

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

4 1966

Port Elizabeth Branch

NOTICE OF MONTHLY MEETING

THE MONTHLY GENERAL MEETING OF THE BRANCH WILL TAKE PLACE AT THE Y.M.C.A., HAVELOCK STREET, PORT ELIZABETH ON FRIDAY 20TH MAY, 1983, AT 8p.m. WE HOPE TO HAVE FINALISED AN INTERESTING ITEM OF ENTERTAINMENT FOR YOU AND ALSO AVAILABLE, WILL BE MORE CANS OF GOODIES DONATED BY JEFF, ZS2GJ FOR A.G.M. FUNDS. THESE ARE A GOOD BARGAIN.

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 (331761)

QSX-PE - ZS2OB and ZS2AB

NEWS

The Committee has in mind a family outing sometime soon along the lines of the trip to Grahamstown, but in view of the fact that not many took advantage of the subsidised bus-trip, we will be using our own cars. The venue will be at the holiday QTH of Trevor ZS2AE who has kindly offered the use of his home at Bushmans River and will probably take place on a Sunday. There will probably be some room in cars for lifts, so if you are interested, please let any of the Committee know so that a definite date can be arranged.

P.M.G. EXAMS: The recent exam took place on Thursday 5th May and several members of the Branch plucked up their courage to write. These were Gordon Knapp, Bill Parfitt and Piet Fourie and we wish them the best of luck.

MOVING QTH: ZS2GJ our good friend Jeff, at present living in East London will be retiring soon and going to live in Cape Town, where he has family. Ben Bennett and family (ZS2GF) are also pulling up roots from Lovemore Heights and settling in Cape Town. Looks like we'll have to start a sub-branch down there.

Nigel Fitt, one of our newer members at presently doing the technical course, will be leaving South Africa to live and work on a kibbutz in Israel. Good luck Nigel and maybe we'll hear you as 4X4 from there.

Percy Buckley ZS2RM has retired after many years of service with Aeradio and has a long European trip planned. Enjoy your well-deserved rest and holiday, Buck.

Bill Browne ZS2BY was heard after last Sunday's bulletin with a good signal from Kimberley. Was it bowls or just visiting Bill?.

Mitch Rundle ZS2DK has got his after-burner rigged up and working now and we wish you lots of good dx, Mitch.

Clive Cornell ZS2GQ has built up a very QRP 40 metre transceiver which he hopes to use from his caravan and seems to be doing very well with it.

Work is presently going ahead with tests on the new repeater which is scheduled to be set up on the Cockscomb range in the not-too-distant future. The solar panels and battery section will be thoroughly tried out at the qth of Trevor ZS2AE and a permit for a crystal filter has been applied for so that the minimum of equipment and antennas have to be taken up the mountain.

Once again, if you have not yet donated anything to the A.G.M. 1984 Fund, you will find an envelope for your convenience enclosed with QSY-PR. We really hate to have to ask, but without YOUR support, we cannot hope to make a success of the weekend, and we would like to uphold the good name of the PORT ELIZABETH BRANCH. Many thanks to all of you who have made such generous donations. Remember - every little bit helps.

THANKS TO ALL AGAIN.

MINUTES OF THE GENERAL MEETING OF THE PORT ELIZABETH BRANCH OF THE S.A.R.L.
HELD AT THE Y.M.C.A., HAVELOCK STREET, PORT ELIZABETH ON FRIDAY 15th
APRIL, 1983.

The Chairman welcomed all to the meeting, especially G2FSP Ben Forde and his xyl Meg.

PRESENT: 14 members and visitors.

APOLOGIES: ZS2AB, ZS2OB, ZS2EQ and Gordon Knapp.

MINUTES: The Minutes of the meeting held 18th March, 1983, having been published and circulated in QSX-PE were taken as read, proposed by Cyril ZS2KX and seconded by Clive ZS2RT.

ARISING: The Chairman mentioned the envelope which was being enclosed with every issue of QSX and reminded members of its function and the need to make a success of AGM 1984.

FINANCE: In the absence of Brian ZS2AB the Treasurer, Trevor ZS2AE reported that three cheques had been received for the AGM Fund.

CORRES: 1) Letter from Rudy v.d. Elst re various awards.
2) Letter from A.J. Basson re assistance with PMG exam.
3) Card from P. Bennett re change of address.

GENERAL: The Chairman commented on a Div. 2 ham in Uitenhage who had refused to co-operate when asked to qsy for emergency traffic. The ham concerned is not a member of the Branch but certainly did not give a very good impression and did not contribute to South Africa and Division Two's good name. Bill Browne agreed with the Chairman's suggestion that the PMG should be approached in connection with the incident.

The Chairman reported on the recent AGM. The PE Branch motion had been unanimously accepted and Dick had offered our assistance with the project. Bill ZS2BY had offered his assistance to Brian with the compilation of universal notes. They would be compiled and submitted to the League and PMG for approval. East London Branch had been rather embarrassed by their motion particularly when the Editor of Radio ZS resigned. The Chairmen of the five biggest Branches would get together to produce Radio ZS. ZS6AKV had offered to produce Radio ZS and said that within 6 months, the subsidy would not be necessary.

The Chairman showed a sample of letterheads for branch and personal stationary for league affairs at Branch level, but as the Branch had just had letterheads printed, we would not take up the offer.

The proposed locator system was available for comment and reading. With regard to the 6meter band plan, Lionel ZS2DD raised some queries. Motion 32 was carried, i.e. IARU 6m bandplan will be accepted in due course.

The Chairman then read out the motions and resolutions for the members information.

Bill ZS2BY asked whether the S.A.B.S. was to be approached re the susceptibility of domestic equipment to RFI.

The Chairman then gave his impressions of the AGM saying that he had been impressed with the organisation, but it seemed that the Chairman had not had the full support of the Committee.

Cyril ZS2KX proposed a vote of thanks to Dick for the efficient way he handled the affairs of the Branch. This was unanimously seconded.

There being no further business, the meeting was closed.

sgd:
R.W. Schonborn ZS2RS
Chairman

sgd:
T.N. Scarr ZS2AE
Acting Secretary

PROPOSED LOCATOR SYSTEM

INTRODUCTION

At the 1982 AGM, the Johannesburg Branch of the South African Radio League undertook to investigate a locator system for Southern Africa. In Europe the QRA Locator System has been in use for years. In 1978, the IARU Region One meeting held in Miskolc accepted a resolution to develop a world-wide system.

Many systems have been discussed. There appears to be one system that is favoured, as it is reasonably compatible with the current QRA Locator System.

What features and characteristics should a locator system have?

Dr. D.R. Morris G4ANE lists the following:

1. Global.
The Locator should cover the whole of the earth's surface. This is becoming increasingly important in these days of satellites, moonbounce transequatorial propagation and other transcontinental communication modes on VHF/JHF.
2. Positionally unique.
A given locator reference should specify only a single area of the earth's surface, the size of the area depending on the precision of the system in use.
3. No ambiguity in locator.
A given position should have only one possible locator.
4. Brevity.
The locator reference should be as short as possible, given other constraints. This is, after all, the reason for using a locator in the first place.
5. Consistency of format.
The locator should have a constant basic outline, e.g. two letters, two numbers, one letter, as in the present QRA system. Not only does this make copying the locator easier, but to allow a particular character to be either a letter or a number is bound to lead to confusion - try writing XYIOZS with XY1025 underneath in your usual scrawl. Then see if someone else can tell the letters from the numbers!
6. Precision.
The locator must be capable of specifying the location of a station with reasonable accuracy. This requirement is clearly in conflict with that for brevity. My feeling (and that of most people I have spoken to) is that the present QRA is about right in this respect - i.e. the smallest squares should be about the same size as the present ones for general use, about 5km.
7. Compatibility with QRA.
This is a requirement unique to European amateurs, but vital for world-wide acceptance. If a new locator system is adopted, then G9BF, having just worked his 250th big QRA square on 2m, is going to be justifiably annoyed if he has to start all over again. If the new system is suitably compatible with the present QRA, however, it will be possible to translate from one to the other with no ambiguity, thus allowing awards and lists to be continued.
8. Big squares and little squares.
For lists and awards fairly large squares are needed and these should be describable as a part of the whole locator (e.g. ZL34b is in the 'ZL' square). Again, the feeling seems to be that the present QRA has this about right. Make the 'big' squares too big, and those running low power from a valley will seldom get the chance to work anything new. Make these too small and every other contact will be in a new square.

9. Letters and numbers.

Locators consisting of just letters or just numbers seem for some reason to be more difficult to copy and remember than those with a mixture.

10. Simplicity.

Given all of the above constraints, the system should be as simple as possible to translate to and from latitude and longitude.

THE PROPOSED SYSTEM

Three sizes of squares are used. The largest (termed 'giant squares') are each 20° wide from west to east and 10° high from south to north, thus dividing the earth into an 18 by 18 grid. Two letter indices (AA to RR) are used to describe these squares, the first letter giving the longitude and the second the latitude, with the origin being at the south pole on the zero meridian. Thus giant square AA runs from 0° to 20° E, 90° to 80° S. North of this is square AB, east is square BA, and so on. The giant square covering most of South Africa would be BG 20° to 40° E, 30° to 20° S.

These giant squares are each divided into 100 'large' squares, each 2° wide and 1° high and labelled OO in the southwest corner to 99 in the north-east.

The final division is of these large squares into a 24 by 24 grid of 'small' squares, each one being $5'$ wide and $2,5'$ high. These may be compared with the present QRA squares, which are $4'$ wide and $2,5'$ high. The small squares are labelled using two letters, again the first specifying the longitude and the second the latitude, starting from AA at the southwest corner and going up to XX at the northeast. The full locator reference thus consists of two letters, two numbers, two letters, with a typical reference of ZS6TJ Clubhouse being BG43AU.

A few points about this proposed system may need some justification. Firstly, the letters I and O are included. It is felt that there is no risk of confusion with the numbers 1 and 0, because of the consistency of the locator format, i.e. the first two characters are always letters and so the "RO" must be two letters and not the letter R followed by a zero. Similarly, the third and fourth characters are always numbers, and so the "91" must be ninety-one - there is no chance of it actually being a nine followed by a letter I. That there is no risk of confusion so long as a constant format is used, is demonstrated by experience with the present QRA system - ZOO1a is instantly recognisable by regular VHF-ers as "Zulu Oscar zero one alpha", with no ambiguity. A positive reason for retaining the letters I and O is that it simplifies the decoding process, as it allows a table of letters versus longitude/latitude to be quickly reproduced by hand, and, with increasing importance in these micro-processor orientated days, their omission can unnecessarily complicate computer programmes for handling and converting locator references.

It will also be noted that all of the longitude defining characters (the second, fourth and last) run from west to east and the characters giving latitude (the first, third and fifth) run from south to north. This is again intended to simplify the translation process, as compared with the QRA, where the third and fifth characters depend in non-simple way on both the latitude and the longitude, the second character runs S-N, the fourth N-S and the fifth in a spiral.

CONCLUSION

It is not clear when a worldwide system will be introduced. In the interim Southern Africa does not have a system. Looking at the merits of the G4ANB system described above, we cannot go wrong adopting this system in the interim. A worldwide IARU decision could take another five or more years!

THANKS

I would like to record our thanks to Roland ZS6RFB for preparing the map.

Hans van de Groenendaal ZS6AKV

54	64	74	84	94	04	14	24	34	44	54	64	74
53	63	73	83	93	03	13	23	33	43	53	63	73
52	62	72	82	92	02	12	22	32	42	52	62	72
51	61	71	81	91	01	11	21	31	41	51	61	71
50	60	70	80	90	00	10	20	30	40	50	60	70
59	69	79	89	99	09	19	29	39	49	59	69	79
58	68	78	88	98	08	18	28	38	48	58	68	78
57	67	77	87	97	07	17	27	37	47	57	67	77
56	66	76	86	96	06	16	26	36	46	56	66	76
55	65	75	85	95	05	15	25	35	45	55	65	75
54	64	74	84	94	04	14	24	34	44	54	64	74
53	63	73	83	93	03	13	23	33	43	53	63	73
52	62	72	82	92	02	12	22	32	42	52	62	72
51	61	71	81	91	01	11	21	31	41	51	61	71
50	60	70	80	90	00	10	20	30	40	50	60	70
59	69	79	89	99	09	19	29	39	49	59	69	79
58	68	78	88	98	08	18	28	38	48	58	68	78
57	67	77	87	97	07	17	27	37	47	57	67	77
56	66	76	86	96	06	16	26	36	46	56	66	76
55	65	75	85	95	05	15	25	35	45	55	65	75

AX	BX	CX	DX	EX	FX	GX	HX	IX	JX	KX	LX
AW	BW	CW	DW	EW	FW	GW	HW	IW	JW	KW	LW
AV	BV	CV	DV	EV	FV	GV	HV	IV	JV	KV	LV
● AU	BU	CU	DU	EU	FU	GU	HU	IU	JU	KU	LU
AT	BT	CT	DT	ET	FT	GT	HT	IT	JT	KT	LT
AS	BS	CS	DS	ES	FS	GS	HS	IS	JS	KS	LS
AR	BR	CR	DR	ER	FR	GR	HR	IR	JR	KR	LR
AO	BO	CO	DO	EO	FO	GO	HQ	IQ	JO	KQ	LO
AP	BP	CP	DP	EP	FP	GP	HP	IP	JP	KP	LP
AO	BO	CO	DO	EO	FO	GO	HO	IO	JO	KO	LO
AN	BN	CN	DN	EN	FN	GN	HN	IN	JN	KN	LN
AM	BM	CM	DM	EM	FM	GM	HM	IM	JM	KM	LM

145,650 is also available on cassette
(FROM THE R.I.)



BILLETIN ROSTER.

22nd May Marge ZS2OB
 29th May Brian ZS2AB
 5th June Lionel ZS2DD
 12th June Colin ZS2AO
 19th June Fred ZS2EQ

IARU REGION 1 HF BANDPLAN.

It was decided at the 1983 AGM in Pietermaritzburg under motion 32 that the following bandplan will be adhered to by the SARB. As decided under motion 36, a committee under the chairmanship of the League Bandplanner will recommend modifications to this bandplan to the IARU to suit South African conditions.

Although not mandatory, good operators observe this bandplan.

3,500-3,600	CW(2)	7,000-7,040	CW
3,600-3,620	RTTY(1)	7,040-7,045	RTTY(1)
3,600-3,800	CW+phone(2,3,4)	7,040-7,100	CW+phone (4)
10,100-10,140	CW	14,000-14,100	CW
10,140-10,150	CW+RTTY	14,090-14,100	RTTY
		14,100-14,350	CW+phone (4)
18,068-18,100	CW	21,000-21,150	CW
18,100-18,110	CW+RTTY	21,100-21,120	RTTY(1)
18,110-18,168	CW+phone	21,150-21,450	CW+phone (4)
24,890-24,920	CW	28,000-28,200	CW
24,920-24,930	CW+RTTY	28,100-28,150	RTTY(1)
24,930-24,990	CW+phone	28,200-29,700	CW+phone(4,5,6)

Notes:

- 1) For RTTY recommended section of operation shared with CW
- 2) 3,500-3,510 and 3,790-3,800 reserved for intercontinental working
- 3) 3,635-3,650 is used by USSR stations for intercontinental working
- 4) For SSTV recommended operating frequencies are 3,735, 7,040, 14,230, 21,340 and 28,680 all +5 kHz.
- 5) For beacons 28,200-28,300 is recommended
- 6) For the downlink of amateur satellites 29,400-29,550 is recommended.

BRITAIN "SWITCHES-ON" THE WIND.

Britain's first wind turbine to generate electricity for the national grid has come on line in South Wales. The 200 kW turbine built for the Central Generating Board (CEGB) will generate about 380 000 kW hours yearly - enough to power a small village - and is the forerunner of a larger 4MW wind turbine the CEGB plans to order next year.

The 24,3 m high, three-bladed design is operated by computer to ensure that the sweep is always facing the wind. Turning at a constant 30 revolutions per minute, the machine starts to generate electricity in gentle breezes of less than 13 kph and achieves its maximum 200 kW rated output in winds of just over 48 kph. If the machine is faced with storm winds or develops vibration or a systems failure, special drag flaps on the blade tips are activated automatically to shut it down. Even so it is designed to withstand hurricane winds up to 241 kph.

POWER AND PLANT - February 1983. (Thanks to Shack News - Highveld Branch).

With our reputation as the Windy City, we could perhaps generate enough electricity to keep our ham rigs going without any help from U-NO-WHO and the power stations. A windmill on top of the beam towers might give the neighbours something else to talk about?! (ED.)

CAR BADGES: The Pretoria Branch is taking orders for car badges. These are in the shape of the League Badge with the members own call sign in the centre. They are metal and vitreous enamel and cost R7.50. Please contact the Secretary, Pretoria Branch, Box 1259, Pretoria 0001 for further details.

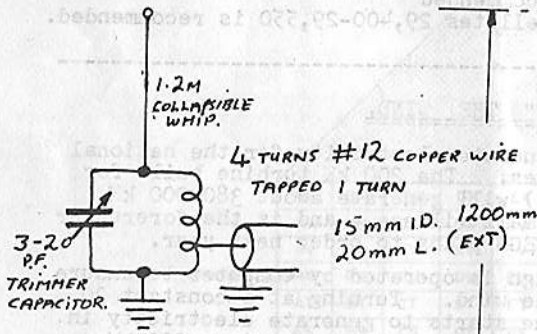
If you get one, remember, it's more likely to be seen at the back of the car!

A PORTABLE 5/8 ANTENNA FOR YOUR HANDI/TALKIE.

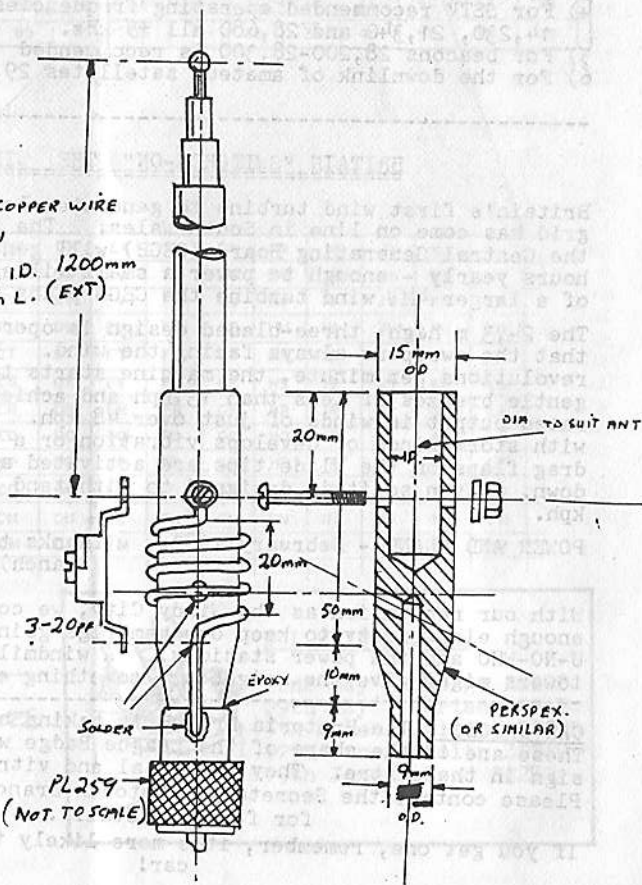
by Colin Ashwell ZS2AO.

I originally built this portable 5/8 antenna from a circuit that appeared in 73 Magazine several years ago. As you can see, it is a tuned circuit which works well without the necessity for radials. The method of construction is new, however. I used an old collapsible whip from a defunct RJ27 walkie-talkie which happened to be the right length. The size of wire is not critical. The PL259 is used so as to enable the antenna to be coupled direct to a SWR bridge for tuning. If you possess an antenna noise bridge so much the better. If you don't have access to a lathe, a suitably sized piece of plastic rod ground down at one end and drilled will suffice.

To adjust, extend the whip to the correct length and while holding vertically (preferably out in the open) key the H/T. Adjust for lowest SWR by tuning the trimmer capacitor and/or opening or closing the coil slightly. If you have to shorten the whip to lower the SWR this is proof that you have too much inductance and the coil should be opened slightly and vice versa. The tapping point may have to be moved as well, but this is unlikely. I used as PL259 to BNC connector for fitting to my I.C.2E H/T. A straight series-fed version (also 4 turns) and without a capacitor was made as well. This works just as well but it is very sensitive to hand effects, etc. However, as the antenna is not used on a permanent basis this should not be a problem. As it is, the whole thing is rather heavy and awkward to use. Also it looks ridiculous on the I.C. 2E. But, if you use it for what is was intended, that is, as a portable method of increasing the range of your H/T during those times you spend away from home and mobile, then it really works well.



2M 5/8 CIRCUIT



"WHY SIX METRES?"

by Mike Bosch - ZS2FM.

That is a question which several two metre enthusiasts have asked the writer. "What is all this fuss about 50 MHz, why not 144 MHz or higher?"

Well, let us put the record straight. The writer is not married to six metres only but has done his share of long distance work on 144 MHz and is equipped for 432 and 1296 MHz etc. and has operated as high as 10 GHz (3 centimetres). Now, why does one return to 50 MHz again? The answer is simple. This band is different from all the other VHF/UHF bands, it is unique and thoroughly fascinating! Just asked Lionel ZS2DD or Sel ZS6AXO (exZS2SS) and they will tell you the same thing.

There are many different types of propagation which appear on this band at various times depending on the distance between stations. They are: Groundwave, Tropospheric Scatter, Tropo or Temperature Inversions, Sporadic E or Es (DX), F₂ Reflection (DX), Aurora reflection, Meteor Trail Reflection, Ionospheric Scatter, Trans-Equatorial Propagation (DX) and EME (DX).

During the peak sunspot cycle 21 there were many F₂ DX openings on six metres and this is truly something to experience! Some openings have been sudden and unexpected and lasted only for a short while. Others were very selective such as the LU opening one Sunday afternoon in 1982. Lionel is not likely to forget this particular occasion since his rig packed up on him.

For country-wide operation there are the tropo openings which occur regularly, also meteor reflection as well as tropospheric scatter. The latter propagates six metre beacon signals at all times between ZS6AXO in Roodepoort and Port Elizabeth as copied by both ZS2DD and the writer, which is a distance of more than 900 kilometres.

Since the F₂ DX season has now passed, long distance operation on the FM mode during tropo openings has proven to be a great challenge - but it requires better than average equipment. Maybe you are biased against FM, if so, you are in for a big surprise. When an FM signal starts limiting it can hold its own with SSB, that is watt for watt! Currently there are no less than 19 stations active on six metres in Port Elizabeth, including one in Uitenhage (ZS2ID). Most of the above operate only FM on 52,6 MHz with vertical polarization. Eight of these stations are also equipped with beams and work long distances on 51,2 MHz - the "DX" calling frequency with horizontal polarization.

Many cross-country QSOs have been made on six metres with the following:

GRAHAMSTOWN - ZS2FM

KING WILLIAM'S TOWN - ZS2BZ, ZS2NR.

KIDDS BEACH - ZS2FW

EAST LONDON - ZS2FF.

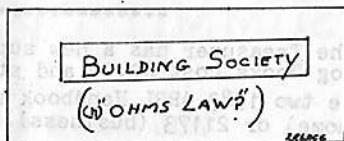
QUEESNTOWN - ZS2AI

KOMGHA - ZS20W

Much further afield stations in UMTATA, DURBAN and PIETERMARITZBURG are getting ready to establish six metre contacts with Port Elizabeth on the FM mode. So if you are in possession of a C-42 or even a little PRC 261 transceiver, then dust it off and let us hear you on 51,2 MHz.

73 de ZS2FM

(Many thanks Mike. ED.)



A TRAGIC END TO SPRATLEY ISLAND DX-PEDITION.

(Reprinted from the PRETORIA NEWS - Thursday April 21 1983, and "Watts"
Pretoria Branch Newsletter).

SEA DRAMA: FRIEND DIES DAY BEFORE 4 RESCUED.

HONG KONG - Four survivors of an attack on a West German yacht had to bury a friend at sea only a day before they were rescued after nine days adrift in the South China Sea, the skipper said today.

West German Mr. Peter Marx described how his 15-metre yacht "Sidharta" was hit and set ablaze by artillery fire as it approached the Vietnamese-occupied Amboyna Cam island, one of the remote, disputed Spratley Group, on Sunday April 10.

He said the attackers had fired no warning shots, were flying no flag and "obviously didn't want any witnesses."

Mr. Diethelm Meullor was killed during the attack and Mr. Gero Band died on Monday.

They were spotted the next day.

Mr. Marx said he, his Singaporean wife, Janet Toh, and German radio Hams Mr. Baldur Drobnic and Mr. Norbert Willand, all wounded when they were shelled, were "feeling great now".

"But we are very weak. We had no food or water for nine days - not even enough to wet our mouths."

The group had sailed from Singapore to set up a radio link on Amboyna Cay and broadcast to other radio enthusiasts around the world.

Other radio hams picked up a mayday message that their yacht was on fire after being shot at.

Air and sea searches had already been called off and they had been given up for lost when the Japanese skipper of the Hong Kong-bound Panamanian freighter "linden" spotted their dinghy two days ago. It had drifted nearly 320 km west of the island.

Mr. Marx said they tied rags to the only oar left on the dinghy when they scrambled from the blazing yacht, but six or seven ships had passed by, apparently without seeing them. Sapa-Reuter.

A NOTE FOR DX'ERS.

Peter Tiedt ZS5DX has been appointed as a checkpoint for Southern Africa for all CQ magazine awards. These awards are:-

Worked all Zones

Worked All Prefixes

CQ DX Award (similar to DXCC)

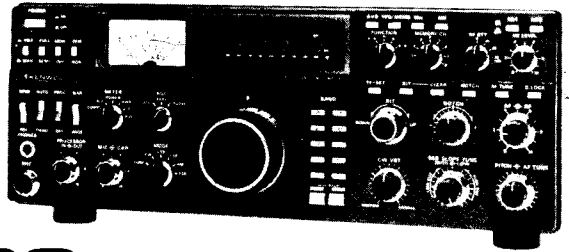
Please forward your cards, together with your application to Peter and he will authorise your application, and return your cards to you.

Peter's address is as follows:

Peter Tiedt ZS5DX
P.O. Box 769
NEW GERMANY
3620

FOR SALE: The Treasurer has a new supply of log books and QSL stickers on hand. Log Books cost R2.00 and stickers cost R4 per 100. Also available are two 1983 ARRL Handbook at R17 each. Please contact Brian at 303498 (home) or 21173 (business).

KENWOOD



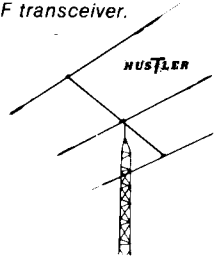
TR 2500

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.

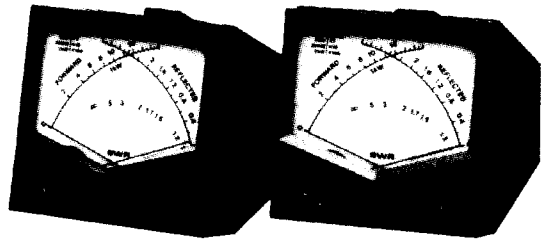
Kenwood's TS-930S HF transceiver.

 KENWOOD

hy-gain



DAIWA POWER METERS



CN540

50MHz · 150MHz

CN520

1.8MHz · 60MHz

SUMMIT DISTRIBUTORS

305 Main Street Tel. 29124
Port Elizabeth