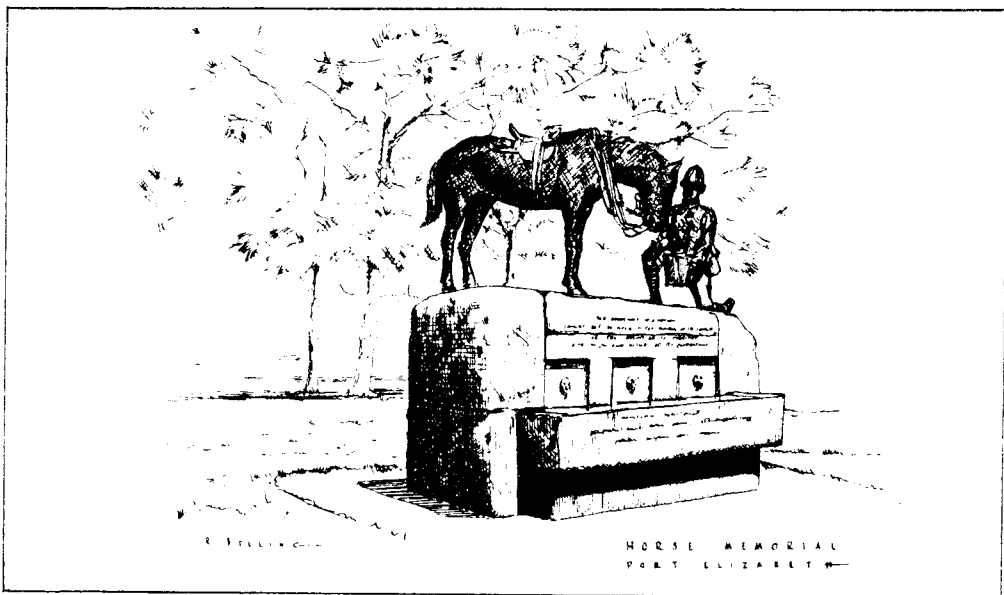




# Q S X P E



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

P.O. BOX 10402  
LINTON GRANGE  
6015

01/87



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, KABEGA, ON FRIDAY 16TH JANUARY, 1987.

THERE WILL BE A DISPLAY OF VARIOUS COMPUTER PROGRAMS ALLIED TO AMATEUR RADIO, I.E. CALCULATIONS FOR ANTENNAS, ETC AND SATELLITE PREDICTIONS. IF ANYONE HAS A PROGRAM THEY WOULD LIKE TO DEMONSTRATE AND TALK ABOUT, PLEASE BRING IT AND YOUR COMPUTER ALONG AND YOU MAY HAVE THE FLOOR FOR A WHILE.

COMMITTEE

<u>CHAIRMAN:</u>	BRIAN WELLER ZS2AB	303498
<u>VICE CHAIRMAN:</u>	LIONEL COOMBE-DAVIS ZS2DD	321770
<u>SECRETARY:</u>	MARGE WELLER ZS2OB	303498
<u>TREASURER:</u>	LYNN CROTHALL ZS2MH	338607
<u>SPECIAL EVENTS AND SOCIAL ACTIVITIES:</u>	OWEN WHEELER ZS2HZ	381310
<u>AWARDS:</u>	BILL HODGES ZS2-157	512580
<u>EDITOR QSX-PE:</u>	MARGE WELLER ZS2OB	303498
<u>MEMBERS:</u>	DICK SCHONBORN ZS2RS	322111
	BEAVAN GWILT ZS2RL	306968
<u>LIRBARIAN</u>	COLIN ASHHELL ZS2AO	312471

BULLETIN ROSTER



	40 METRES	2 METRES	80 METRES
18 JAN	ZS2DD BOTTOM UP	ZS2RL	ZS2AB
25 JAN	ZS2OB MIDDLE DOWN	ZS2RS	ZS2HZ
1 FEB	ZS2MH MIDDLE UP	ZS2HZ	ZS2DD
8 FEB	ZS2HZ TOP DOWN	ZS2MH	ZS2RL
15 FEB	ZS2157 BOTTOM UP	ZS2RS	ZS2DD

SUNDAY BULLETINS

HF 40M - 7098KHZ (LOWER SIDEBAND)  
80M - 3640KHZ (LOWER SIDEBAND)  
VHF 145,700 AND 145,75MHZ

BRANCH FREQUENCIES  
P.E. REPEATER 145,05/65  
GRAHAMSTOWN 145,15/75  
LADY'S SLIPPER 145,10/70  
COCKSCOMB 145,00/60  
RTTY MAILBOX 145,35  
VHF BEACON 144,910MHZ

WE LIKE BEING YOUR BRANCH

## THIS AND THAT

COMMITTEE: WE WOULD LIKE TO WELCOME DICK SCHONBORN ZS2RS BACK AS A MEMBER OF THE COMMITTEE. DICK WAS CO-OPTED AT THE LAST COMMITTEE MEETING TO TAKE THE PLACE OF DICK HARDIE ZS2DH WHO HAS BEEN TRANSFERRED TO DIV. 6. JUST WHEN YOU THOUGHT IT WAS SAFE, DICK.....

WELCOME: A SPECIAL WORD OF WELCOME TO JOHAN HARMSE ZS2HH WHO HAS TRANSFERRED HIS MEMBERSHIP TO THIS BRANCH. WE WISH YOU A LONG AND HAPPY ASSOCIATION WITH THE BRANCH JOHAN AND HOPE TO SEE YOU AT MEETINGS AND SOCIAL GET-TOGETHERS.

VISITORS: IN TOWN DURING THE RECENT HOLIDAYS WERE SEL ZS2SS AND RIETJIE STAPLES WHO STAYED WITH BRIAN AND MARGE FOR A FEW DAYS WHILE VISITING FAMILY AROUND THE EASTERN CAPE.

ALSO PASSING THROUGH P.E. ON THEIR WAY TO FAMILY IN CAPE TOWN WERE GORDON ZS6AFL AND JOAN KNAPP WHO ALSO SPENT A FEW DAYS HERE AND IT WAS GOOD TO SEE THEM AGAIN.

AN OLD MEMBER OF THE BRANCH PETER NEVELING EX ZS2PD NOW ZS6PC WAS ALSO HERE BUT WAS VERY QUIET DURING HIS STAY.

HOPE EVERYONE WHO WAS HERE, INCLUDING THOSE WE DON'T KNOW ABOUT, ENJOYED THEIR HOLIDAYS AND THAT WE'LL SEE THEM AGAIN SOON.

HOSPITALIZED: WE WERE VERY SORRY TO HEAR THAT BILL BROWNE ZS2BY HAD TO SPEND SOME TIME IN THE WHITE HOUSE FOR A KIDNEY OPERATION. SURE HOPE THAT YOU ARE FIT AGAIN, BILL AND WILL BE OUT AND ABOUT VERY SOON.

THANKS: THE BRANCH WOULD LIKE TO THANK NEVILLE ROEBERT ZS2NR OF KINGWILLIAMSTOWN, A SOCIAL MEMBER OF THE BRANCH, FOR HIS GENEROUS DONATION TOWARDS THE REPEATER AND MAILBOX. HOPE CONDX ARE ALWAYS GOOD FOR YOU, NEVILLE AND THAT YOU DO WELL IN THE CONTESTS AGAIN.

CONTESTS: WE WERE PLEASED TO SEE THAT BOTH INDIVIDUAL MEMBERS AND THE ZS2PE BRANCH STATION DID WELL IN THE RECENT HF CONTESTS. IN THE FONE CONTEST, ZS2PE OPERATED BY ZS2AB AND ZS2OB CAME TWELFTH, THE THIRD HIGHEST BRANCH STATION; ZS2RS, ZS6AFL, ZS2HZ, ZS2MM ASSISTED BY ZS2G ALSO FIGURED. IN THE CW CONTEST, ZS2RM CAME 7TH, ZS2FE OPERATED BY ZS2OB CAME TWELFTH AND ZS6AFL ALSO ENTERED. LOTS OF GOOD LUCK FOR NEXT TIME ROUND.

RADIO ZS: WE WOULD LIKE TO THANK BUCK TAYLOR ZS1VP THE EDITOR OF RADIO ZS AND HIS STAFF FOR THE BRAND NEW LOOK RADIO ZS. CONGRATULATIONS AND KEEP UP THE GOOD WORK.

WANTED: ANDRE LE ROUX ZS2AL IS LOOKING FOR EITHER A RECEIVER OR TRANSCEIVER, C.W. CAPABILITY ONLY WILL ALSO BE ACCEPTABLE. CONTACT ANDRE AT 12 GUSTAV PRELLER STREET, DESPATCH.

AMATEUR LICENCES: THE POSTMASTER GENERAL WILL SHORTLY BE SENDING OUT RENEWAL FORMS. PLEASE WAIT FOR THESE AS YOU WILL NOT BE ABLE TO PAY YOUR LICENCE FEE UNTIL YOU RECEIVE THE FORM. LISTEN FOR FURTHER DETAILS ON BOTH H.Q. AND BRANCH BULLETINS.

TECHNICAL CLASSES: BRIAN ZS2AB WILL BE RUNNING CLASSES AGAIN FOR THE R.A. EXAMINATION AND WILL BE STARTING DURING THE FIRST TWO WEEKS OF FEBRUARY. PLEASE CONTACT HIM FOR FURTHER DETAILS.

SOCIAL GET-TOGETHERS: WE HOPE TO ARRANGE A NUMBER OF EVENT DURING THE COMING MONTHS AND HOPE TO SEE LOTS OF MEMBERS AND THEIR WIVES THERE. LET US KNOW JUST WHAT SORT OF OCCASION YOU ENJOY.

DF HUNTS: HOPEFULLY THESE WILL BE SUPPORTED MORE DURING THIS COMING YEAR. IT'S A LOT OF FUN AND THE GATHERING FOR TEA AND EATS AFTERWARDS IS EVEN BETTER. SEE YOU ALL THERE.

MINUTES OF THE GENERAL MEETING OF THE PORT ELIZABETH BRANCH OF THE SOUTH AFRICAN RADIO LEAGUE HELD AT ST. MARTIN'S CHURCH, PORT ELIZABETH ON FRIDAY 21ST NOVEMBER, 1986.

PRESENT: 30 MEMBERS AND VISITORS.

APOLOGIES: ZS2RB, CZ, HB, MK, RM, DH AND ZR2L.

THE CHAIRMAN WELCOMED ALL TO THE MEETING, ESPECIALLY THE WIVES AND THE TWO SPECIAL GUESTS, DIANE AND ROBBIE WHO WERE TO PRESENT A VIDEO AND TALK ON CONSUMERISM AND THE BAR-CODING PRINCIPLE. THIS WAS VERY WELL RECEIVED AND FROM THE NUMBER OF QUESTIONS ASKED, BOTH TECHNICAL AND RELATING TO CONSUMERISM, A GREAT AMOUNT OF INTEREST WAS AROUSED. AT 9.30 TEA WAS TAKEN AND THE MEETING STARTED AT 10P.M.

MINUTES: THE MINUTES OF THE MEETING HELD 17TH OCTOBER, 1986, HAVING BEEN PUBLISHED AND CIRCULATED IN QSX-PE WERE TAKEN AS READ; PROPOSED BY LYNN ZS2MM AND SECONDED BY DICK ZS2RS.

ARISING: (1) THE VHF BEACON HAD BEEN RE-INSTALLED BUT APPARENTLY WAS NOT RUNNING DUE TO A LIGHTNING STRIKE.

(2) THE FIELD DAY HAD BEEN VERY SUCCESSFUL AND ENJOYED BY ALL WHO HAD TAKEN PART. A TOTAL OF 296 CONTACTS HAD BEEN MADE WITH A TOTAL OF 24570 POINTS. A VOTE OF THANKS WAS EXTENDED TO OWEN ZS2HZ FOR DOING A MARVELLOUS JOB OF ORGANISATION, TOGETHER WITH THE HELP AND SUPPORT OF OTHER OPERATORS AND HELPERS.

(3) AN APOLOGY WAS MADE FOR THE POOR QUALITY OF THE PRINTING OF NOVEMBER QSX. APPARENTLY THE PRINTERS WERE STILL HAVING SOME TROUBLE.

FINANCE: THE BRANCH FINANCES WERE IN GOOD ORDER WITH APPROXIMATELY R3500 IN VARIOUS ACCOUNTS.

CORRES: (1) LETTER OF THANKS FROM ALGOA FLYING CLUB.

(2) LETTER FROM KEMPTON PARK BRANCH RE A.G.M.

ARISING: IT WAS NECESSARY TO APPOINT A DELEGATE FOR THE 1987 LEAGUE A.G.M. TO BE HELD IN KEMPTON PARK BECAUSE ACCOMMODATION WAS AT A PREMIUM AT EASTER. THE CHAIRMAN BRIAN ZS2AB WAS UNANIMOUSLY ELECTED.

THE SECRETARY WAS ASKED TO WRITE LETTERS OF THANKS TO RAY WARREN OF COASTAL BATTERIES AND TO JULIAN LUCAS AND COLIN FOX FOR THEIR HELP WITH THE FIELD DAY.

GENERAL: (1) THE MOTION WHICH HAD BEEN FORWARDED TO HQ FROM THIS BRANCH FOR 1987 A.G.M. WAS READ TO THE MEETING AND WOULD BE PUBLISHED IN QSX NEXT MONTH.

(2) NEIL ZS2MG ASKED ABOUT A LOWER AGE LIMIT FOR OBTAINING LICENCES AND THOUGHT IT WOULD BE BENEFICIAL TO INTEREST YOUNGSTERS IN AMATEUR RADIO.

(3) A VERY WARM WELCOME WAS EXTENDED TO JOHN ZS2DO WHO HAD TRANSFERRED HIS MEMBERSHIP TO P.E. BRANCH AND HE WAS WISHED A LONG AND HAPPY STAY WITH US.

(4) OWEN ZS2HZ MENTIONED THAT THERE WAS THE POSSIBILITY OF OBTAINING A PERMANENT CLUBHOUSE FOR THE BRANCH AND HE DESCRIBED THE BUILDING. THERE WAS THE PROBLEM THAT THE SITUATION WAS ALMOST IN THE CENTRE OF TOWN IN THE MIDDLE OF FLATLAND WHICH COULD BE DIFFICULT BOTH FOR PARKING AND FOR SETTING UP A STATION. ATTENDANCE AT MEETINGS HAD IMPROVED VASTLY SINCE MOVING FROM TOWN AND IT WAS FELT THAT ATTENDANCE AT MEETINGS MIGHT DECLINE ONCE AGAIN.

(5) THE BRANCH CHRISTMAS PARTY WAS DISCUSSED AND IT WAS FELT THAT IT WOULD BE BETTER TO HOLD IT OVER TO THE NEW YEAR. THE SECRETARY WOULD MAKE ENQUIRIES.

(6) THE CHILDRENS CHRISTMAS TREE WOULD BE HELD AT THE KABEGA SCOUT HALL ON SUNDAY 8TH DEC.

THERE BEING NO FURTHER BUSINESS, THE MEETING WAS CLOSED AND LIONEL ZS2DD AND DORIS WERE THANKED FOR TEA AND EATS.

SGD:B.A. WELLER ZS2AB

SGD:M.T. WELLER ZS2OB

CHAIRMAN

SECRETARY.

## STRICTLY INSTRUMENTAL

THE AMERICAN FEDERAL TRADE COMMISSION ONCE ASSERTED THAT A CERTAIN INVENTOR'S CLAIM THAT HIS INSTRUMENT WAS AN "ORGAN" AND THAT IT COULD PRODUCE AN "INFINITE NUMBER" OF TONE COMBINATIONS WAS QUESTIONABLE.

THE INVENTOR, A QUIET PERSON WHO NORMALLY KEPT OUT OF THE LIMELIGHT, DECIDED TO CONTEST THE GOVERNMENT. THE TRADE COMMISSION DECIDED ON AN IMPARTIAL PANEL WHICH WOULD LISTEN TO BOTH AN EXPENSIVE PIPE ORGAN AND THE ELECTRIC ORGAN IN QUESTION TO SEE WHETHER THEY COULD DETECT ANY DIFFERENCE. BOTH PLAYERS WERE HIDDEN FROM VIEW AND THE SPEAKER CABINETS WERE CONCEALED AMONG THE ORGAN PIPES IN THE ROCKEFELLER CHAPEL, UNIVERSITY OF CHICAGO.

THE JURORS HEARD A NUMBER OF TEST PIECES ON THESE INSTRUMENTS AND THEIR ANSWERS WERE WRONG IN 10 CASES OUT OF 30. THE ORGAN'S INVENTOR WAS VINDICATED; IT HAD BEEN ACCEPTED AS A TRUE MUSICAL INSTRUMENT. THE COMMISSION DECIDED THAT THE ELECTRO-MECHANICAL DEVICE COULD BE TERMED AN ORGAN BUT THAT THE COMPANY CONCERNED SHOULD DESIST FROM CLAIMING AN INFINITE NUMBER OF TONES - AS IT COULD ONLY PRODUCE 253 000 000!

### THE ORGAN MAN

THE YEAR WAS 1937 AND THE INVENTOR WAS LAURENS HAMMOND. IT WAS PROBABLY A TURNING POINT FOR ELECTRONIC MUSIC (THOUGH HAMMOND CALLED THEM ELECTRIC ORGANS) AND WAS AN ENORMOUS ACHIEVEMENT IN MANY WAYS, ESPECIALLY CONSIDERING AMPLIFIER AND SPEAKER SYSTEMS OF THE DAY.

VERY FEW PEOPLE HAVE BEEN RESPONSIBLE FOR CREATING AN INDUSTRY: GEORGE EASTMAN AND HENRY FORD ARE EXAMPLES IN OTHER FIELDS BUT UNDOUBTEDLY LAURENS HAMMOND LAID THE KEEL FOR THE ELECTRONIC MUSIC INDUSTRY WE HAVE TODAY. BORN IN 1895, HE TOOK AN INTEREST IN ENGINEERING FROM AN EARLY AGE. HE PROPOSED A METHOD OF AUTOMATIC TRANSMISSION TO THE RENAULT MOTOR CO. WHEN 14 YEARS OLD AND GRADUATED FROM CORNELL UNIVERSITY WITH A DEGREE IN MECHANICAL ENGINEERING IN 1916. HE SERVED WITH THE AMERICAN EXPEDITIONARY FORCE IN THE FIRST WORLD WAR, ACTING AS INTERPRETER TO THE COMMANDER, GENERAL PERSHING.

BACK IN CIVILIAN LIFE, HAMMOND BECAME CHIEF ENGINEER TO A MARINE ENGINE CONCERN BUT WORKED ON HIS OWN IDEAS PRIVATELY. APPROPRIATELY ENOUGH, HIS MOTHER'S MAIDEN NAME WAS IDEA STRONG. HIS FIRST SUCCESS, A 'TICKLESS CLOCK' PROVIDED MONEY ENOUGH TO SET HIMSELF UP IN BUSINESS.

### MOTOR

HIS MIND TURNED TO MAKING A MOTOR THAT WOULD REVOLVE IN PHASE WITH THE 60HZ SUPPLY: HAVING SUCCEEDED, HE FOUND THAT A PATENT HAD BEEN FILED ELSEWHERE. EVEN SO, HE DISCOVERED AN APPLICATION FOR HIS SMALL EFFICIENT MOTOR AND APPLIED FOR HIS FIRST PATENT - A THREE-DIMENSIONAL MOVIE SYSTEM. PUBLIC INTEREST WAS INTENSE BUT ONLY FOR A SHORT PERIOD, DESPITE HIS SIMPLIFYING THE METHOD BY USING RED AND GREEN SPECTACLES (ANAGLYPH PRINCIPLE).

ANOTHER EARLY IDEA WAS A 'POWER PACK' FOR OPERATING DRY BATTERY RECEIVERS FROM THE A.C. SUPPLY. THIS PROJECT WENT WELL - UNTIL COMPLAINTS STARTED TO FLOOD IN THAT THE CONVERTORS WERE EXPLODING AND THROWING ACID OVER FURNITURE AND CARPETS! HE WAS NEXT TO CONCENTRATE ON PERFECTING A MAINS-DRIVEN ELECTRIC CLOCK AND IN 1928 FORMED THE HAMMOND CLOCK COMPANY. PROFITS SOARED OVER THREE YEARS BUT THE DEPRESSION SAW NOT ONLY HIS COMPETITORS GOING OUT OF BUSINESS BUT HIS OWN CLOCKS BEING GIVEN AWAY AS A PROMOTION FOR WRIGLEY'S CHEWING GUM.

DETERMINED TO SURVIVE, HE PRODUCED A DEVICE FOR SHUFFLING PLAYING CARDS INTO FOUR HEAPS; BUILT INTO A BRIDGE TABLE, IT WAS PRICED AT 25 DOLLARS BUT EVEN AT THIS LEVEL WAS DIFFICULT TO SELL WHEN MONEY WAS SCARCE.

BECAUSE OF HIS CONNECTIONS WITH THE CINEMA, HE NOTED THE REVIVAL OF INTEREST IN THE PIPE ORGAN. USED FOR ACCOMPANYING THE FILMS OF THE DAY, CINEMA ORGANS GREW IN COMPLEXITY AS MORE AND MORE EFFECTS WERE REQUIRED FOR SILENT MOVIES. THE QUEST FOR LARGER INSTRUMENTS CULMINATED IN THE MAMMOTH ORGAN IN THE CONVENTION HALL, ATLANTIC CITY: INSTALLED IN 1932 IT HAD SEVEN MANUALS, OVER 1200 STOPS AND 32882 PIPES.

## FLUTE

SURELY, THE ORGAN WAS A PRODUCT THAT COULD BENEFIT FROM HIS SYNCHRONOUS MOTOR, HE REASONED. AS A CHILD, HAMMOND HAD SEEN THE TELEHARMONIUM (THE FIRST COMPLEX-TONE GENERATOR), KNEW ITS PRINCIPLES AND WAS DETERMINED TO BUILD A SMALLER AND HIGHLY RELIABLE INSTRUMENT. AFTER LENGTHY EXPERIMENTATION, HE MANAGED TO PRODUCE A FLUTE TONE BY USING HIS MOTOR TO DRIVE A CONTOURED STEEL WHEEL IN FRONT OF A PERMANENT MAGNET.

LIKE THOSE BEFORE HIM, HE HAD PRODUCED AN ELECTRICAL WAVEFORM BUT HE HAD ALSO FOUND OUT HOW IT COULD BE CONVERTED TO A MUSICAL SOUND: THE TINY CURRENT FROM A WINDING ON THE MAGNET WAS FED INTO A RADIO AMPLIFIER (THE VALVE BY NOW BEING WELL ESTABLISHED.) THE VERY NEXT DAY, HE AND HIS TEAM BEGAN TO EXPLORE THE POSSIBILITIES OF CONVENTIONAL MUSICAL TONES BY ELECTRIC SYNTHESIS.

TRIAL AND ERROR CONVINCED HIM THAT 91 TONE WHEELS WERE SUFFICIENT TO PRODUCE ALL THE MUSICAL SOUNDS FAMILIAR TO THE EAR. ACCURATE GEARING HAD TO BE EVOLVED FOR THE TWELFTH-ROOT OF TWO RATIOS BETWEEN TONEWHEEL SHAFTS BUT THIS WAS NOT A PARTICULARLY DIFFICULT TASK FOR A CLOCK COMPANY. AN OLD PIANO KEYBOARD WAS WIRED SO THAT PARTIALS COULD BE KEYED WITH FUNDAMENTALS - A VERITABLE CAT'S CRADLE! HAMMOND'S CONCEPT OF AN INVENTION WAS COLOURED BY HIS EXPERIENCE AS A MANUFACTURER: THE PRODUCT HAD TO BE RUGGED. THE EVENTUAL SOLUTION WAS TO KEY NINE PITCHES AND ALLOW THE PLAYER TO MIX THESE AS HE WISHED.

## TRAILBLAZER

THE PATENT FOR MODEL A WAS FILED IN 1934 AND THE INSTRUMENT FIRST AVAILABLE EARLY IN 1935. MANY FAMOUS MUSICIANS BOUGHT THE MODEL A, PRICED AT 1250 DOLLARS: THOUGH SMALL COMPARED WITH A PIPE ORGAN, THE COST WAS THREE TIMES THAT OF A PLYMOUTH CAR IN 1935. THE MODEL B WAS PRODUCED IN 1936 (MERELY A CHANGE IN THE CABINET STYLING) AND IT WAS THE CLAIMS FOR THIS ORGAN THAT LED TO THE STORY HEADING THIS ARTICLE. BECAUSE VERY FEW ORGANS FROM OTHER ORIGINS EXISTED AT THE TIME, THE HAMMOND ORGAN WAS BY NOW A HOUSEHOLD WORD FOR A NEW AND EXCITING EXPERIENCE IN MUSIC.

HARMONIC SYNTHESIS METHODS WERE USED FROM THE EARLIEST HAMMONDS BUT THE FIRST PURELY ELECTRONIC SYNTHESISER WAS PRODUCED IN 1939: THE NOVACHORD. ANOTHER IDEA FROM THE FERTILE MIND OF LAURENS HAMMOND, THIS SIX-OCTAVE KEYBOARD INSTRUMENT WAS CAPABLE OF PRODUCING WOODWIND, BRASS, PLUCKED AND BOWED STRINGS, PIANO AND ORGAN TONES. BASED ON A MASTER OSCILLATOR AND DIVIDER STRINGS WITH A WIDE RANGE OF ENVELOPE CONTROL AND HARMONIC CONTENT, THE NOVACHORD WAS EXTREMELY POPULAR IN THE FIELD OF BROADCASTING AT THE TIME.

HIS NEXT INSTRUMENT APPEARED IN 1940. THIS WAS THE HAMMOND SOLOVOX, WITH A THREE-OCTAVE KEYBOARD (CAPABLE OF SIX OCTAVES) DESIGNED TO SUPPLEMENT THE PIANO. SMALL DANCE BANDS USED THESE INSTRUMENTS, ATTACHED BELOW THE PIANO KEYBOARD, TO ADD EXTRA SOLO VOICES (OF WHICH IT HAD 12) TO THE ENSEMBLE.

DURING THE WAR YEARS, THE COMPANY PRODUCED LARGE NUMBERS OF ORGANS FOR THE ALLIED SERVICES AND WAS ALSO DESIGNING AND MANUFACTURING FLIGHT CONTROL SYSTEMS, GYROSCOPES, LIGHT AND INFRA-RED SENSING EQUIPMENT AND AERIAL CAMERAS.

THE FEW COMMERCIAL ORGANS AVAILABLE AT THE TIME HAD NOT BEEN DESIGNED FOR USE IN THE HOME AS A FIRST PRIORITY. WARTIME SERVICEMEN HAD DEVELOPED A TASTE FOR THE HAMMOND, SO THE COMPANY DECIDED TO INTRODUCE THE VERY FIRST HOME SPINET MODEL IN 1949 - THE FIRST OF THE M SERIES. ETHEL SMITH WAS AMONG THE MANY FAMOUS INSTRUMENTALISTS WHO HELPED TO POPULARISE THESE SMALL, SELF-CONTAINED MODELS. THEIR GREAT SUCCESS PROMPTED OTHER MANUFACTURERS TO FOLLOW SUIT.

BY 1953 ORGANS HAD OUTSTRIPPED CLOCK MANUFACTURE, SO THE NAME WAS CHANGED TO THE HAMMOND ORGAN COMPANY. LAURENS HAMMOND WAS DETERMINED TO MAINTAIN HIS LEAD IN THE FIELD AND EXPANDED HIS ENGINEERING STAFF. NEW INSTRUMENTS CONTINUED TO MAKE THEIR APPEARANCE, PERCUSSION BEING INTRODUCED ON MODELS B-3, C-3 AND THE M SERIES SPINET. A SELF-CONTAINED CONSOLE MODEL A-100 DISPENSED WITH THE PR-40 TONE CABINET REQUIRED BY EARLIER CONSOLE ORGANS. MODEL RT, A FULL CONCERT INSTRUMENT, WAS INTRODUCED AND HAD A UNIQUE PEDAL SOLO SYSTEM COMBINING THE SYNTHESIS METHODS USED IN THE NOVACHORD AND SOLOVOX.

THE ENERGETIC FOUNDER RETIRED IN 1960, LEAVING OTHERS TO CONTINUE THE CONCERN TO WHICH HE HAD GIVEN SO MUCH IMPETUS.

#### THE CHIP

THEATRE ORGAN SOUNDS WITH AN ULTRA-MODERN PEDESTAL CONSOLE WERE INTRODUCED WITH THE X-66 IN 1965. THE X-77 WAS PRODUCED IN RECOGNITION OF THE INFLUENCE OF JAZZ ORGANISTS: ESSENTIALLY THIS WAS A NEW VERSION OF THE POPULAR B-3 BUT WITH EXTRA TONAL FACILITIES AND POWER OUTPUT.

THE BEGINNING OF THE COMPANY'S WATERSHED WAS IN 1967 WHEN THE J-SERIES ALL TRANSISTOR ORGANS FIRST APPEARED: THESE WERE THE FIRST ALL-ELECTRONIC TAB-CONTROLLED HAMMONDS. THE PIPER AUTOCHORD MADE ITS DEBUT IN 1970 AS THE FIRST AUTOMATIC CHORDING INSTRUMENT: THE CIRCUITRY PROVIDED THE BASS LINE SO NO PEDALS WERE FITTED.

LSI CIRCUITRY WAS FIRST INCORPORATED IN THE PHOENIX ORGAN IN 1972. THIS WAS A TAB-CONTROLLED ORGAN BUT LATER THAT YEAR THE CONCORDE BECAME THE FIRST LSI/DRAWBAR INSTRUMENT. MANY HAMMOND ENTHUSIASTS AVERRED THAT NOTHING WOULD EVER EQUAL THE SOUND FROM TONEWHEEL GENERATORS ALTHOUGH I WAS IMPRESSED WHEN I HEARD THIS ORGAN AT ITS PRESENTATION CONCERT.

THE COMPANY HAD TO MARCH WITH THE TIMES - THE CALL FOR GREATER PORTABILITY AND CONSIDERATION OF THE STEEPLY RISING COSTS OF PRECISION ENGINEERING. IN TURNING FROM TONEWHEELS TO LSI, THE COMPANY HAD CREATED ITS OWN CHALLENGE; IT HANDLED THAT SITUATION WITH FLAIR, AS SUBSEQUENT MODELS HAVE PROVED.

NO DOUBT LAURENS HAMMOND WAS ALSO PLEASED THAT THIS RADICAL CHANGEOVER HAD BEEN SO SUCCESSFUL AS THIS HAPPENED A YEAR BEFORE HIS DEATH IN 1973. HE LEFT BEHIND HIM A MASSIVE INTERNATIONAL INDUSTRY, PART OF WHICH BEARS HIS NAME AND HAS CONTINUED IN HIS INVENTIVE VEIN WITH THE SUCCESS AND PRESTIGE IT HAS ALWAYS MERITED.

BY K. LENTON-SMITH. (PRACTICAL ELECTRONICS).

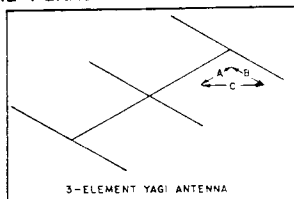
### CALCULATING ANTENNA TURNING RADIUS.

CROWDED LIVING IN THE WORLD TODAY SOMETIMES MAKES IT NECESSARY FOR THE AMATEUR TO KNOW IF THE TURNING RADIUS OF AN ANTENNA WILL PERMIT ROTATING IT IN A LIMITED SPACE. AS CAN BE SEEN IN THE SKETCH, A IS THE LONGEST (OR AT LEAST HALF) PART OF THE BOOM EXTENDING OUT FROM THE MAST OR TOWER, B IS ONE-HALF OF THE REFLECTOR LENGTH, AND C IS THE TURNING RADIUS. IN OTHER TERMS, C IS THE HYPOTENUSE OF THE RIGHT TRIANGLE FORMED BY A AND B. YOU MAY REMEMBER FROM HIGH SCHOOL MATHS THAT C EQUALS THE SQUARE ROOT OF  $A^2 + B^2$  OR  $C^2 = A^2 + B^2$  IS ITS USUAL FORM.

IF YOU CAN'T MAKE THE PHYSICAL MEASUREMENTS FOR ANY REASON, LIKE NOT HAVING THE ANTENNA YET, YOU WILL WANT TO MAKE SURE IT WILL FIT YOUR SPACE BEFORE YOU ACQUIRE IT. ALL YOU NEED DO IS STUDY THE LITERATURE OR ADVERTISEMENTS, DETERMINE THE BOOM LENGTH THAT IS APPLICABLE TO THE FORMULA AND THE LENGTH OF THE REFLECTOR AND YOU ARE IN BUSINESS.

FOR BEAMS OF VARIOUS LENGTH BOOMS, THE FOLLOWING FORMULA CAN BE USED:

$$\text{RADIUS IN FEET} = \frac{\text{BOOM LENGTH}^2}{2} + \frac{\text{REFLECTOR LENGTH}^2}{2}$$



IF YOUR AVAILABLE SPACE PREVENTS INSTALLING A "STANDARD" COMMERCIAL ANTENNA, THERE ARE A FEW TRICKS YOU CAN USE. MOUNTING THE YAGI VERTICALLY IS JUST ONE; THE TURNING RADIUS RESULTING WILL BE 1/2 THE BOOM LENGTH.

## THE LAZY U DIPOLE

VE7BS'S LAZY Z TAKES ON A NEW BENT.

SEVERAL YEARS AGO I DESCRIBED A SORT OF "LAZY Z" ANTENNA IN USE ON 160 METERS. PAT HAWKER G3VA COMMENTED ON IT IN *RADIO COMMUNICATIONS*, A READER TRIED IT ON 40 METERS AND REPORTED PROMISING RESULTS AND BILL ORR MENTIONED IT IN HIS COLUMN IN *HAM RADIO*. SOMEWHERE ALONG THE LINE IT HAD BECOME THE "VE7BS ANTENNA", BUT BY THIS TIME I HAD COME TO THE CONCLUSION THAT THE "LAZY U" (DESCRIBED BELOW) WORKED RATHER BETTER.

THE VE7BS WAS BASICALLY A HALF-WAVE DIPOLE BENT IN THE RIGHT PLACES (SEE FIG. 1) THE ARROWS SHOW THE DIRECTION OF CURRENT FLOW AT A GIVEN MOMENT, AND YOU CAN SEE THAT THE TWO END SECTIONS ARE IN PHASE WITH EACH OTHER. MOST OF THE RADIATION IS FROM THE CENTER SECTION WHERE THE CURRENT IS HIGHER, SO THE CONTRIBUTION OF THE END SECTIONS IS NOT THAT GREAT, AND THEY ARE TOO CLOSE TO EACH OTHER TO GIVE ANY BROADSIDE GAIN. BUT THIS CONFIGURATION DOES MAKE IT POSSIBLE TO HAVE THE MAIN RADIATING PORTION AT A RELATIVELY STEEP ANGLE WHILE PRESERVING THE USEFUL BANDWIDTH OF A FULL-LENGTH DIPOLE.

A STRAIGHT SLOPING HALF-WAVE DIPOLE 240 FEET LONG SUSPENDED FROM A 100-FOOT-HIGH SUPPORT THINKS OF ITSELF AS A HORIZONTAL DIPOLE 50 FEET HIGH AND FIRES MOSTLY STRAIGHT UP ON 160. A BIT OF GEOMETRY OR A SCALE DRAWING SHOWS WHY: EVEN IF THE WIRE WERE TIGHT AND STRAIGHT, IT WOULD BE ONLY 24 DEGREES FROM THE HORIZONTAL.

ALL THIS CAME TO MIND WHEN W4KM BROUGHT TO MY ATTENTION AN INTERESTING ITEM THAT APPEARED IN *RADIO* PUBLISHED IN THE USSR, DESCRIBING THE "SNAKE ANTENNA" USED BY UYSAP FOR COMMUNICATION VIA SATELLITES ON 144 MHZ (SEE FIG. 2). UYSAP'S ANTENNA IS MADE WITH RIGID COAXIAL CABLE, USING THE SHEATH AS A FAT CONDUCTOR (3/8" OR 1/2" COPPER PIPE WOULD BE AN IDEAL MATERIAL TO USE FOR THIS KIND OF CONSTRUCTION). IT IS DESCRIBED AS A "SEVEN-STAGE SYNPHASE" ANTENNA, WITH A FIGURE-8 PATTERN IN THE HORIZONTAL PLANE AND A NARROW LOBE TOWARD THE HORIZON IN THE VERTICAL PLANE. BEAR IN MIND THAT THIS IS ON 144 MHZ, SO PRESUMABLY THE ANTENNA IS MOUNTED SEVERAL WAVELENGTHS ABOVE GROUND.

THE DIMENSIONS GIVEN IN *RADIO* SHOW THAT EACH STAGE IS A HALF WAVE LONG, SLIGHTLY SHORTENED TO ALLOW FOR THE DIAMETER/LENGTH RATIO, AND THE DISTANCE BETWEEN EACH STAGE IS A 5/16 WAVE.

IN EFFECT, THEN, WE HAVE SEVEN CLOSE-SPACED ELEMENTS IN PHASE AS FAR AS VERTICAL POLARIZATION IS CONCERNED, BUT EACH STAGE IS IN ANTIPHASE TO ITS NEIGHBOUR AS FAR AS HORIZONTAL POLARIZATION IS CONCERNED. I CAME TO THIS CONCLUSION BY PLAYING WITH CURRENT-FLOW ARROWS, AS ILLUSTRATED IN FIG. 3.

YOU CAN LOOK UPON IT ALSO AS A PAIR OF CROSS-POLARIZED STACKS WITH FOUR ELEMENTS CO-POLARIZED AND THREE OTHERS IN QUADRATURE WITH THEM. MAYBE, WITH FOUR IN ONE DIRECTION AND THREE IN THE OTHER, THIS COULD BE SAID TO BE ELLIPTICAL? (SEE FIG. 4).

THIS IS ALL VERY INTERESTING FOR THE 2-METER SATELLITE ENTHUSIAST, BUT FOR ME VHF IS AN ABSTRACTION. TO ERECT SUCH AN ANTENNA FOR AN HF BAND REQUIRES RATHER A LONG LINE OF TREES, BUT IT DOESN'T HAVE TO BE SEVEN STAGES LONG, DOES IT? AFTER ALL, NOT ALL YAGIS HAVE 60 FOOT BOOMS, BUT THERE ARE LOTS OF YAGIS AROUND.

HOW ABOUT THREE STAGES? WITH A BASICALLY VERTICALLY POLARIZED ARRAY IT CAN BE CLOSE TO THE GROUND WITHOUT SUFFERING ILL EFFECTS, AND FOR 40 METERS A THREE-STAGE "SNAKE" WOULD BE ABOUT 150 FEET LONG AND COULD BE HUNG ON SUPPORTS 50 FEET HIGH. IT WOULD NEED ONLY TWO SUCH SUPPORTS, BECAUSE ONE END OF THE SNAKE IS CLOSE TO THE GROUND. (SEE FIG. 5).



THERE ARE DEFINITE ADVANTAGES TO HAVING AN ANTENNA THAT HAS CROSS-POLARIZED ELEMENTS. ALL SIGNALS COMING VIA THE IONOSPHERE ROTATE ON THE WAY AND THE DEGREE OF ROTATION IS UNPREDICTABLE. IT IS BECAUSE OF THIS ROTATION THAT YOU CAN GET GOOD SIGNALS (MOST OF THE TIME) ON YOUR HORIZONTAL ANTENNA ALTHOUGH THE OTHER FELLOW IS USING A VERTICAL. BUT SOME OF THE QSB YOU SUFFER COMES FROM THE ROTATION OF THE SIGNAL, AND IF YOUR ANTENNA CAN RESPOND TO ANY POLARIZATION, YOU SUFFER LESS. I DON'T RECALL SEEING ANYTHING ABOUT THIS ANTENNA ARRANGEMENT IN THE LITERATURE, ALTHOUGH IT SEEMS IMPOSSIBLE THAT KRAUS AND STERBA AND FRANKLIN AND COMPANY COULD HAVE OVER-LOOKED IT IN THE HEYDAY OF LINEAR ARRAYS FOR HF IN THE THIRTIES.

THE SEVEN-STAGE VHF SNAKE HAS A FEED-POINT IMPEDANCE OF 300 OHMS, SO IT IS FED WITH 300 OHM BALANCED FEEDER OR WITH 75 OHM COAXIAL CABLE THROUGH A 4:1 COAXIAL BALUN. IN THE THREE-STAGE HF VERSION, THE FEEDPOINT IMPEDANCE IS BETWEEN 100 AND 125 OHMS. A QUARTER-WAVE SECTION OF 75 OHM TRANSMISSION LINE TRANSFORMS NICELY FROM 50 OHM CABLE TO THE FEEDPOINT IMPEDANCE.

THE WIRE IS SUPPORTED AT THE BENDS BY INSULATORS AND A SHORT PIECE OF ABS TUBING TO KEEP THE BEND FROM BEING TOO SHARP, SO EACH "ELEMENT" IS 468/F LONG TO ALLOW FOR END EFFECT. IF AVAILABLE HEIGHT OR SPACE IS A BIT SHORT, THERE ARE SOME INTERESTING POSSIBILITIES IN FOLDING AT THE CORNERS, AS SHOWN IN FIG. 6. POINTS X AND Y ARE AT THE SAME POTENTIAL AND SIGN, AND SO CAN BE TIED TOGETHER WITHOUT HARMING THE RESONANCE. BUT THAT'S A COMPLICATION.

#### A JAPANESE SNAKE

IN 1984, A SHORT ITEM APPEARED IN THE IEEE LITERATURE DESCRIBING THE RESULTS OBTAINED FROM BENDING THE WIRE OF A DIPOLE IN ZIGZAG FASHION, BUT IN THIS CASE AT MORE FREQUENT INTERVALS THAN WITH THE "SYNPHASE" JUST DISCUSSED. STARTING WITH A LENGTH OF WIRE A HALF WAVELENGTH LONG, IT IS BENT AS SHOWN IN FIG. 7 TO MAKE EACH ZIG OR ZAG .0208 OF A WAVELENGTH LONG (12 BENDS IN EACH HALF OF THE DIPOLE).

IF THE ANGLE OF EACH BEND IS MADE 130 DEGREES, THE ACTUAL LENGTH OF THE ANTENNA WILL BE SHORTENED BY 10% AND THE ANTENNA WILL BE SELF-RESONANT WITH A FEEDPOINT RESISTANCE OF 65 OHMS AND A NEGATIVE REACTANCE OF ABOUT 50 OHMS. THE PATTERNS AND THE HALF-POWER BANDWIDTH REMAIN ABOUT THE SAME AS A STRAIGHT HALF-WAVE DIPOLE, AND THIS STAYS TRUE IF THE ANTENNA IS SHORTENED FURTHER BY DECREASING THE ANGLE AT EACH BEND. WHAT IS MORE, THE INPUT RESISTANCE DOES NOT CHANGE RADICALLY.

FOR EXAMPLE, IF YOU MAKE THE ORIGINAL WIRE .58 OF A WAVELENGTH LONG AND THEN COMPRESS IT TO .4 OF A WAVELENGTH (20% SHORTER THAN A STRAIGHT HALF WAVE), THE INPUT RESISTANCE IS A LITTLE LESS THEN 50 OHMS, A DIRECT MATCH TO RG-8 COAX IF YOU USE A TRANSMATCH TO COMPENSATE FOR ANY REACTANCE THAT APPEARS.

I SUPPOSE A STRETCHED-OUT "SLINKY" (TM) WOULD WORK IN A SOMEWHAT SIMILAR WAY ALTHOUGH THE THEORY OF THE CLOSE-COILED SLINKY IS PROBABLY DIFFERENT. THE POSSIBILITIES OF COMBINING THE SHORTENING EFFECT OF THE 24-BENDS-PER-HALF-WAVE WITH THE SYNPHASE EFFECT OF THE ONE-BEND-PER-HALF-WAVE ARE ENDLESS. IF YOU ARE INTERESTED, THE BASICS OF THE SHORTENING EFFECT ARE COVERED IN A 1982 IEEE PUBLICATION (A NEW CLASS OF WIRE ANTENNAS.)

#### THE LAZY U

THERE ARE ONLY TWO BENDS IN THE LAZY U VARIANT OF THE HALF-WAVE DIPOLE-SEE FIG. 8. YOU MAKE THE VERTICAL PORTION AS LONG AS POSSIBLE (SOME HAVE BEEN USED ON 160 METRES WITH AS LITTLE AS 33 FEET OF VERTICAL) AND THE TOP HORIZONTAL WIRE SHOULD BE DIRECTLY ABOVE (PARALLEL TO) THE BOTTOM WIRE. THE BOTTOM WIRE CAN BE AS CLOSE TO THE GROUND AS PRACTICAL CONVENIENCE ALLOWS, BUT PREFERABLY AT LEAST 6 FEET UP; REMEMBER THAT THERE IS A HIGH RF POTENTIAL AT THE END! RADIATION IS EFFECTIVELY VERTICALLY POLARISED. MAXIMUM CURRENT FLOWS IN THE VERTICAL PORTION, AND EXPERIMENTS HAVE SHOWN THAT A DISPLACEMENT CURRENT FLOWS BETWEEN THE UPPER WIRE AND THE LOWER (IN EFFECT, COUNTERPOISE) WIRE, CREATING A WHOLE RAFT OF PHANTOM VERTICALS.

IT IS MUCH QUIETER THAN A VERTICAL MONOPOLE ON RECEIVE, AND I HAVE A SPECIAL AFFECTION FOR IT BECAUSE IT GAVE ME MY FIRST AFRICAN CONTACT FROM VE7 ON 160. (THAT PARTICULAR ANTENNA HAD ABOUT 90 FEET OF VERTICAL, BUT ONE WITH 60 FEET OF VERTICAL WORKED ABOUT THE SAME.)

BRING THE COAX AWAY HORIZONTALLY FOR A FEW FEET FROM EITHER SIDE OR THE BACK OF THE U - A FEW TURNS OF COAX WOUND AS A CHOKE NEAR THE FEEDPOINT WILL PREVENT ANTENNA CURRENTS FROM RUNNING ON THE OUTSIDE OF THE COAX SHIELD. IT IS MORE OR LESS A SINGLE-BAND ANTENNA, BUT WAS DERIVED FROM THE MULTIBAND 680N - SEE FIG 9. A TO D IS A HALF-WAVELENGTH; ON HARMONIC FREQUENCIES, X TO D IS AN ODD NUMBER OF QUARTER-WAVELENGTHS. X IS THE CENTRE OF A HALF-WAVE SECTION, THE POINT OF MAXIMUM CURRENT. AB AND CD ARE EQUAL, AND AB IS PARALLEL TO CD. CD IS, IN EFFECT, A COUNTERPOISE, AT LEAST 6 FEET ABOVE THE GROUND. THE DOTTED PORTION IS A SINGLE-WIRE FEEDER-IT COULD BE OPEN-WIRE ZEPP. TO USE IT ON HIGHER FREQUENCIES, YOU PUT SUITABLE LENGTHS OF WIRE AS EXTENSIONS AT D TO CREATE A CURRENT MAXIMUM AT X (MAKE THE POINT X AN ODD NUMBER OF QUARTER-WAVES FROM THE FAR END- POINT D).

**A GENERAL REMINDER**

WHEN YOU MAKE A BEND IN A RESONANT ANTENNA, MAKE IT AS GRADUALLY AS POSSIBLE. A SHARP CORNER TENDS TO LOOK SOMETHING LIKE A TERMINATION TO THE RF CURRENT ARRIVING AT IT. ALTHOUGH THE GENERAL IDEA IS THAT YOU WANT THE CURRENT TO JUMP OFF SOME TIME IN THE DIRECTION OF THE OTHER STATION, YOU ALSO WANT IT TO RECOGNISE WHAT FREQUENCY THE ANTENNA IS DESIGNED FOR!  
HAVE FUN BENDING!





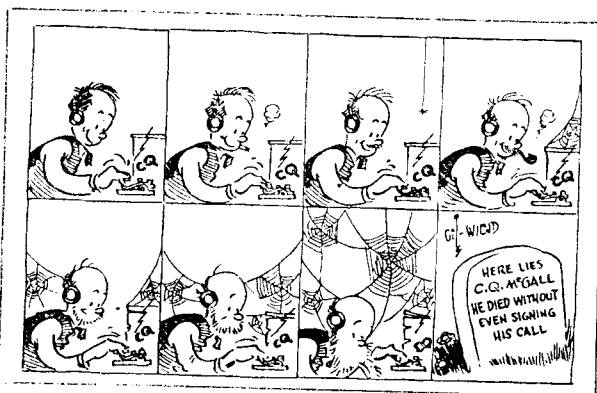
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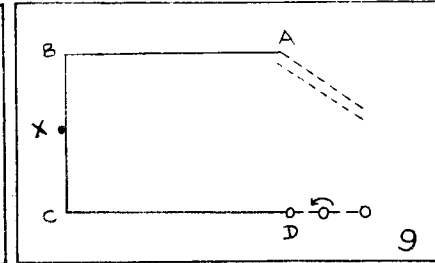
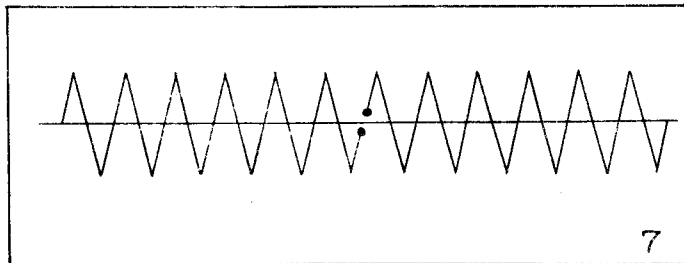
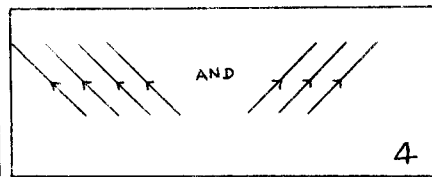
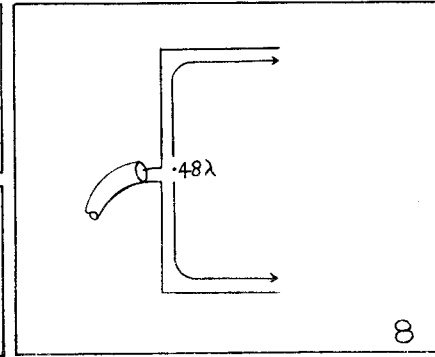
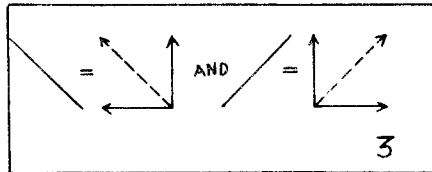
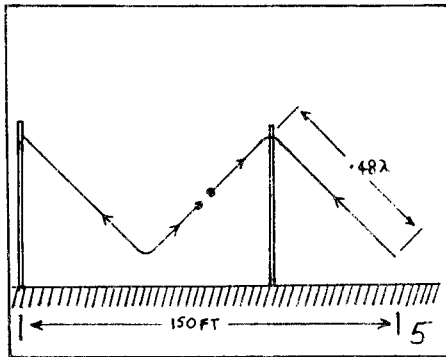
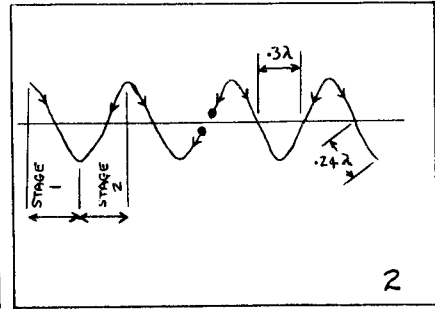
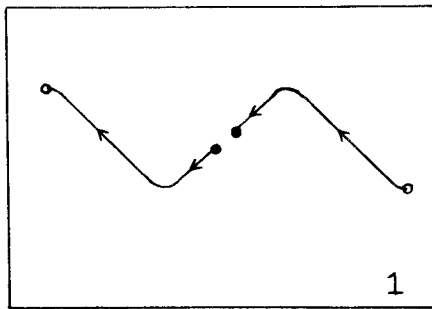
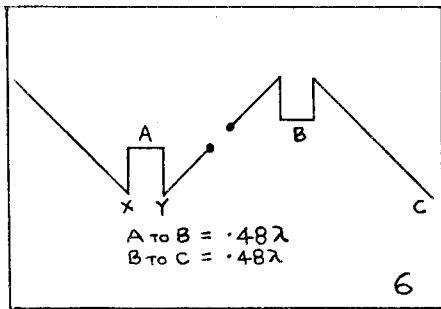
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FIGS 1-9



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