



電波の不思議実験室

子供達が科学に興味を持たなくなったと言われるようになって久しいが、本来子供達は珍しいこと不思議なことには興味を示すものである。

そのようなことに関心を持つ大人が少なくなって科学の魅力を体感する環境が失われていることに気が付いた私達は保護者や学校の先生が、お手本になっていただくための体験会の手始めに極小規模の「電波の不思議実験室」を1月24日に大阪市内で開催した。

市内の父母や郊外、果ては鳥取から駆けつけた熱心な人達を迎えてアイハウスラジオクラブのJA3AOP杉山さん、JP3AZA 河田さん等が講師を務めた。参加者も加わって熱心に実験が行われ電波の不思議さとその働きに驚くとともに理解を深めたようであった。

実験機材や準備の為に全ての費用が講師のポケットマネーで賄われていることを知った参加者の眼差しは驚きと賞賛にも似たものであり初期の目的の効果を高めたようである。

実験案内人

JA3AOP 杉山 暁

「電波の不思議実験室」の実験案内人をさせていただきました。

河田 (JP3AZA) さんと三好 (JA3UB) さん、そして当日駆けつけてくださった電波適正利用推進員の皆さんのお助けを頂いて何とか目的地の近くまでたどり着きました。有難うございました。

今回は新しい試みとして学校の先生など、こどもを指導しておられる方々を対象にという目標で準備を始めました。残念ながらこの点では目的を果たせませんでした。むしろ個人で近所の子供や興味のある大人を集めて、若干のポケットマネーと手持ちの材料を活用してハム仲間の助けを借りながら「実験室」をやるのも良いのではと感じました。郷土芸能や手工芸などのベテランの方たちが子供たちに手ほどきをしているケースのように。また、集まってこられた方の中に学校の先生が居られるという幸運もあるかもしれないし・・・。

「輪が広がっていけば・・・」なんてことを思っていると、「科学実験教室」の折り込み広告が学習塾から配られてきました。学習塾はビジネスチャンスありと見たのですが、マニュアル至上の画一的実験にならないように願います。



新しい発見

JP3AZA 河田至弘

今回の電波不思議実験室はいままでとは様子の違ったものでした。杉山さん、三好さんに電波適正利用推進員の皆さん共々参加させて頂きました。

杉山さんの起案された435MHzのAMを使用しての実験は波長が短いこともありアンテナの製作が容易で、電波の性質を理解するには持って来いでした。また、私もいろいろ勉強になる実験が出来ました。そのひとつとして435MHzの鉱石ラジオを製作しましたが意外に感度が良いので自分自身で少々びっくりしています。なんせゲルマニウムダイオードの1N60が435MHzで何の問題も無く立派に検波器として動作したのは新しい発見で、以前に作成して好評を得た中波の鉱石ラジオと同等の感度が得られました。(約85dB μ 程度)435MHzの電波を使用したことにより電波不思議実験室では基本的な事柄以外に、今までに出来なかった電波の反射実験、無電力中継のなど非常に中身の濃いものでありながら楽しく実験出来、参加された方々の興味に輝いている表情は素晴らしいものでした。この次には初期の目標通りに先生方にも啓蒙出来ればと思っています。



世界のアンテナ

JA3CZY 三浦聡之

昨年末、日本中の多くのハムがCQ誌12月号表紙の超巨大アンテナを見て度肝を抜かれました。

このアンテナ、広島県八千代町の7J4AAL/KANさんが永年の夢を掛けて完成した地上高60mにそびえる3.5/3.8Mhz用5エレ八木アンテナです。

Boom長：42m、エレメント長：42m、重量：1.6T。アンテナ平面積を地上に投影してみると約1700平米、600坪！！我がウサギ小屋は私道を含めても155平米。このアンテナの10分の一の面積も無いのです・・・とほほほ。

小生も3.8Mhz-DXing愛好家の一人として、是非そのアンテナを見てみたいと、その機を伺っていたら、意外と早くそのチャンスが訪れました。何度かメールでのやり取りで1月11日に訪問することにKANさんの承諾を得ましたので、近隣希望者を募り見学会の乗りで広島まで行ってきました。当日、まだ夜も明けないうちに集合場所へ。なんと皆さん予定より30分以上も早くからお集まりで・・・まるで遠足に行く気分です・・・早速出発。

途中、福崎ICで神戸組みと合流し、車2台10名で広島を目指しました。前もって打ち合わせの通り、到着予定の12時30分に430Mhz/FMで声を出すと既に千代田IC前でJ140XV吉川さんが待ち構えておられ、彼の先導で約15分走ると途中からそのアンテナの威容が姿を表し「うわぁーっ！」と大歓声。八千代病院（KANさん経営）玄関先でKANさん始め多くの方々の歓迎を受けて病院内の食堂でしばし歓談の後、早速アンテナ見学へと出発しました。そのアンテナは病院前の小高い山の頂上にあり、広く整地された道路を100mほど登っていくと巨大な60m鉄塔が目前に現れました。この場所はこの超巨大アンテナを立てる為にわざわざ山を削り整地したのだと。そこから真上に見上げる3.5Mhz-5el-fullsizeは、遥か60m上にあるため案内小さく感じますが、それでも天空を覆い被さるが如く、まさに圧巻そのもの。鉄塔の足元で吉川さんからアンテナ仕様や工事の苦労話など詳細な説明があり、参加者各自からの数々の疑問にも快く何でも答えて頂きました。その後、病院内の広大

な敷地に点在する従来からの3.5Mhz用3eleアンテナを始めとする鉄塔4本と数え切れないほどのアンテナ群の説明には、全員上空を見上げて口をあぐり、一同只々ため息しか出ません。アンテナ見物に疲れた頃を巧く見計らってKANさんが「じゃあ、



シャックへご案内しましょう」の声に追われてKANさんご自慢のご自宅へ。小さなホテルと云った感じの全くの洋式建築で、欧米サイズでゆったりと豪華なお宅です。いよいよシャックへと案内されて入っていくと、機能的に整然と並べられた無線機類はもちろん、数々のアンテナ関係の制御装置にも工夫が凝らされ、実際に操作して頂きました。新しい鉄塔上に取り付けられたカラーカメラからの周辺の山々などの美しい映像にはしばし全員見入って



おりました。

今回の見学会は大阪より日帰りと言う時間的な制約で、実質3時間足らずと言う短いものでしたが、KANさん始め皆さんのご尽力で非常に充実した内容で生まれ、我々一同は大満足で帰途に着きました。

日頃から75/80mに親しんでいる我々は勿論のこと、今までDX遊びに、ましてやLowbandにそれほど関心の無かった方々にも大なる刺激を与えてくれる結果となりました。帰途車中で話し合ったのですが、このDXに向かない、殆どの方々も関

心を持たない、しかも狭いバンドにひしめき合う、あの75mバンドに、KANさんがあれだけの情熱を注ぎ込む魅力って、いったい何なのか？単に道楽と云う言葉では片づけられない、男のロマンとしか考えられません。わが身の恥をさらしますが、

今回の見学会に参加するまでは、7J4AAL/KANさんは数々の事業で大成功をされた稀有な大金持ちだから、もてる資金を好きなだけ注ぎ込める金持ちの無線道楽だろう、と少しは考えていました。が、あの完成された設備を目の前にした時に、我が頭を思いつき叩かれ、自分の浅薄な未熟な考えが大変恥ずかしくなりました。単に「幾らでもお金を払うから作ってくれ」ではあの設備は決して出来ません。

今回主目的として拝見した、新しいアンテナ、タワー、無線設備・・・どれを取ってみても、KANさんの十分な知識と技術の裏づけの基に、求めるプロ級の性能と安定度が察せられ、氏の無線に対する情熱と知識が只者では無いことを如実に表していました。勿論、始めてで、それも短時間お会いしただけでは、心情までも理解することは早急かもしれませんが、KANさんご自身の飾り気の無い、謙虚で温厚なふるまいに接して、氏の無線に対する姿勢を少しでも理解出来たように思えたことが、この見学会でも一つの大きな収穫でした。

このアンテナのホームページ

<http://www.nn.ij4u.or.jp/~mak-oxv>

73 FB DX

Project Star - 3B9C

Five Star DXers Expedition to Rodrigues Island, March/April 2004

G3NUG Neville Cheadle
G3XTT Don Field

By now, most readers will be aware of Project Star Reach, the next project to be undertaken by the Five Star DX Association (FSDXA) who organised the 1999 9M0C and 2001 D68C DXpeditions. The latter, incidentally, is still the only DXpedition to have achieved over 100,000 QSOs, with its massive total of 168,000. The forthcoming expedition, to Rodrigues Island, will sign 3B9C and will be active from around 19th March to 12th April.

One of the successes of the D68C Comoros Island DXpedition was the way in which it brought some 3,400 UK amateurs onto the HF bands to work the expedition. That's probably close to 10% of all the amateurs in the UK who were licensed for HF operation at that time. Many had brushed off their old valve transceivers to work the expedition, and some clubs organised special club nights so that those who had limited stations at home could still have a shot at D68C. Many of these amateurs would probably not have bothered with other HF DXpeditions; there is often a feeling that DX chasing is only for those with huge antennas and kilowatts of power. But the FSDXA team had made a point of taking plenty of hardware themselves, so that the chasers stood a good chance, even with modest stations of their own. The 3B9C organisers feel that a similar level of participation can be reached in many more countries too, with the right encouragement, hence this article.

Since 2001, many more HF operators have come onto the bands, through new licence structures and, most recently, through the abolition of mandatory Morse testing in many countries, leading to former VHF-only licencees being granted HF privileges for the first time. FSDXA selected Rodrigues Island in the Indian Ocean as a suitable location around which to base this project (so called because the expedition itself is just one part of it, albeit the central element). Rodrigues has just one resident amateur, and has seen no DXpedition activity since 1999, almost half a sunspot cycle ago. Yet it's accessible enough to permit the shipping of the six tonnes of equipment that the expedition will require and should have excellent propagation to the major centres of amateur radio population (Japan, Europe and the USA). An advance team has already been out to Rodrigues to ensure that the necessary logistics are in place, and to establish relationships with key local contacts (including Robert 3B9FR, the resident amateur mentioned above).

But Project Star Reach is very much aimed at you, the reader. The organisers are keen to ensure that you are able to participate through making contact with 3B9C on a range of bands and modes and chasing after one of the attractive trophies on offer. For seasoned DXers, that means being able to fill in those 3B9 band slots that you might still be missing, but hopefully it will also mean that you

try out a new band or mode, perhaps satellite or PSK. For those new to HF, while the team certainly can't guarantee you a contact on all nine bands, almost everyone should be able to manage at least a handful of QSOs. The main purpose of this short article is to give you some advice on how best to go about doing so.

One of the tough decisions DXpeditions have to make is when to operate on each band. Anyone who has operated from near the equator will know that only the highest bands are open during local daylight, but from dusk to dawn all nine HF bands can be open simultaneously. With anything less than nine stations available, some will have to be missed. The good news is that 3B9C will be able to operate all nine bands at once (Yaesu, Principal Sponsors, are providing ten FT-1000MP MkV transceivers and ten VL-1000 Quadra amplifiers) and, all being well, may even be able to activate more than one station on some bands (10, 15, 20 and 80) to be active on both CW and SSB together. So, if there is an opening from your area to 3B9 on a particular band, rest assured that 3B9C will be there for you.

PROPAGATION AND CHOICE OF BAND

That brings us to propagation, of course. Many DXpeditions nowadays run propagation forecasts for the major geographic areas, and post them on the DXpedition Website. 3B9C is no exception. But if you live elsewhere in the world, or want to run some much more specific predictions for your own QTH, there are plenty of propagation prediction software packages available which allow you to do it yourself. Follow some of the links at the end of this article for some good examples. Rest assured that the 3B9C team themselves have done similar analyses and will be aware of where their beams should be pointing on any given band and at any given time. Almost certainly, the easiest bands on which to look for your first QSOs with the expedition are going to be 20, 17 and 15m. As the sunspots start to reduce in number, openings on the highest bands become less frequent, while the low bands are always a tougher challenge, with greater absorption and higher noise levels.

Of course, most serious DXers have gain antennas for 20, 15 and 10m; often a triband Yagi or even stacked monobanders. So even on those bands you may well have to wait your turn for a QSO (the good news is that 3B9C will be active for three full weeks and four weekends). Far fewer DXers have gain antennas for 30, 17, and 12m, so 17m may well be an excellent band on which to focus to make that first 3B9C QSO (or, indeed, to chase other DXpeditions).

This highlights one of the dilemmas facing the would-be HF operator. With nine HF bands available, not to mention the VHF bands, how on earth can you put up an effective antenna system to cover them all? Unless you live on a farm, the answer is probably "no way". This is why low-profile multiband antennas such as trapped verticals or the G5RV are so popular but, inevitably, they are a compromise. It's often forgotten, for example, that when Louis Varney G5RV came up with his ground-breaking antenna design, not

only did the WARC bands not exist, but neither did 15m. And in no way was the antenna expected to present a resistive 50-ohm load to the transmitter but, in those days of valve PA's, it didn't really matter! Modern solid-state rigs may behave differently, and reduce power in the face of what they see as a mismatch.

A SIMPLE ALTERNATIVE

In the RadCom article which preceded the D68C expedition, the team recommended, instead, to focus on one band at a time, and to install a resonant sloping dipole, orientated towards D6. This led to a great deal of positive feedback after the expedition, many operators discovering that such an arrangement worked much better on that specific band than their multiband system, allowing them to work the expedition much more easily. So the recommendation is very much the same again. A full-size, resonant dipole, cut according to the standard dimensions, out in the clear and, ideally, sloping and orientated towards 3B9C is an excellent starting point for those of you without Yagis or other gain antennas. Suitable dimensions are given in Table 1 (you may need to modify them slightly to achieve best SWR, as lengths can be affected by surrounding objects, etc.). The antenna can be suspended from a chimney or gutter, perhaps. Feed with 50 or 75 ohm co-ax, with the centre conductor to the higher half and the outer to the lower half. Seal the feedpoint to keep out moisture, with insulators at either end and you have an excellent single-band antenna. On the low bands, of course, such an arrangement starts to get prohibitively large, so other approaches have to be tried. 3B9 is a long way from most centres of population, so arrival angles will be low. Even on 40m, the half-wave above ground required to achieve low angle radiation from a horizontal antenna is 20m (67ft), so it is much easier to use some sort of vertical. Actually, on 40m, that then becomes quite easy. A full-size quarter-wave vertical is just 10m (33ft) high and takes up almost zero ground space! Of course, like any vertical, it will only work properly with an effective ground system, but for practical purposes this means running out as many radials as you can, of whatever length, in whichever directions they can go. Very few of us have the space to put down a textbook radial mat with, for example, 120 quarter-wave radials at exact spacings of 3 degrees! One of the authors has had great success on 40m with an elevated ground-plane consisting of a 10m glass-fibre fishing pole, with the quarter-wave radiator wire running up its length (held with insulating tape), mounted on an insulating support (old fence post, or whatever) just a metre or so high, with two elevated quarter-wave radials (if you use elevated radials, do not have an earth connection in addition). Feed the centre of the co-ax to the vertical radiator and attach the outer to the radials.

RIGS AND OPERATING TECHNIQUES

Having discussed the antenna system, what about your transceiver? The answer is that most transceivers these days are more than capable of doing the job, and almost all elderly ones are

too. The only feature you will need that you may not be using in your day-to-day ragchewing is split-frequency capability. 3B9C, like almost all DXpeditions, will operate split-frequency at all times in the early parts of the expedition, though may revert to co-channel working later, when the pile-ups diminish, for those without the capability. What is split-frequency operation, and why is it used?

Quite simply, DXpeditions transmit on one frequency and listen on a different frequency. For example they will transmit on 28.495MHz and listen between 28.500 and 28.520MHz. There are two reasons:

1. If the DXpedition station listens on the frequency on which it is transmitting, it will not be heard by those calling because of the pile-up on that frequency.
2. The DXpedition operator will be faced with a huge barrage of calls and will not be able to differentiate between them if they are all calling on the same frequency.

Experienced DXpeditioners will tune slowly up and down their listening band. Listen to the stations working the DXpedition and establish the operator's tuning pattern. Work out where he is likely to be listening next and then call - bingo! Never, never transmit on the DXpedition's transmitting frequency unless the DXpedition says "Listening this frequency".

On CW, generally all you will need to do is set your receiver to the 3B9C frequency and then use XIT (transmitter-incremental tuning) to offset your transmitter by the necessary split (see your transceiver manual if you haven't had occasion to do this before). Activating RIT (receiver incremental tuning) will also allow you to hear the calling stations, while leaving your main receive frequency on 3B9C.

RIT and XIT usually only work for splits of up to 10kHz, which may not be sufficient for SSB operation. In this case you need to bring your second VFO into operation. Set, say, the A VFO on the 3B9C frequency. Set the B VFO on the frequency where 3B9C is listening, and activate "Transmit on B, receive on A". Again, your transceiver's manual will explain how to do this.

When 3B9C responds to your call, the exchange will consist simply of an exchange of signal reports. Make sure the 3B9C operator also has your callsign correct. The reason for the short, contest-style exchange is simple - the expedition operators want to maximise the number of people who get a chance to work 3B9C, so contacts are kept as short as possible. Information such as QSL route, etc. have been announced in this magazine and elsewhere, and there will even be a log lookup facility on the 3B9C Web Page so you can be sure that you are in the log OK. If not, then do feel free to have a second attempt. If your contact is, indeed, OK, then please try to work 3B9C on other bands and modes.

So where on the bands will you find 3B9C? The plan is to focus initially on the frequencies listed below, subject to change for technical or operational reasons. In any case, the team is

well aware that band plans in some countries, including the USA, restrict certain classes of operator to sub-sections of the band. This will not only be reflected in the range of listening frequencies used, but in transmitting frequencies as the DXpedition progresses. With widespread use of PacketCluster (via VHF/UHF and Internet) and the DX Summit Web pages, even if you don't hear 3B9C immediately, you should always be able to find out very easily where the expedition is currently operating.

MHz	CW	SSB	RTTY
1.8	1,822	1,842	N/A
3.5	3,502	3,795	3,570
7	7,002	7,047	7,035
10.1	10,102	N/A	N/A
14	14,022	14,195	14,085
18	18,072	18,145	N/A
21	21,022	21,295	21,085
24.9	24,892	24,945	N/A
28	28,022	28,595	28,075
50	50,102	50,145	N/A

PSK31 activity will be around 14071, 21071 and 28071kHz.

Satellite will be via AO-40 and any EME operation will take place on 70cm.

Regarding the above frequencies, note that the team is aware of at least one other major DXpedition to be active while 3B9C is still on the air, so may decide to change transmitting frequencies to avoid confusion. Typically, a DXpedition SSB station transmitting on 14.195 MHz will listen up in the range 14.200 to 14.220 MHz. If 3B9C finds itself operating on the same transmit frequency as another DXpedition it will, for example, move down around 5kHz typically to 14.190 MHz and will then listen down say between 14.165 and 14.185 MHz so as to split the pile ups and avoid confusion. Listen to the operator carefully. Each has been briefed to give the 3B9C callsign at least after every two QSOs and to announce the listening frequencies every five QSOs. Incidentally, 3B9C will not work by numbers; believing that with good ears and equipment this is quite unnecessary.

There really isn't the space here to discuss how to get started with the more specialist bands and modes, but the team does encourage readers to have a go. There have been many articles written about getting started on RTTY and PSK, which is straightforward using a personal computer and its built-in sound card. There will be a section on the 3B9C Web site giving some hints and tips, with links to useful references. The same is true of satellite and EME. The latter requires a well-equipped station, but satellite operation through AO-40 doesn't require large investments in equipment, especially if you already have a 70cm multimode radio (3B9C will be using the popular FT-847) and 70cm Yagi. Again, follow the links on the Web page for suitable advice on getting started.

NEVADA RODRIGUES TROPHIES

As an encouragement to both individuals and clubs to work 3B9C on a wide range of bands and modes, Nevada Communications of the UK

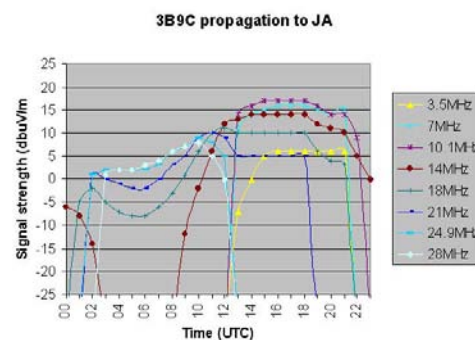
is sponsoring some trophies to be known as the Nevada Rodrigues Trophies. There are 22 separate categories, covering all continents, both newly-licensed operators and old-hands, SWLs, and club entries. The trophies themselves will be an attractive locally-made model of a sailing pirogue, as used by the Rodrigues Islanders. For those who don't qualify for a trophy, but hit pre-determined numbers of band-slots, there will be a range of certificates. Full rules and how to apply can be found on the 3B9C Web site.

SPONSORSHIP

A significant number of sponsors, led by Principal Sponsor Yaesu, is already supporting this DXpedition. A colour brochure has been prepared about the project and has recently been circulated to DX clubs throughout the world. If any club is interested in sponsoring Project Star Reach then please contact Bob Beebe GU4YOX (e-mail gu4yox@cwgsy.net)

We very much hope this article has inspired those of you who are inexperienced in DXing to have a go and work 3B9C. You could be pleasantly surprised at what is possible. We look forward to putting your call in the log.

3B9C URL: www.fsdxa.com/3b9c



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