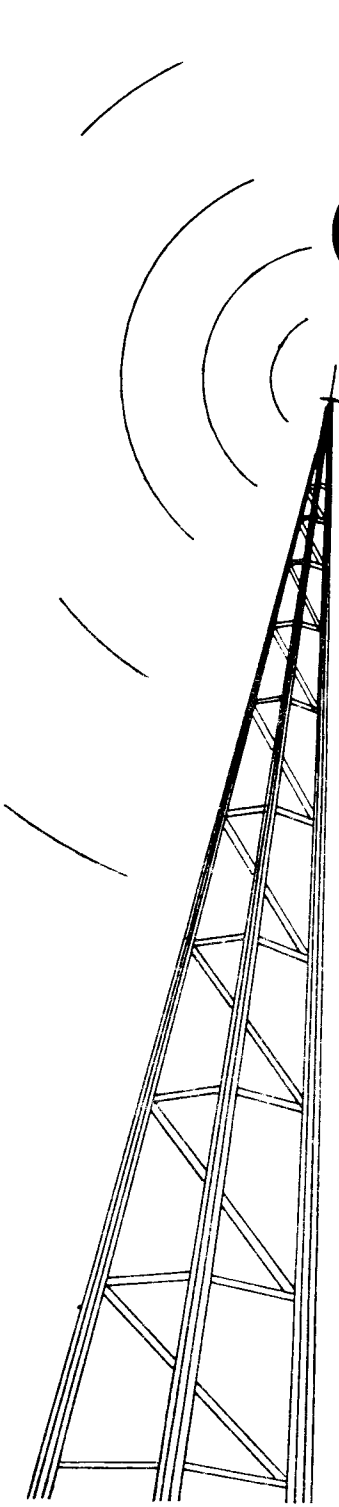


Q S X
P E

Port Elizabeth Branch of the

South African Radio League

P.O.Box 462, Port Elizabeth. 6000.

National Call	145.5 Mhz
P.E. Repeater	145.05/65
Grahamstown	145.15/75
Lady's Slipper	145.10/70

ZS2PE

Bulletin: Sunday 08h40

HF: 40m – 7098 KHz

VHF: FM–145,700 MHz

Port Elizabeth Branch

›NOTICE OF MONTHLY MEETING‹

THE MONTHLY GENERAL MEETING OF THE PORT ELIZABETH BRANCH WILL TAKE PLACE AT THE Y.M.C.A., HAVELOCK STREET, PORT ELIZABETH ON FRIDAY 15th JULY, 1983, AT 8p.m. LOVE TO SEE YOU THERE.

****

COMMITTEE MEMBERS.

Chairman:	Dick ZS2RS (322111)	Vice Chairman	Trevor ZS2AE (321746)
Secretary	Marge ZS2OB (303498)	Treasurer	Brian ZS2AB (303498)
Projects	Lionel ZS2DD (321770)	Special Events	Colin ZS2AO (312471)
P.R.O.	Fred ZS2EQ (0422-31419)	Awards	Attie ZR2DY (325349)

QSX-PE - ZS2OB and ZS2AB

****

NEWS

CONGRATULATIONS: To Piet Fourie who passed the P.M.G.May exam. May you get much enjoyment from your new rig and the hobby Piet and better luck next time to those who weren't so lucky. Also to Waldie Bartie who has passed the cw test and sports the call sign of ZS2WM. Lots of good dx Waldie.

WELCOME: to Malcolm Harwood ZR2ET as a new member of the Branch and we hope you have a long and happy association with the League and Branch.

CONGRATULATIONS: to Percy Buckley ZS2RM who has been awarded the Worked All Europe Certificate - First Class. Buck says that this took many years of extremely hard work. Well done!

SUBSCRIPTIONS: It seems as though none of our members has yet received a reminder card for their subs, but that doesn't mean you are being let off the hook this year! Please let the Branch Treasurer have your subs as soon as possible so that records can be kept up to date. If you do not intend to renew your subs, please let us know.

PERMANENT LOAFERS CLUB: Jeff ZS2GJ who has been working and living in East London for a few years now, will be retiring at the end of this month and soon taking up residence in Cape Town from where he will operate with his old call sign of ZS1VS. Good luck Jeff and many thanks for all your generous donations.

MOVED QTH: Ronnie Drescher ZR2AD has packed his bags and moved from Central P.E. to Despatch. Hope you'll have room for an antenna Ronnie.

BRANCH TROPHIES: Just a few months to go before these trophies are awarded at the Branch AGM. They are available for Home construction, DX and VHF activities. Keep them in mind and let the Committee know in August if you wish to be considered for the awards.

AGM 1984 FUND: The target for this fund is R3000 and to date we are quite a way behind. If we are to make a success of the League AGM, we must have more funds, so we are relying on YOU and YOU to come forward with your donations. Many thanks to all those who have already contributed.

SILENT KEY: With regret, we announce the passing away of OM Louwtjie ZS2HZ who was active on 2 metres and will be missed by family, friends and colleagues.

BULLETIN ROSTER.

17th July Marge ZS2OB
24th July Brian ZS2AB
31st July Lionel ZS2DD
7th August Colin ZS2AO
14th August Fred ZS2EQ

MINUTES OF THE GENERAL MONTHLY MEETING OF THE PORT ELIZABETH BRANCH OF THE S.A.R.L. HELD AT THE Y.M.C.A. ON FRIDAY 17th JUNE, 1983.

PRESENT: 21 members and visitors.

APOLOGIES: ZS2RS and ZS2EQ.

In the absence of the Chairman Dick ZS2RS, the Chair was taken by Trevor ZS2AE. Trevor welcomed all to the meeting, especially Cyril ZS2KX and Bette ZS2LO who had been overseas on holiday, and Chris ZS2S and Gus ZS2MC.

MINUTES: The Minutes of the General Meeting held 20th May, 1983, having been published and circulated in QSX-PE were taken as read, proposed by Brian ZS2AB and seconded by Bill ZS2BY.

ARISING: The proposed trip to Bushmans River was discussed and it was felt that it was possibly too late in the year. There had been no feedback and it was decided to leave this till later in the year when the weather was warmer.
The Winterberg Enduro Rally was mentioned and Colin ZS2AO said he had received offers of help from 6 people. There had been no final details from the organisers who were having some trouble with the route. 2meter and HF stations would be required and anyone who could help was to let Colin know.
Two further cartons of fruit had been promised by Jeff ZS2GJ for AGM funds and these would be sold when they arrived.
No exam results had been received, but they were due soon.

FINANCE: The Treasurer Brian ZS2AB reported that the AGM fund stood at R1332 and R596 had been received as a result of the special request. 7 subs had been received. One new member had been enrolled and forms were still awaited from another.
The import permit for the crystal filter had arrived.
One of the fixed deposits was due for renewal.

ARISING: It was noted that there were only 8 months left to the 1984 AGM and perhaps more propaganda was needed. R80 had been donated at the meeting and many thanks to all who had donated so far.
The crystal filter for Cockscomb repeater would cost in the region of R230-250.

CORRES: -

GENERAL: Trevor thanked Bill Browne for his article on the 80 metre antenna for QSX-PE. Bill said that the diameter of Coil B should read 50mm and a correction would be printed in QSX next month.
The bulletin on 80 meters was discussed and it was decided to drop the relay on 20 meters as there was no propagation. Maybe the bulletin would ultimately be restricted to 80 meters.
Trevor ZS2AE then discussed the Cockscomb repeater and said that work was going ahead with the testing of the solar panels and batteries at his qth and the Branch would be kept informed of progress made.

There being no further business, the meeting was closed. Trevor thanked all for coming to the meeting and their attention. Tea was then taken and afterwards a very interesting talk and demonstration was given by Attie ZR2DY on some of the latest cardiac monitoring machines and their electronics. Trevor thanked Attie.

sgd:
T.N. Scarr ZS2AE
Acting Chairman

sgd:
M.T. Weller ZS2OB
Secretary.

Back to the Breadboard

By Gordon Harris, ZS2GH.

Several developments have taken place over the past few years which make it much easier for the amateur radio enthusiast to contemplate the design and construction of a communications receiver having a satisfactorily high performance. These include:
(1) the availability of variable capacitance diodes for tuning and digital displays for frequency indication, both of which ease mechanical constraints and allow easy manipulation of bandspreading;
(2) the popularisation of modular construction, each stage being self-contained in a shielded enclosure. This not only ensures that screening is of a very high order, a task also made easier by the availability of 'self-shielding' toroidal cores, but facilitates modifications and allows modules to be removed for use in either another piece of equipment under development or as test units/accessories in their own right, e.g. wideband IF amplifier modules for use as general purpose RF amplifiers. Furthermore, this approach allows each module to be constructed separately, starting perhaps with the AF stages, thus providing the increased satisfaction of being able to test each stage separately and simplifying fault-finding.
(3) the popularisation, particularly by W7ZOI, of 'ugly' printed circuit board construction. This entails the mounting of components on an unetched single-sided piece of p.c.b. using components' legs or IC's backs as supports, allowing the amateurs ingenuity to devise suitable means of fixing trimmer potentiometers etc. to the board using suitably shaped mini-hardware and cyanoacrylate adhesives. This form of construction enables the builder to keep lead-lengths short where necessary, provides a first class ground plane which eliminates earth loops within the stage concerned and allows him to place his components in optimum positions, providing maximum isolation where required. Thus printed circuits need not be used at all in the construction of a modern receiver and this makes construction from circuit diagrams very much easier and quicker.
(4) the availability of simplified data relating to the construction of multi-pole LC bandpass filters and ladder crystal filters, the latter allowing considerable saving over the use of commercially available filters.
(5) the availability at reasonable prices of communications ICs, mainly Plessey, RCA and Motorola, reducing the overall component count.

The author was greatly encouraged to attempt crystal filter construction for his new receiver by an article in Radio Communication (1), journal of the Radio Society of Great Britain. In order to encourage other Eastern Cape amateurs to 'have a go', there follows a brief description of ladder filter construction and results of the author's attempts.

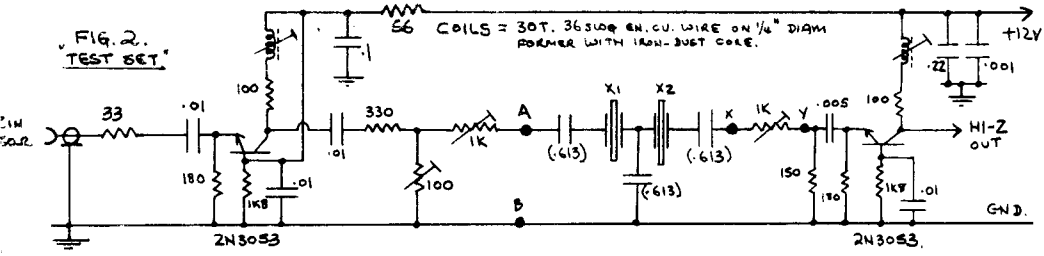
The advantages of ladder over lattice filter construction are that all crystals used are of the same nominal frequency, bandwidths suitable for SSB can be more easily obtained, stopband attenuation is better, there are less spurious responses near the hf cut-off frequency, any number of crystals can be used (odd or even) and the only other components required are silver mica or polystyrene capacitors and, perhaps, preset trimmer capacitors.

Attainable bandwidth depends on the separation between the series and parallel resonant frequencies and as these are greater in the case of plated crystals (e.g. HC6U) than in that of clamp-mounted crystals (e.g. FT243), the former are more suitable for SSB filters.

There are 3 steps to obtaining the data required to construct a ladder filter:
(1) The construction of a 'test set' to determine the capacitor values required to obtain the desired bandwidth using a 2-pole filter.
(2) The use of a simple formula to determine terminating impedances.
(3) The use of design coefficients to determine actual capacitor values to be used for the number of crystals available (remembering that one of the crystals will probably be required for the b.f.o.)

Essentially, the test equipment required consists of a signal source having fine frequency adjustment around the centre frequency concerned and an output of a few volts, buffer amplifiers providing adjustable input and output terminating resistors for the filter and a calibrated low-level r.f. measuring instrument such as a 10 MHz 'scope. G3JIR described a suitable test set (2) but the author found that only the buffer amplifiers were required for initial tests.

FIG 1. BASIC TEST SETUP



Initially, equal-value capacitors of between 12pF and 150 pF should be tried, with the terminating resistors adjusted while measuring between A and B for the input and X and Y for the output (note that Z in of the common-base buffer stage after the filter is approx 10 ohms). The terminating resistance is calculated using the following formula:

$$R = \frac{k \times 10^6}{2\pi fc}$$

where k = capacitor coefficient (0.6B for 2-pole filter)
f = filter centre freq.(MHz)
R = circuit impedance (ohms)
C = capacitance (pF)

The capacitor coefficient mentioned is for a Chebyshev response, having steep skirts and slight ripple within the passband. The greater the number of crystals used, the less will be the ripple, the steeper will be the skirts and the better will be the stopband attenuation, the main penalty being increased insertion loss.

G3JIR found that when using 2 8455 KHz crystals in the test set, capacitor values of 15 pF provided an SSB bandwidth of roughly 2.5 KHz, while the author needed 82 pF capacitors to obtain the same bandwidth with 7845 kHz crystals. Fig 3 shows the bandwidths obtained with different values of capacitors. It can be seen that the required terminating impedance becomes very low as the bandwidth is decreased to 400 Hz and it might be more convenient to use shunt rather than series capacitors at the filter input and output ports, if a 400 Hz filter were to be constructed, in order to increase the impedance to nearly 50 ohms.

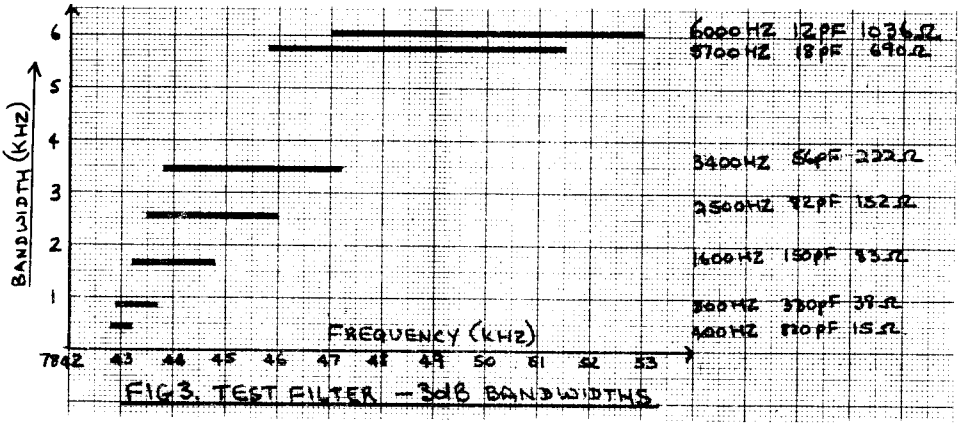


FIG 3. TEST FILTER — 3dB BANDWIDTHS

It will be noted that both centre frequency and terminating impedance vary with the bandwidth and this should be remembered when using switched capacitors to change the filter bandwidth. This could necessitate changing the b.f.o. frequency. By deliberately mismatching filters, the author found that the effect of lowering the terminating impedance was to increase the 'hump effect' while increasing it made the response more 'single-peaked'.

Having determined the terminating resistance required for a filter of the desired bandwidth, the design coefficients shown in Fig. 4 are used to determine the capacitor values required in the final filter.

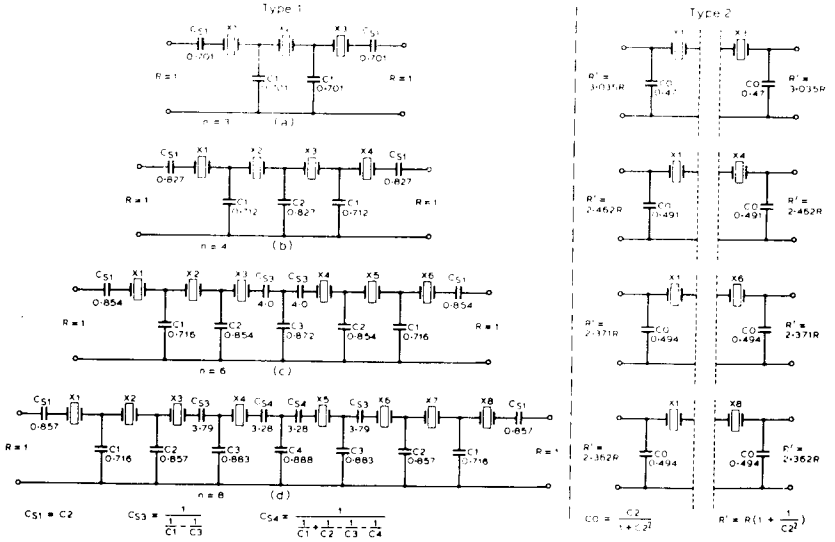


Fig 4 Design coefficients for Chebyshev filters

Type 2 diagrams show values of shunt capacitors required to increase terminating impedance.

The author constructed an 8-pole filter with a 2 kHz -3dB bandwidth which was then tested using the test set described. Unfortunately, as the buffer amplifiers were constructed on an open p.c.b. there was too much signal leakage to allow the response to be plotted below -4 dB. The following test set-up was then used to plot the response somewhat more fully.

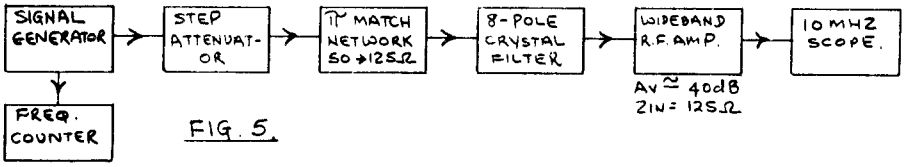


FIG. 5.

It could then be seen that the stopband attenuation exceeded 70dB before the limits of the test equipment were exceeded. The skirt response was measured as 1:1.8 (6:60dB) but unfortunately the insertion loss was nearly 6dB. This loss is higher that that quoted for most commercially available 8-pole filters and might possibly be due to the use of the nearest available preferred value capacitors rather than the exact values calculated.

A 3-pole post-i.f. filter has since been constructed, using 120pF silver-mica capacitors and this has a bandwidth of 2 kHz at -3dB, 2.3 kHz at -6dB, 7.7 kHz at -40dB and 20 kHz at -60dB. Once the receiver is completed it is quite possible that the author will decide to widen the bandwidths, but he does like to try to winkle out that weak DX station! The filters have been constructed in enclosures sufficiently large for the addition of relays for capacitor switching, an added advantage of the length being improved isolation between input and output.

Collecting the required number of crystals of the same frequency was not easy and was largely due to the help of Brian ZS2AB. It is unlikely that most constructors will be able to obtain more than 3 or 4 surplus HC6U crystals of the same nominal frequency but it should be remembered that this is a sufficient number to construct an excellent CW filter. The author found that for simple 2-pole and 3-pole filters the stopband attenuation of narrow bandwidth (400 or 800 Hz) filters was much better than it was for SSB bandwidths. A 3-pole filter with a bandwidth of 330Hz at -6dB was 600 Hz wide at -20dB, 1.25 kHz wide at -40dB and 3.1 kHz wide at -52dB, a very useful filter! The maximum useable bandwidth of filters constructed appeared to be about 6KHz at -3dB.

Due to the work of G3JIR and others the construction of crystal filters has been greatly simplified. The author looks forward to many more hours of fiddling around with these beasties in order to enrich his leisure time. In the meantime, he exhorts all other like-minded souls to 'have a go'.

References: (1) Ladder Crystal filter design by J.A. Hardcastle G3JIR Radio Communication February 1979.
(2) Some experiments with high-frequency ladder crystal filters by J.A. Hardcastle G3JIR. Radio Communication December 1976, January and February 1977.

(Many thanks Gordon for this most interesting article and thanks also to Brian ZS2AB for re-drawing the drawings and to Debbie for the headings!)

A Trap Antenna for 80 and 40 Metres

Further to my short note on a simple coil loaded antenna for the Branch net frequency of 3,64 mHz here are some design particulars for trap loaded antennas for 3,64/7,08 MHz.

The construction of the traps should pose no great problem, but it is most important to make sure that the value of the tuning capacitors used is accurately known (to within 1%). They should be as closely matched as possible. The coils must be sealed against the weather and the turns should be permanently fixed in position once they have been properly tuned.

All measurements are made to the middle of the coil in the same manner as was mentioned for the coil loaded antenna.

When you have built the antenna it may not peak exactly on 3,64 and 7,08 MHz. This is because the dimensions given in the accompanying table are calculated values and in practice the proximity of masts, buildings, trees, etc., might have some detuning effects. For this reason you will have to be prepared to make final tuning adjustments after the antenna has been put up and tested.

As far as my experience goes I do not think that it makes a great deal of difference to the tuning whether the antenna is of the flat top or drooping type. Possibly the end lengths might have to be shortened slightly if the antenna has a significant droop.

Before going to the table, just a few words on the bandwidth of the antenna. Normally an antenna has an effective operating bandwidth of about 2-3%. i.e. on 80 metres this is about 70-105kHz. When a trap or coil loaded antenna is used this bandwidth drops to about 1% or slightly less if the antenna is very short. For this reason it is most important to spend some time getting the antenna to tune as close to the desired frequencies as possible.

The traps should be set up as separate units before being connected to the antenna and for this purpose a grid dip oscillator and accurately calibrated receiver is essential. The GDO must be very loosely coupled and the trap should be tuned as close as possible to the required freq.

In the table that follows I have used the same lengths as for the table given with the coil loaded antenna so that you could consider modifying your antenna to one or other form. In addition I have given some dimensions for specific values of capacitance. You could of course draw graphs from the figures in the table and interpolate for any other desired values of capacitance.

As a further bonus for those of you who would like to extend your 80/40 trap to a three band version for 80/40/20 the required dimensions are shown in Table 2.

If anyone takes the trouble to make up one of these antennas, please make notes of your progress and let the editor of QSX have a short article on your experiences and results.

Table 1 and 2 are shown on the following page.

(Many thanks to Bill Browne ZS2BY for this interesting and informative article. We hope to hear how YOU got on with your antenna!)

TABLE 1. Trap antenna for 3,64/7,08 MHz.

	2,5 mm wire			2,0 mm wire			1,5 mm wire		
Length "A" m.	Cap. pF.(C)	Ind H.(L)	Res.Freq MHz (F)	C	L	F	C	L	F
5,5	234	6,6	4,0327	229	6,8	4,0333	222	7,0	4,0340
6,0	124	10,2	4,4595	121	10,4	4,4605	117	10,7	4,4617
6,5	91	11,5	4,8921	89	11,8	4,8934	86	12,1	4,8949
7,0	77	11,4	5,3253	76	11,6	5,3267	73	12,0	5,3283
7,5	73	10,3	5,7494	72	10,5	5,7507	69	10,8	5,7523
8,0	77	8,6	6,1502	75	8.8	6,1513	73	9,0	6,1526
8,5	91	6,5	6,5086	89	6,6	6,5093	86	6,8	6,5103
6,04	120	10,3	4,4939						
6,01				120	10,5	4,4691			
5,98							120	10,6	4,4445
6,31	100	11,2	4,7243						
6,28				100	11,4	4,7025			
6,23							100	11,6	4,6606
6,79	82	11,6	5,1438						
6,73				82	11,8	5,0931			
6,64							82	12,2	5,0166
7,26	75	10,9	5,5478						
				75	11,5	5,4040			
							75	12,0	5,2766

Notes: (1) The capacitance values given in the table make allowance for a small amount of self-capacitance in the coil.
(2) The total length of the antenna is 4 times "A".

TABLE 2. TRAP ANTENNA FOR 3,64/7,08/14,2 MHZ.

Inner Length Metres	Outer Length Metres	2,5 mm wire			2,0 mm wire			1,5 mm wire		
		C	L	F	C	L	F	C	L	F
10,0635	6,983	57	8,7	7,08						
10,0635	6,98				56	8,9	7,08			
10,0635	6,977							54	9,2	7,08

Note: Total length of antenna is 2 x INNER plus 2 x OUTER lengths.

PLEASE NOTE !!!

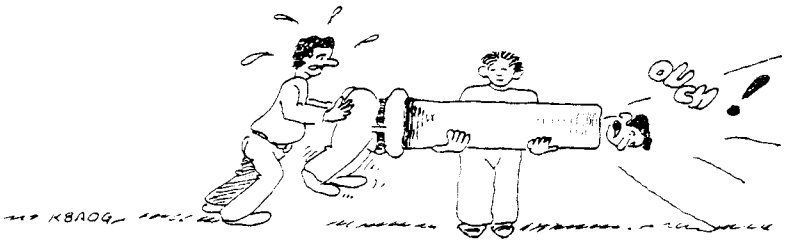
It appears that, through a misunderstanding, a rumour has been spread around on the air that Vy Cruikshanks ZS2BR had gone silent key. This resulted in worried times for her relatives until they managed to contact her. Vy would like it known that she is alive and well.

Men I wish I had known

VOLTA, ALESSANDRO, COUNT -- Born 1745 - died 1827.
Volta was an Italian physicist who was one of the first men to experiment in electrical science. The unit of electrical energy, the volt, is named after him. Volta discovered the electrical decomposition of water and developed the theory of current electricity in physics. His inventions include the electrical condenser, the voltaic pile, and the voltaic or electric battery.
He was born in Como, of a noble family. By 1774 he established a reputation by his work in electricity and was appointed professor of physics at the Royal school at Como. Five years later he became professor of natural philosophy at the University of Pavia, where he remained until he retired in 1804.

AMPERE, ANDRÈ MARIE
Born 1775, died 1836. Ampère, a French physicist and mathematician, discovered the relationships between magnetism and electricity. He also investigated the flow of electric currents. The unit of strength of electric current is named after him. Amperes laws form the basis of electrical practice. They are: (1) two parallel currents having the same direction attract each other; and (2) two parallel currents having opposite directions repel each other. Ampère showed that coils carrying electric currents have the same effect as magnets. As a result he invented the astatic needle, making it possible to detect and measure electric currents. He was born hear Lyon and served as professor of physics and science at the College of France.

OHM, GEORGE SIMON (1789-1854)
German scientist who discovered the principles concerning the flow of current through a conductor that is now expressed in Ohm's Law. He was born in what is now West Germany, son of a master mechanic. In 1833 he was named director of the Polytechnic School of Nurimberg and in 1849 awarded a professorship at the University of Munich. During the productive years of his life he was always in reduced financial circumstances, and as a result his experimental equipment was crude and his discoveries originally appeared in a series of minor publications.
In addition to his work with resistance, electromotive force and current, he also experiment with optics, acoustics and the electrical conductivity of liquids.

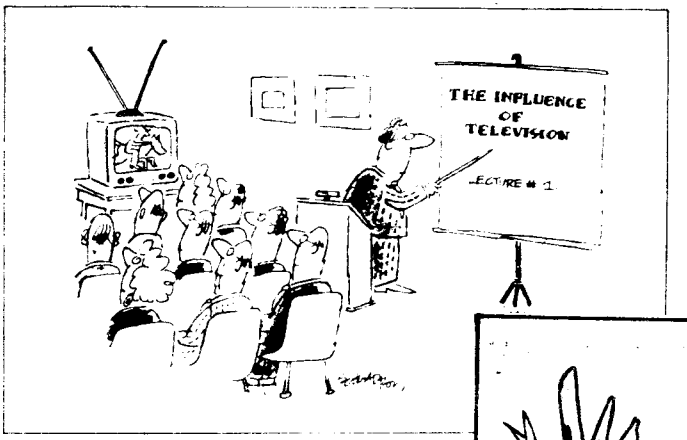


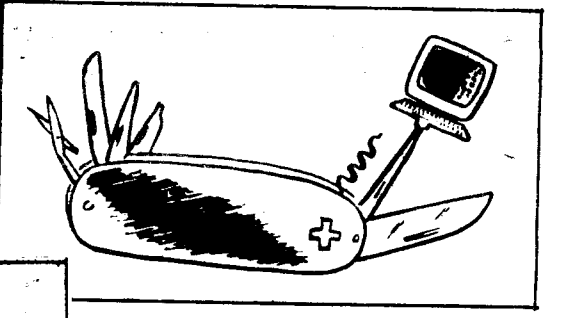
AN EMF OF ONE VOLT WILL PUSH A CURRENT OF ONE AMPERE THROUGH A RESISTANCE OF ONE OHM.

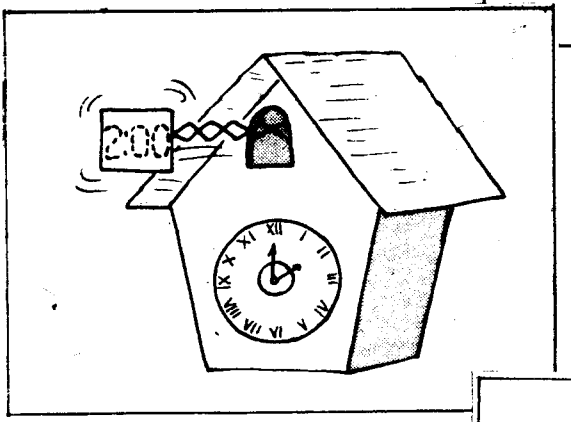
The work of Volta, Ampère and Ohm may not appear to be much, looking back from the mass of technology we take for granted today - but, can you imagine the difficulties they faced in trying to find a beginning to unravel the mysteries of electricity? That has always fascinated me.
Do you remember, if you ever knew, what the definition of a Volt, an Ampere an Ohm really is - apart from Ohm's Law.

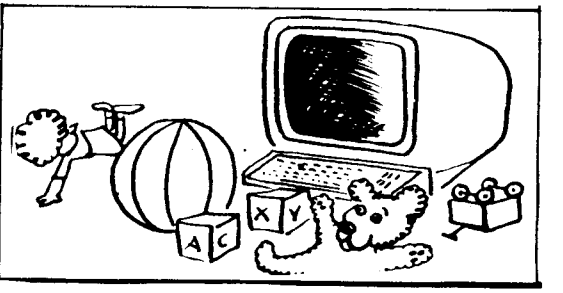
(Thanks to Ed, K8EMI, from SARA Newsletter).

The Last Laugh

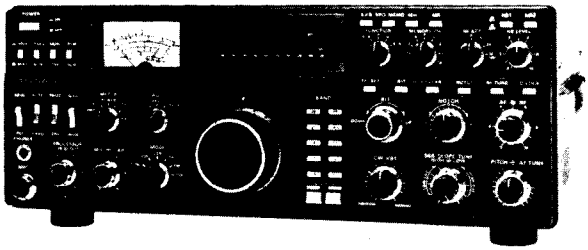








KENWOOD



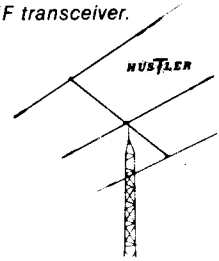
TR 2500

The TR-2500 is a compact 2 meter FM handheld transceiver featuring an LCD readout, 10 channel memory, lithium battery memory back-up, memory scan, programmable automatic band-scan and Hi/Lo power switch.

Kenwood's TS-930S HF transceiver.

KENWOOD

hy-gain



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