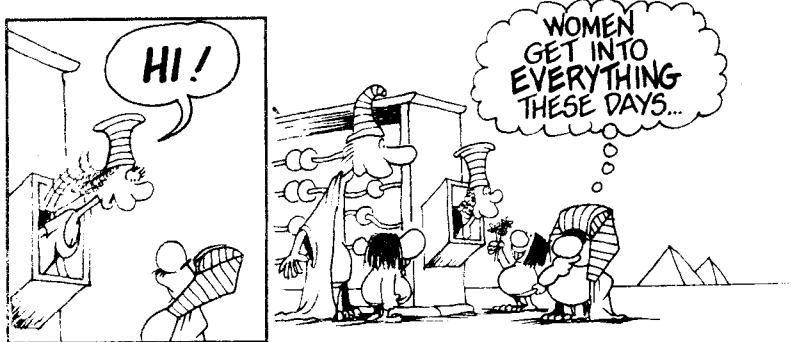
CRYSTAL OSCILLATORS WERE INVENTED IN THE 1920s. CADY MADE ONE OF THE FIRST IN 1921. MILLER PATENTED BOTH HIS OWN AND PIERCE'S CIRCUITS IN 1930. PIERCE PATENTED BOTH HIS OWN AND MILLER'S CIRCUITS IN 1931 AND AFTER SOME LEGAL ARGUING IN THE COURTS, PIERCE REPATENTED BOTH CIRCUITS AGAIN IN 1938. SABAROFF'S QUARTZ CRYSTAL VERSION OF THE COLPITTS LC OSCILLATOR WAS PUBLISHED IN 1937, AND MEACHAM'S RESISTANCE BRIDGE CIRCUIT WAS PUBLISHED IN 1938. BUTLER PUBLISHED HIS ARTICLE ON VHF HARMONIC OSCILLATORS IN 1946. GOLDBERG AND CROSBY PUBLISHED THEIR ARTICLE ON CATHODE COUPLED OR GROUNDED GRID OSCILLATORS IN 1948.

THE U.S. ARMY SIGNAL CORPS FUNDED AN INTENSE QUARTZ CRYSTAL DEVELOPMENT PROGRAM DURING AND AFTER WORLD WAR II AND FUNDED A SMALL AMOUNT OF OSCILLATOR CIRCUIT DEVELOPMENT ALONG THE WAY. EDSON DID A STUDY OF VHF HARMONIC OSCILLATOR CIRCUITS IN 1950 AND PUBLISHED HIS CLASSIC BOOK ON VACUUM TUBE OSCILLATORS OF ALL TYPES IN 1953. IN 1965, FIRTH PUBLISHED HIS DESIGN HANDBOOK ON THE PIERCE CIRCUIT AND THE BUTLER COMMON BASE HARMONIC CIRCUIT.

THE EARLY OSCILLATORS USED VACUUM TUBES, WHICH HAD LIMITED LIFE AND WERE, THEREFORE, HIGH-MAINTENANCE ITEMS. CONSEQUENTLY, THERE WAS A CONSIDERABLE ADVANTAGE IN USING A ONE-TUBE OSCILLATOR CIRCUIT, AS COMPARED WITH A TWO-TUBE CIRCUIT. STRONG EMPHASIS WAS PLACED ON GETTING THE MAXIMUM POWER OUT OF THE OSCILLATOR CIRCUIT, SINCE THIS MEANT THAT FEWER POWER AMPLIFIER TUBES WERE REQUIRED IN A TRANSMITTER. VACUUM TUBES OPERATED AT POWER SUPPLY VOLTAGES OF 150-300 VDC, WHICH PERMITTED LARGE VOLTAGE SWINGS AND MADE IT EXTREMELY EASY TO OVERDRIVE THE CRYSTAL'S DISSIPATION LIMIT OR EVEN FRACTURE THE CRYSTAL.

WITH THE ADVENT OF TRANSISTOR AND IC CIRCUITS, THE EMPHASIS WAS PLACED ON PERFORMANCE. TRANSISTORS ARE VERY SMALL AND HAVE INDEFINITE LIFE, SO IN MANY CASES, THE NUMBER OF TRANSISTORS USED IN AN OSCILLATOR CIRCUIT IS ALMOST IRRELEVANT. THE LOWER POWER SUPPLY VOLTAGE USED IN TRANSISTOR CIRCUITS HAS REDUCED THE CRYSTAL OVERDRIVE PROBLEM TO MORE MANAGEABLE PROPORTIONS. AND TO GET BETTER FREQUENCY STABILITY, OSCILLATOR CIRCUITS ARE NOW ROUTINELY DESIGNED WITH LOW POWER OUTPUT, SINCE IT COSTS SO LITTLE TO ADD AN AMPLIFIER STAGE.

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