“THE NEW DXER’S HANDBOOK” ©

SECOND EDITION

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Author's Comments

Every accomplished DXer was a beginner at one time.

In 2010 I wrote the first edition of this handbook for new members of the Utah DX Association. It was intended to give them something that would be easy to understand yet would quickly teach them the basic skills of successful DXing that took me years to discover on my own. Now in hindsight it all seems so simple.

DXing can become a lifelong passion and is a lot of fun! It offers opportunities for personal growth in a wide variety of areas: geography, engineering, science, language skills and many more. It also offers a competitive outlet for those who are so inclined. And best of all, through DXing I have made many new friends all over the world!

To my pleasant surprise this primer has gained an international readership and is now available in six languages! The first edition has become somewhat outdated and was never written for a broad audience. I have attempted to remedy both of those issues here in the second edition. I am honored by the recognition that I have been given. Wherever you are, I hope that you will enjoy this handbook and that it will help you gain some new skills. I truly hope that it will give a running start to those new to our ranks. Nothing would please me more than to learn that I have helped a new generation of young DXers get started.

Please feel to email me your feedback or questions. My email address is listed on QRZ.com.

Best regards,

Bryce Anderson, K7UA

Yes, I was once a clueless beginner.

This is a picture of me when I was fifteen years old and knew absolutely nothing about DXing. I sent it to my lifelong friend, Joe, JA1LZR, in 1964 after we met on the air. Joe submitted it to JA CQ Ham Radio Magazine. I had a pretty good station only because my father was also a ham.

K7SAI: 21Mcでは私が（1LZR）最初のJAだそうです。14cwにも出ているようで又彼の父もK7SAJです。彼は15才RigはTXがKnight-150. RXはNC-300, Ant. は 2ele です（提供1LZR）

CHAPTER - 1

Listening – The key to successful DXing:

What is the single most important thing in DXing? **Listening! Always listen!**

Listen? Why? Listen for what?

In the most literal sense an accomplished DXer is truly a hunter. Great hunters know what they are hunting, what it looks like, what it sounds like, and where it is likely to be found. They don't just tromp through the woods hoping that their prize will just stand in front of them saying "Hey, shoot me!" They know when and where to look to improve their odds and they keep a keen eye open to find the big game before someone else does.

That is why we listen. We are scouting the band for stations that just came on the air. The weak ones from far away that no one else has noticed yet. If you are the first to find a great DX station, you will probably get him. You will have no competition. Also, some openings to the most remote places on Earth are only a few minutes long. You have to be there at just the right time. Sometimes propagation can be very selective in who can contact who. You might just be the only one hearing that rare DX station.

Oh! I don't need to do that! I'll just wait for him to come up on the DX Cluster system. OK. If you are the"**Tyrannosaurus Rex"** of 20M this might work out fine. You have the power to destroy your competition and slam through any pile up. However, for the rest of us, once a rare DX station is spotted the competition skyrockets. And by not listening, you will miss out on those weak ones that no one else ever hears or bothers to spot. Using DX Clusters is a terrific tool, but it isn't the only means to becoming a successful DXer. We will discuss DX Clusters in a later chapter.

Now back to **listening - the key to successful DXing.** The concept of listening is very simple. Start on one end of the band and slowly tune up or down the band looking for DX. You should especially check out the DX portion of that band. The DX portion is usually the lower end of each sub-band (phone & CW). While you are slowly tuning, stop on each station that you hear for a few seconds and figure out if they are DX, working DX, or of no interest to a DXer. Pick out call letters. They are the obvious way to determine if a station is DX or not. The subject that they are discussing can also be a clue. A rag chew discussing something mundane can be skipped over. A station ripping off QSOs as fast as they can go is something to be checked out further. Pay special attention to weak signals, phone operators speaking with accents or in a foreign language, and to signals that just sound "funny." By funny I mean having a "fluttery" sound, an echo, or a poor CW note. Signals that travel over the poles are impacted by the aurora that is always present. It gives both phone and CW signals the fluttery sound. It is called "arctic flutter." Once you have heard it, you will never forget it. Echoes come from signals arriving at your location from multiple paths. The difference in those path lengths creates the echo. Sometimes nearby stations sound this way from "backscatter," but some DX stations from very far away may be arriving via multiple paths and also have an echo. Poor CW notes may be caused by echoes or from technical issues at the DX station. A poor power source or equipment that was not constructed to modern standards

may tip you off to a DX station. Commercial power is very poor in many parts of the world and good equipment may be very hard to obtain. Of course when you tune upon a huge pileup you know that something of interest is on!

The best way to listen is by wearing headphones. Having a nice speaker to use with rag chews, waiting for your turn on the net roster, or other casual operating is fine. For DXing you need headphones. Headphones allow you to reduce the noise around you and to use the minimum of AF gain (volume). You can concentrate better without distractions. **You will hear a weak signal better with headphones.** Trust me on that.

Not just any headphones will do. First they have to be **comfortable** so that you can wear them for extended periods. Another factor to consider is the **frequency response** of the headset. High fidelity headsets designed for music have a very wide frequency response. Typically from 50 to 20,000 hertz. Communications only uses a range from about 300 to 3,000 hertz. You don't want those super highs because in a communications situation they are just noise. The chest thumping bass response is also useless. You are better off with a headset designed for communications. Various manufacturers make them. Many DXers use headsets made by Heil Sound http://www.heilsound.com/ . They are the standard for ham radio and difficult to beat. Noise cancelling phones can be very useful if you have something like an amplifier blower making a constant sound that can be blocked out. The final choice of a headset is very personal, just like picking out a pair of shoes.

As you gain experience in listening you will get greater and greater rewards. There is no doubt that an experienced DXer will pick out many more DX stations than a less experienced operator. You too can gain that skill through practice. After a while you will be able to "sniff out" DX that many others won't even notice.

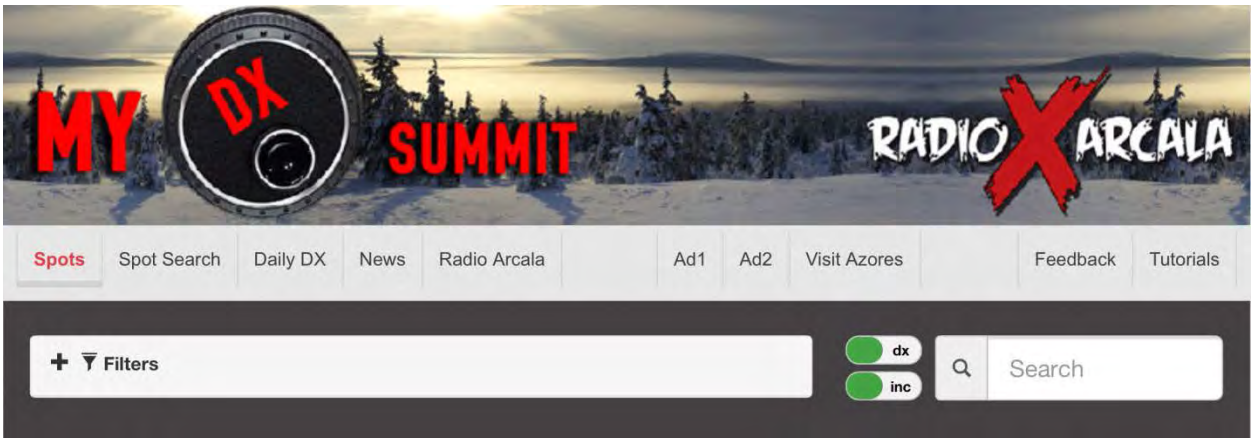
CHAPTER - 2

DX Cluster basics

When I started DXing, there was no Internet or DX clusters. Friends called each other on the telephone or on local 2M frequencies to get the word out when a rare DX station was on. Today DX clusters are an infinitely better solution for knowing what is on the air. The clusters have become so important that every serious DXer needs to have Internet access and know how to properly use a DX Cluster.

How it works: There are many DX clusters throughout the world. They are all connected via the Internet. Consequently data that is submitted to any one of them gets instantly routed to all of them worldwide. The data is called a "spot." The spot shows the call of a DX station, the frequency and mode that it is operating on, the time, and identifies who submitted the spot. Various software filters at the cluster or on your own computer can pass through spots that are relevant to you and screen out ones that are not. There are local DX clusters in most places. Many use web browser connections. Others may use either telnet or even local VHF packet connections. In addition to filters there are search functions to review past spot data. If you want to see if a particular rare DX station has been active and at what times and frequencies, you can just search for their call. Obviously that will help you know when and where to look for him.

Great. I now am connected and I see spots for stations that I want to contact. It is working.
Here is a more advanced concept. While all of the clusters get sent pretty much the same data there are reasons to monitor more than one. The mother of all DX clusters is in Finland and operated by Radio Arcala OH8X. It can be accessed at http://www.dxsummit.fi/ . It is a very sophisticated site and has several valuable tools available including propagation prediction. More on that in a later chapter.



Sometimes it can be useful to see the stations that are being spotted in other parts of the world. This can give you a feel for propagation conditions or to find out if that new DXpedition actually went on the air when they said that they would. You might even see yourself spotted from another continent.

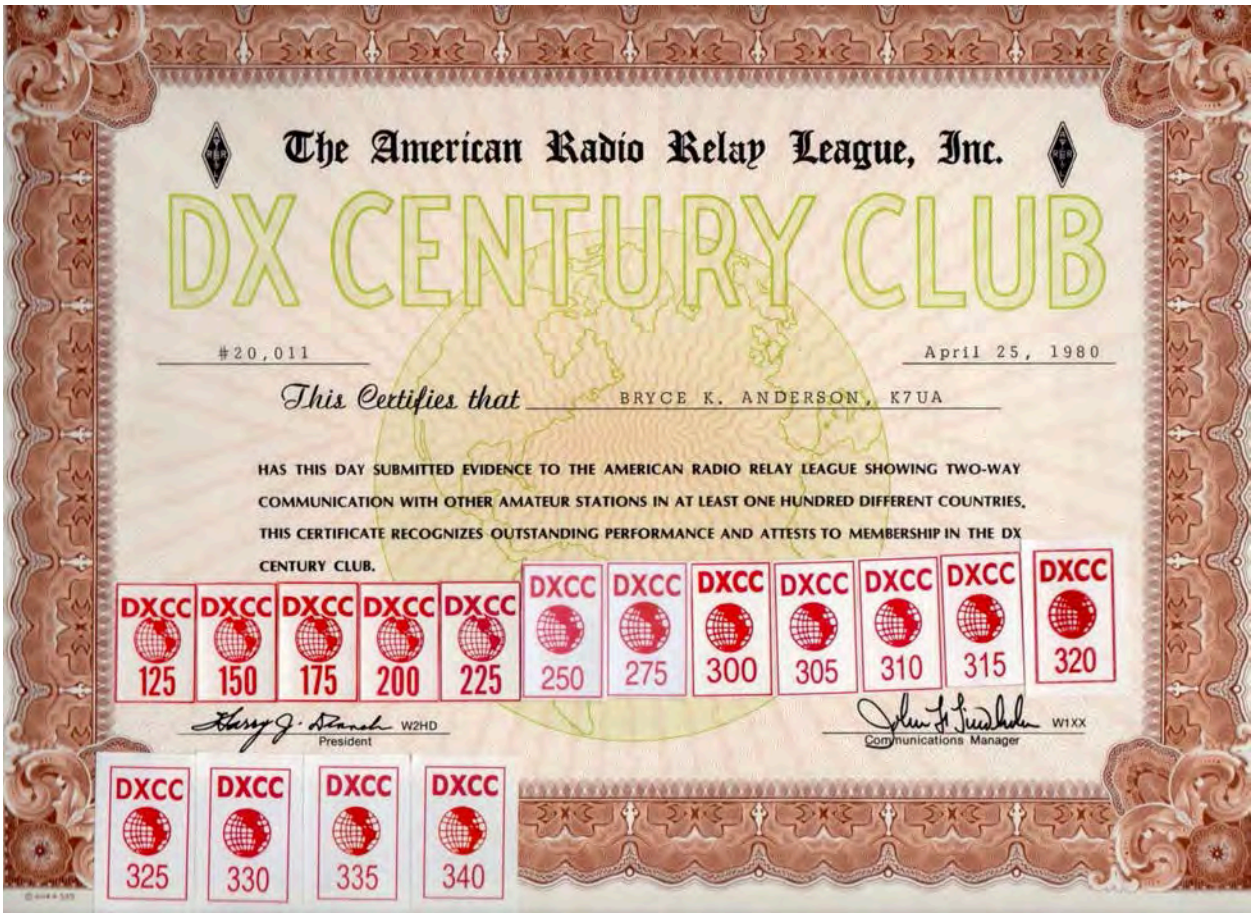
Some cluster manners: It is considered poor form and very much frowned upon to spot yourself. The idea is to spot DX stations. While it is possible to send messages via this system, it is not Instant Messenger and should not be used as such. It isn't Twitter either. No one wants to hear your "tweets." Not every DX station warrants being spotted. Don't clutter up the cluster with spots from really common places. No one cares about them. If you are fortunate enough to be the first to discover a great DX station consider whether to spot him or not. Or spot him a little later. If you and a couple of other guys found the DX at the same time and you got through first, hold off spotting. Give the other discoverers a chance to work him. They have earned that right by finding the DX on their own too. Once you send that spot an instant dog pile is likely. The height of stupidity is to show the world how clever you are by spotting some really rare DX before you have worked it yourself. It is comical to see a spot and then hear the guy who sent it trying to make it through the chaos that he just created. Also, don't spot a station that has already drawn a big crowd. He already has all that he can handle. Did you just work a guy calling CQ and now he is CQing again? Give him a boost with a spot. Some DX stations will ask you to spot them. Don't duplicate spots that are already posted. Always be **VERY** careful what you enter. If you meant to enter PZ5XX on 20M CW and you mistype it as P5XX you will infuriate the entire planet! Tens of thousands of alarms will go off. Everybody needs North Korea on CW and you will instantly become extremely unpopular! If you see a spot for a good one and you can hear him, listen to be sure that the call sign of the spot was posted correctly. Mistakes are made. A call may have actually been HH3AA (Haiti), but some guy can't count dits and posted it as 5H3AA (Tanzania). Then everyone after him assumes that they worked a 5H, when actually they did not. Always double check the facts. One final thought. Just because you see a good spot does not mean that you can hear him. Don't just pile in and start calling without first listening to see if you can actually hear him well enough for a QSO. If you can't hear him, leave him to the guys who can. That goes double if the DX station is running simplex.

CHAPTER - 3

The Pinnacle of DXing - the ARRL's DX Century Club:

Back in 1935 the ARRL launched what is the premier award in all of amateur radio. The idea was to work at least 100 "countries" and to obtain written proof of those contacts. The term "country" does not always mean a literal country. Hawaii and Alaska are part of the USA, but because of their distance from the rest of the nation they count as separate countries. The award was reborn after WWII. It was again modernized in 2000. The term "country" has been updated to the more accurate term of "entity." There are some rather complicated rules about what constitutes an entity, but it is no longer something that is open to interpretation as it once was. See http://www.arrl.org/dxcc for information on the award. A current countries/entities list is available at http://www.arrl.org/country-lists-prefixes . I'm going to use country and entity interchangeably in this chapter. I just can't break the habit.

DXCC is a really nice award!



The basic DXCC award requires 100 confirmed countries, but that isn't the end. There are endorsement stickers to place on your award certificate for confirming more countries. The stickers are issued at intervals defined in the DXCC rules. See the link above.

So should you care about this? Maybe you don't, but most DXers are interested in working as many countries as they can and attaining and upgrading their DXCC award. It is a lifelong competition with other hams and with yourself. **The DXCC award is a badge of DXing competency that is to be prized!** There are actually a number of different awards in DXCC. There are "mixed" (any mode counts), phone, CW, digital, QRP, satellite, single band (160M, 80m, etc.) awards, and the highly prized 5 band DXCC award for confirming 100 countries on each of the traditional bands of 80, 40, 20, 15 & 10M.

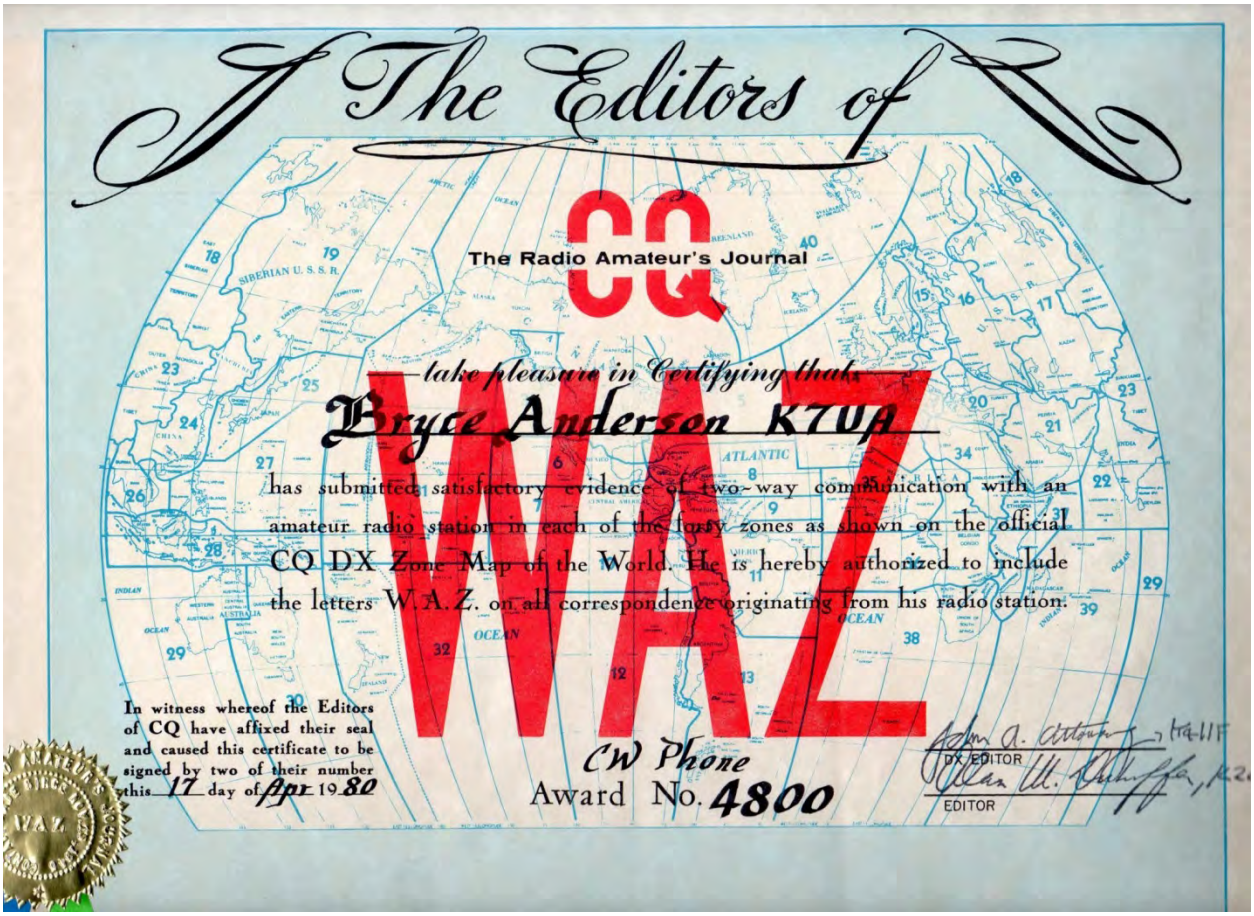
There is another award called the “Challenge.” The Challenge is an extension of regular DXCC. This one requires 1,000 band-countries for the basic award. A band-country credit is given for a confirmed country on any given band from 160 – 6M. Example: If you work England on 80M, 20M, and 10M you get three band-countries. The DXCC endorsements and “Challenge” can be a lifelong quest.

There are currently 340 entities on the DXCC list. A DXer within ten entities of that possible number is listed on the “Honor Roll.” A DXer who has them all is “#1 Honor Roll.” Both are great honors to attain!

Here is a bit of advice to new DXers. DXing is addicting. Once you get hooked you will work very hard to get a new country, especially if it is a rare one. Some of the rare entities may not have anyone operate from them for long periods of time… like 20 years! To get on the Honor Roll, you can’t afford to miss expeditions to those places when they happen. At my advanced age I really can’t miss any. I’ll probably be dead of old age before some of them come on again. ☹ Don’t forget to get the confirmations as you go. I didn’t do that and when I got interested in the “Challenge” my statistics were dismal. I had worked hundreds of band countries and never bothered getting the confirmations. I’m still playing catch up.

The confirmation process has been modernized. For DXCC purposes the contacts may now be either in written form or confirmed via the ARRL's Logbook of the World (LoTW) system. Paper cards may be checked for credit at ARRL Headquarters or by official ARRL card checkers. Find one in your area here: http://www.arrl.org/dxcc-card-checker-search .

Incidentally, CQ Magazine www.cq-amateur-radio.com has a very similar award to DXCC. They also offer the **Worked All Zones Award (WAZ)** for contacting radio amateurs in the forty zones of the world. Many consider WAZ to be more difficult to attain than DXCC. It too is a very nice award.



In my humble opinion every DXer should be interested in DXCC. ☺

CHAPTER - 4

The DXer's Tool Kit - **T**his chapter is full of stuff that I have learned first hand as a DXer. I hope that it is useful to you.

What tools do you need? A DXer's greatest assets are **operator skill and persistence**. Skill comes with experience. There is no away around it. An experienced DXer will work more DX with a modest station than an inexperienced operator will be able to do with a top notch setup. **Always learn as you go.** You will get there with time. On the other hand, **persistence can start right now.** I have had several times when the pileups for rare expeditions were so large and I was at such a geographical disadvantage that I became discouraged. The same has happened when I have spent day after day listening for that new one without ever being able to hear them well enough for a QSO. If you don't try your chances of success are **zero**. Even a low probability is better than that. If you keep trying you might just make it! If you don't you automatically fail. **Dogged persistence has paid off for me.**

After failing to get through for many days, I finally made this QSO during the last few hours of the BS7H expedition. Don't give up!

You can't work them if you are not there!

A station: Obviously to make any contacts you need a station. Your **antenna system** is the most effective place to invest your time and money because it impacts both your receiving and transmitting capability. Having large beams on high towers is the way to go, but many hams can't do that for financial or logistical reasons. Do not be discouraged if you are only able to put up a simple antenna. No, you won't smash every pileup that you are in, but you can still work a lot of DX. Low angle radiation is the key to working great distances. A 100 ft. (30M) tower will give you that for your big beam, but a much lower height can also be effective. To start getting significant low angle radiation a horizontal antenna needs to be at least one-half wavelength high. That is only 10 meters (33 ft.) high on the 20M band. No it isn't as good as a taller tower, but it isn't terrible either.

I have now confirmed 340 countries. In 2013 I put up a new 72 ft. (22 M) tower. Before that I had never had a tower over 42 ft. (13 M) in height. All but one of my DXCC countries have been worked with either a two or three element Yagi on a 40 foot tower or with a vertical. Here is a picture of the antennas that I had until mid-2013.

Yes, you can be very successful with a small tower, verticals or wire antennas.

The receiver: Second only to the antenna system is the receiver. All modern rigs are transceivers containing both a transmitter and a receiver. Any of them can be used for DXing. The transmitter section doesn't vary much in quality between units. A 100 watt output power is standard. Some are a little more powerful than that, but not by enough to make much difference. The receiver sections in the various transceivers, however, are **not** all equal. After your antenna system, invest in the transceiver with the best receiver that you can afford. "You can't work them if you can't hear them!" Sensitivity is important. Some radios will pick up weaker signals on the higher bands like 15M better than others. On the low bands like 80M the band noise makes that issue largely moot. A more important factor is the degree of selectivity that is determined by the rig's filters. These filters allow you to block QRN and QRM from other stations. In general, crystal filters are better than DSP (digital signal processing) filters. Some DSP filters leak undesired signals through them. The older technology crystal/mechanical filters are less prone to this. However, a combination of both crystal filters and DSP is a great way to go. Another very important factor in a receiver is dynamic range (DR). DR is a technical quality that defines how well a receiver can reject strong adjacent signals without distorting the one that you are trying to listen to. These problems are most apparent on a crowded band like during a contest. In a contest, a rig with poor DR will sound like a mish mash of signals that can become indistinguishable. A discussion of these technical qualities is beyond the scope of this chapter, but it is a matter to be seriously evaluated.

See this link for more information about dynamic range:
http://www.radio-electronics.com/info/receivers/dynamic_range/dynamic_range.php

Some of the latest transceivers have been designed to excel at DR while maintaining high sensitivity. See the Sherwood Engineering site for lots of good information on specific receiver evaluations here: http://www.sherweng.com/table.html . Some radios get a lot worse with this problem when the noise blanker (NB) is turned on. My old Kenwood TS940SAT is so bad in this regard that one time the NB got accidentally turned on and I thought the receiver had failed. The band was crowded and every signal became so distorted that I couldn't copy any of them.

Here is a little trick that I use to improve my receiver's sensitivity:
Sometimes less is more. When listening for a very weak signal, turn your RF gain DOWN. Sometimes this improves sensitivity by suppressing the AGC (automatic gain control) in your receiver. AGC is designed to reduce the receiver's gain to keep strong signals from blasting your ears out. It still reduces the receiver's gain with moderate strength signals. Turning down the RF gain is counterintuitive, but it works! Let the rig run at its maximum sensitivity by disabling the AGC. Always learn as you go.

And finally **The Transmitter**: Many new operators make the mistake of getting an amplifier instead of getting a good antenna. A better antenna helps your transmitter AND your receiver. High power certainly helps one punch through QRM, but it is of no help for your receiving capability. Being an "alligator" (big mouth, little ears) isn't desirable. High power is great if you can afford an amplifier. If you have done your best with your antenna and receiver it is the next logic step. However, like having a modest antenna, a 100 watt rig will let you work a lot of DX. In fact, having a 100 watt rig **AND** a modest antenna will still allow you to work a lot of DX!

You can improve your chances of getting through a pile up on phone by tailoring you audio's "presence." Having high quality audio with the correct amount of compression will add to your success. The human voice is not equal in its level over all frequencies in the voice's range. Compression will increase its average peak power. Your microphone's frequency response should be tailored for communication. See the chapter on "listening." That which is good in a headset's frequency response is also good in a microphone's frequency response. Here is a good article on the theory of compression. It isn't written about amateur radio, but the idea is still the same: http://www.barryrudolph.com/mix/comp.html

Backup One more thing before we leave the equipment section. Keep in mind the fact that your rig or antenna might fail at a particularly bad time. A while ago I was anxiously awaiting a DXpediton that I needed for an all time new one. My rig died at the worst possible time. ☹ Within a couple of days I was able to scramble and come up with a substitute. Everything worked out, but I relearned the need for back up to any critical system. OK, maybe you don't think that not being able to use your radio is critical. Remember that DX addiction thing? If an all time new one is about to come on then I DO feel it is critical! Anything built by man can fail. That includes your radios! Think twice before giving away or trading in your old rig when you upgrade. After you get your new tower, keep that old G5RV strung up in the tree. Backup is a good thing.

Be Flexible: Make your station as flexible as possible. Be able to operate on as many frequencies and modes as you can.

Flexible modes: SSB might well now be the DXer's primary mode. It wasn't always so, but today there is as much or more DX activity on phone as any other mode. Everybody has phone capability. Happy hunting on phone!

Some old timers claimed that it would be the end of the world when Morse code was dropped as a licensing requirement. The world changed and somehow survived. With that concession, CW is still an **extremely** effective form of communications. While some futuristic digital modes, like those used for moon bounce, can actually copy signals below the noise level, CW beats anything else. Why? Simple. It is of a narrower bandwidth than any other mode. Without getting theoretical on you, just accept the fact that CW has about a 10 db effectiveness advantage over phone. Ten db is the equivalent of increasing your power ten times. One **hundred** watts of CW is as effective as one **thousand** watts of SSB. This really helps if you have a low powered station. At this time many hams do not know the code. That is ok, but they are missing out on a valuable resource. If you are one of them, consider learning CW (at least well enough to do basic exchanges), or use your computer for CW. After all, it is just another digital mode. Some of the world's top CW operators have long used keyboards instead of hand keys and virtually all CW contesters use their computers to send the contest exchanges. Many hams are now using "code readers" in DXing. That is great, but remember that they have their limitations. I constantly hear operators who respond to the DX station in a CW pileup when they were

not the one the DX answered. Undoubtedly, at least some of this is caused by wishful thinking and code readers. Always be sure of call signs.

While it is great to be able to run CW fast, sometimes running slow is the way to go. A few years ago a guy in TT- Chad (an all time new one for me) was working CW on 20M at about six words per minute. Apparently he was building a new skill. The pileup was calling him at high speeds. That was just plain dumb. You should always send at the same speed as the station that you are calling! He couldn't possibly copy those speed demons. I tried to slow down my keyer. It wouldn't go anywhere near that slow. I got up and dug through my closet and found a hand key. I plugged it into the rig in place of my keyer and called him at six wpm. I got him! My competitors didn't learn and kept calling him at 35 wpm without success. I wonder why? After that I keep a straight key nearby at all times. Like I said earlier, learn as you go.

I spent lots of time in the military running RTTY. I got sick of it and to this day I really don't like the mode. It is, however, a resource to pick up DX stations. By obtaining that capability I have worked some all time new ones that I would have missed otherwise. **Digital modes other than RTTY have really caught on.** There are a bewildering number of them that use your computer's sound card. The new digital technologies are evolving rapidly. Their various attributes are beyond the scope of this chapter, but they should not be overlooked. They can be very effective even with very low power.

Flexible frequencies: All of the HF bands are good for DXing. I have picked up all time new ones on 75/80M and all of the higher bands. Having the capability to take advantage of propagation on every band is a big advantage. When 10M is really open, the world is at your feet. Even with a very small station. Try to have antennas that will function on all of the HF bands. Most DX operation occurs in the bottom end of the bands. If you have a license that limits your frequencies of operation (less than an Extra Class in the USA) you are at a definite disadvantage.

A note for General Class operators in the USA: Because of your frequency limitations you will have an uphill fight in DXing. Many DX stations operate higher in the bands, but many do not. Let's face it. Most DX stations really don't care about working as many W's as they can. They have already worked thousands of them. Some DXpeditions are nice guys and try to work everybody, giving special attention to American General Class operators. This is especially true if there are American operators on the expedition team. Many others just don't care about the quirks of the American licensing system. It is really worth the effort to upgrade if you are serious about DXing.

CHAPTER - 5

Split Operation & How to Be Heard in a Pileup.

What is working split and why would I want to do it?
Working split is simply transmitting and receiving on two different frequencies. Many DX contacts are made by calling the DX station on his own frequency and listening for his reply. Transmitting and receiving on the same frequency is called working "simplex." That works fine unless a large number of stations start calling the DX station. That will almost certainly happen with a truly rare DX station. Everybody wants to work him. Once a bunch of stations get calling it becomes impossible to hear him respond to anyone because the callers are transmitting on top of him. And they probably are a lot stronger than he is!

What is the solution? When this situation begins, a good DX operator will announce that he is going to "work split" and that he will listen on another frequency and not on his own. That is usually done simply by saying something like "listening up 5" or on CW "up 5." That means that you should call him **not** on his own frequency, but 5 khz above him.

Before we go further, here is a very short history lesson. Before the late 1960's, and for a lot longer for many hams, a station consisted of a separate transmitter and receiver. The HF transceiver didn't exist until then. With separate units it was very easy to transmit and receive on two different frequencies. In fact the issue was to get your transmitter set to the same frequency that you were receiving on! Working split, especially on phone was common. At first when the transceiver came into existence the split capability was lost. The transmitter and receiver tracked each other. That was very convenient for normal work, but a real step backwards for some DXing. To regain the loss, it was necessary to purchase an outboard VFO that would give the rig two VFOs that would operate independently and once again allow split capability. Some transceivers simply couldn't do it.

Luckily for us all modern transceivers have the capability to work split within a band. Most rigs use two digital VFOs called "A" and "B." One VFO is set to the DX station's frequency and the other one to your desired transmit frequency. Simple.

This is how to set up a rig to work split that has "A" and "B" VFOs.

It will make things easier if you start by pushing the "A=B" button to set the second VFO to the DX station's frequency. That will get you close to where you want to transmit without a lot of knob twisting.

Then press the "SPLIT" button and follow the pictures.


VFO "A" ON DX FREQ
F.LOCK
VFO-A
VFO-B
MEMO
RIT
XIT
kHz
TRANSCEIVER TS-940S
ON AIR
AT TUNE
SPLIT
NOTCH
SET FOR "SPLIT"
AGC
FAST
SLOW
METER
ALC
POWER
SWR
COMP
IC
VC
RECEIVE MODE
ON
OFF
MIC
PWR
MODE
FUNCTION
LSB
USB
CW
AM
FM
SELECT VFO "A"
VFO USED TO
SET "A" FREQ
T-F SET
A/B
SPLIT
A=B


DESIRED TX
FREQ USING
VFO "B"
F.LOCK
VFO-A
VFO-B
MEMO
RIT
XIT
kHz
ON THE AIR!!
ON AIR
AT TUNE
SPLIT
NOTCH
SET FOR "SPLIT"
METER
POWER
SWR
VC
TRANSMIT MODE
MODE
FUNCTION
LSB
USB
CW
AM
MIC
PWR
SELECT VFO "B"
VFO USED TO
SET "B" FREQUENCY
T-F SET
A/B
SPLIT
A=B

The most desirable set up, however, is to have what is called a “sub-receiver.” That gives you the capability to transmit on one frequency, to receive on that same frequency, and at the same time to receive on another frequency. We will talk more about a sub receiver’s advantages in a minute.

This is how to set up a rig to work split that has a sub receiver.

Again start by pushing the “A=B” button to preset the second VFO.

One more important point before we go on. Having the DX station listening on one frequency and transmitting on another allows you to hear him answer calls without interference from the callers. The same is not necessarily true at the DX end. Again, many stations may be calling on the same frequency clobbering each other. In that case the DX station should spread them out frequency wise by now saying “listening up 5 to 10.” You pick a spot in that range to call and hopefully the DX station can now separate out the callers. Elementary so far. Now this is where skill gets involved.

How do I make myself heard in a pileup?

The simple answer is to transmit in the clear from your competitors! Detecting patterns in how the DX operator responds to callers is invaluable. More on that later. Of course you have to make your call sign understandable to the DX station. On simplex it is difficult to ever be in the clear once multiple stations start calling. If you listen carefully, however, you may be able to time your calls between the other callers. That may let you through. Use clear phonetics on phone and a clear "fist" on CW. Be brief. Give your call once and then listen. If the DX station does not answer anyone try again. The loudest station may well win out on simplex, but not always. The guy in the clear when he sends his call will be heard the best. Unless the pileup grows, you will get your turn as the competition thins out. On simplex, gentlemen may give each other a momentary clear shot and then send their call expecting the same in return. That's nice, but it usually doesn't happen. ☹ Some inexperienced DX operators answer the last person who called. That station was probably in the clear, but this sets a bad precedent. Once a DX station starts doing this the callers go longer and longer trying to be the last one to transmit. The result is usually someone transmitting over the DX station. Sometimes they don't listen for two or three quick QSOs that go on underneath them. ☹ After listening for a while, and detecting a pattern with the DX operator's behavior, you may have no choice except to try and be the last one calling. This really is poor procedure, but it might work. Don't be ridiculous about it. Give the poor guy a chance to answer. A competent DX operator won't let this happen and will go split. Help the DX station work the pileup efficiently. Don't break up his rhythm. If he comes back with a partial call, like "The Whiskey 7, go ahead" or on CW "W7?" Don't call again if you are not a W7! If he comes back with your complete call sign correctly, do not repeat it. Just send your report and let him move on. You will only be wasting his time and adding to the confusion by repeating your call sign again. The DX station is in control of the pileup. If he asks for "EU only" don't call if you are not in Europe. The same goes for "NA," "JA" or whatever. He is probably taking advantage of a very short opening to that area. Standby and wait your turn.

Now it is time to talk about more advanced skills. Like I said above - **listening to the DX station and detecting patterns is invaluable.** Once a pileup goes into split mode skill becomes more important than shear signal strength. Again, you goal is to transmit in the clear. If the split has gone beyond a single frequency, like the "5 to 10 up" scenario, transmitting where the DX is actually listening becomes essential. Just blaring away on a set frequency might work, but it might not. The idea is to find where the DX is listening or to anticipate where he will listen next. With most transceivers, to do this you must switch your radio's VFOs to use the receiver to try and find the station that just connected with the DX. With a normal rig this requires jumping back and forth between receiving on VFO A and VFO B to hear the DX station and also search for the guy he is in contact with. This can be tricky and if you are not careful you may end up transmitting on the DX station's transmit frequency by mistake. We have all done it, but you look like a real lid. In many cases the DX will hear you call on the same frequency that the last successful station used. Give it a try. You won't be the only one who figures this out. Other experienced operators will be doing the same thing. Others will be trying to find the station in contact with the DX and then calling on the same frequency as the successful one too. If a pileup gets very large the spread may go much wider, especially on phone. In that case figuring out where to transmit becomes paramount. Calling on the last station's frequency may not work. Keep listening. See if

another station on that frequency was successful or if the DX gave his VFO a spin to again spread things out. If you hear another success story on the same frequency, try again. If you don't, search again for the station that made it through. Try to detect a pattern. You may well see that each successive contact goes up a little in the band. In that case set yourself up a little above the last guy that was successful and try there. Keep working on finding a pattern. Some guys will list the frequency that worked for them on the DX cluster. That can be useful, but everyone in the world sees it and tries that frequency. If you cannot determine a pattern or hear the other stations that are calling (which sometimes happens on the higher bands) then pick a frequency and call. If no luck you can either move a little and try again or just keep on with your original frequency. In this situation getting through becomes partly blind luck.

As I mentioned earlier, some transceivers have a built in advantage in working split. They have a sub receiver that allows you to listen to the DX station on his frequency and search for the callers at the same time on another frequency. This can be very valuable, but it is not absolutely necessary. Radios like the Yaesu FT1000/FT2000/FT5000 series have true sub receivers. The Elecraft K3 has an option to add a sub receiver. The top of the line Icoms like the IC7800 also have a sub. Many other Icom radios have what Icom calls "dual watch." It isn't exactly a sub receiver, but it does allow you to listen to two frequencies at once. A transceiver with a true sub receiver normally sends the audio from each of its receivers to your headphones separately in "stereo." Dual watch puts the two signals together into both ears. Not quite as good, but still useful. You are using headphones by now aren't you?

The key to pileup busting is more than shear power. Many times it requires skill. Try out the ideas that I gave you here. Your success rate will improve.

CHAPTER – 6

DX Propagation Basics: Propagation is a real science and cannot possibly be covered completely in a short chapter. I do, however, hope to give the new DXer some basics in understanding how it all works. Having knowledge of propagation will certainly improve your odds of making great DX contacts.

First a little very basic theory: Above what we normally think of as the Earth's atmosphere there are four layers of ionosphere. If you will think back to your high school chemistry an ion is an atom that is missing an electron or the free electron itself. This occurs in the ionosphere by the Sun's radiation beating down on those upper layers and jolting individual atoms to give up a free electron. These ions make a very conductive layer wherever this occurs.

The ionosphere has three basic layers designated by the letters "D", "E" and "F". The "F" layer is broken down into two sub layers called the "F1" and "F2" layers. The D layer is closest to the Earth at a lower altitude (70 km) than the E layer (120 km), which is lower than the F1 (200 km) and finally the F2 layer (300-400 km). Radio signals may be either reflected or absorbed by the ionosphere. The level of ionization is determined by many factors all related to the Sun. Radio waves of different wavelengths are impacted differently by the ionosphere. Shorter wavelengths (higher frequencies) penetrate deeper into the ionosphere than longer wavelengths (lower frequencies). This makes for radically different propagation depending on a radio wave's frequency. During the daylight hours the D layer forms at a relatively low altitude. It mostly acts as an RF sponge. The longer wavelengths are soaked up by it during the day. The D layer disappears at night. That is why standard AM radio has very limited range during the day, but may go great distances at night by reflecting off of one of the higher layers. Conversely, UHF and VHF frequencies normally penetrate all of the layers and shoot out into space, never to return to Earth. During daylight the higher HF ham bands can penetrate the D layer and then are reflected by the F layer. At night the lower bands are reflected by the F layer, but the F layer may not be ionized densely enough to reflect the higher bands. Once again those signals blast out into space. When the Sun is directly overhead sometimes there is enough energy to ionize the "E" layer. This is especially true at the summer solstice when the Sun's rays are coming in at a higher angle than in the winter months. At that time, the E layer can be very densely ionized. Sometimes this ionization can be so dense that it will even reflect VHF signals.

The bottom line of all this is that the lower bands are open at night and the higher bands during daylight. The 20 M band is in the middle and can be open anytime. Actually, all of the higher bands can be open at night depending on the level of the Sun's activity. Radio waves propagate around the world by bouncing between the ionosphere and the Earth. Multiple hops occur in long distance communications. Sea water is much more reflective than dirt. Therefore paths that transverse the oceans are more favorable than land paths. Each hop causes signal strength to decrease. The aurora is always present at the poles. The intensity varies widely based on solar activity. It often blocks signals from passing through. That is why polar paths are much more difficult to work than non-polar paths.

That's enough of the theory. Now the practical stuff! Everyone knows that the shortest distance between two points is a straight line. That is the path that radio signals normally follow. That route is called the "short path." If you grew up looking at the maps in school you probably learned a very distorted view of the world. Those maps are usually a Mercator projection which distorts both the northern and southern polar regions.

The world is not like this!

Those maps are very misleading. They give you the picture that the direction to Europe from the USA is nearly due east. Then India is just further east and that South Africa is south east. **That just isn't true!**

No flat map can represent the round Earth accurately in all respects. That can only be done with a round globe.

If you put a string between two distant points on a globe you get a true bearing that is called a "great circle" route. The great circle is the real direction to distant points. Try it yourself. It is interesting.

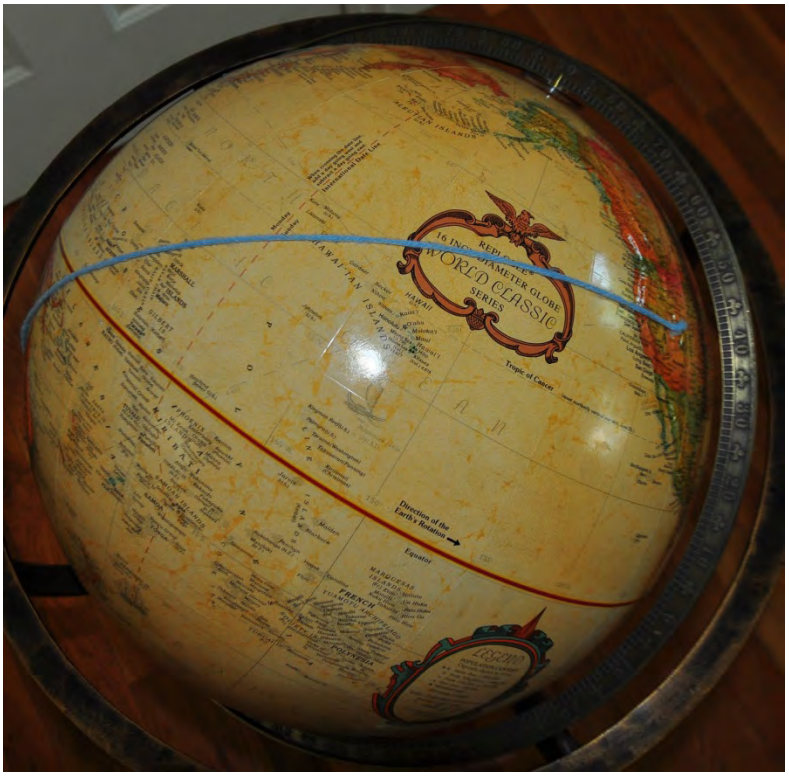
W7 to Europe

W7 to Japan


REPLOGLE®
16 INCH DIAMETER GLOBE
WORLD CLASSIC
SERIES
ALEUTIAN ISLANDS
HAWAII
HAWAIIAN ISLANDS
YUKON
BRITISH COLUMBIA
ALASKA
Tropic of Cancer

W7 to South Africa in two parts! It is a long way!

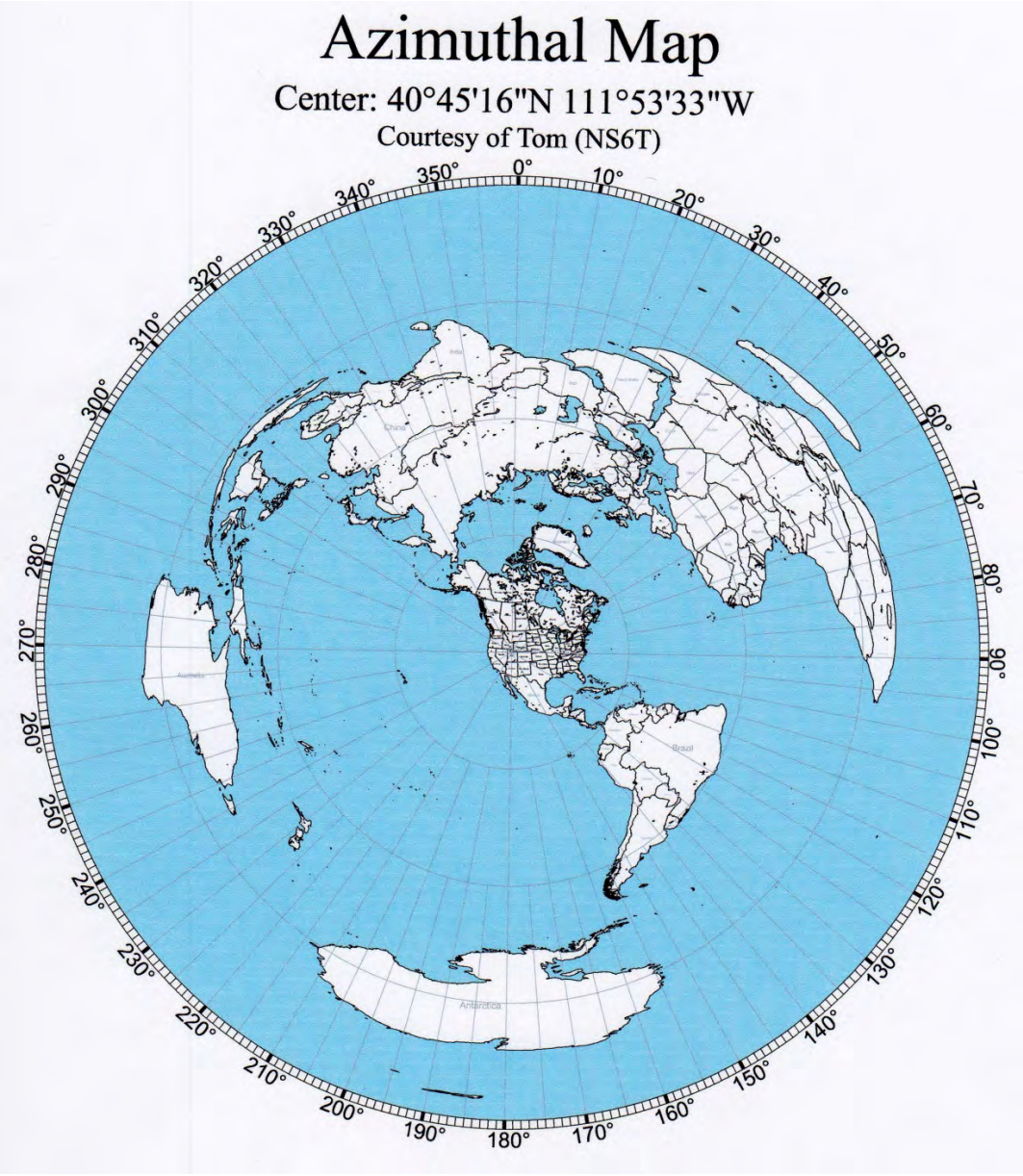
W7 to Western Australia - again in two parts!

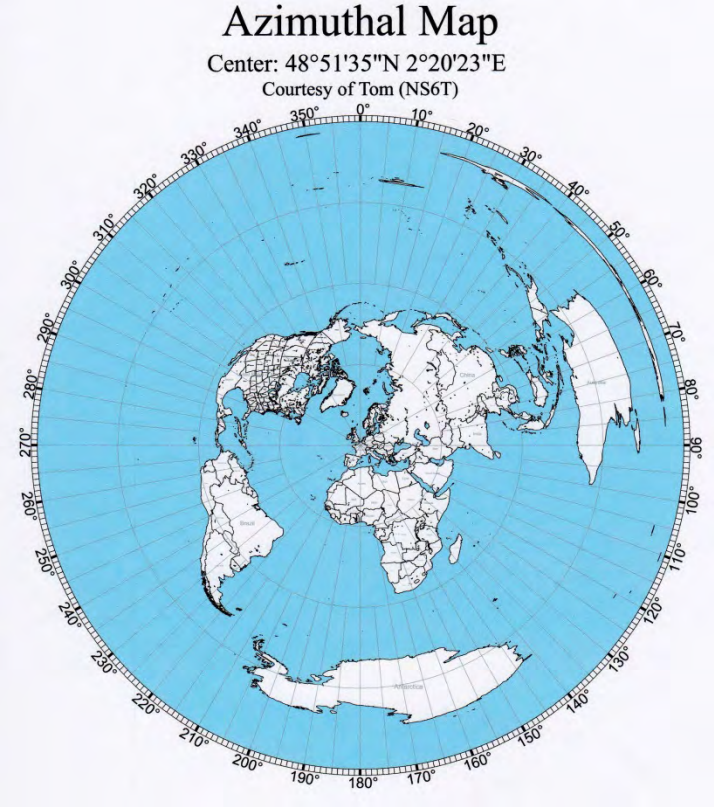


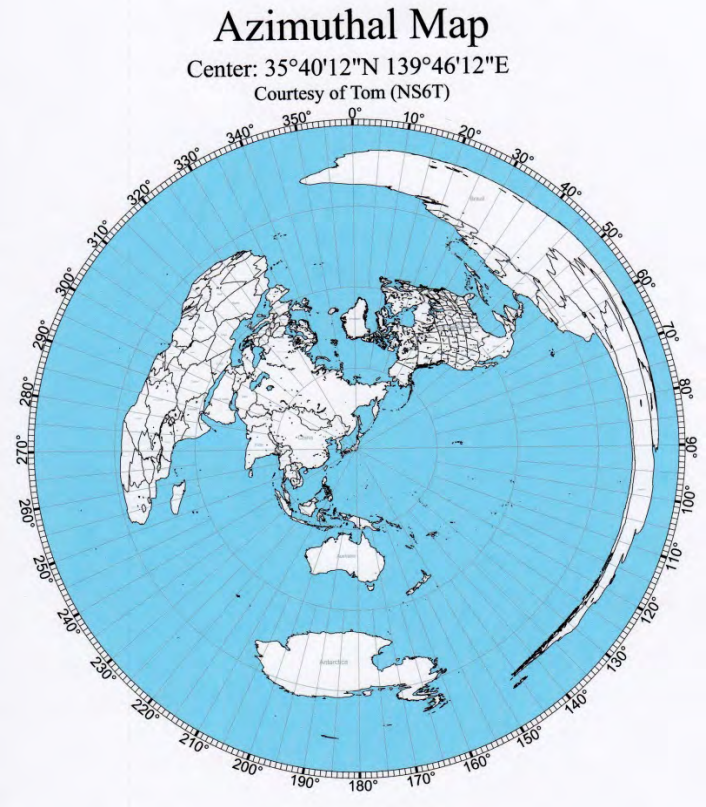
Your beam antenna won't work well unless it is pointed in the right direction!

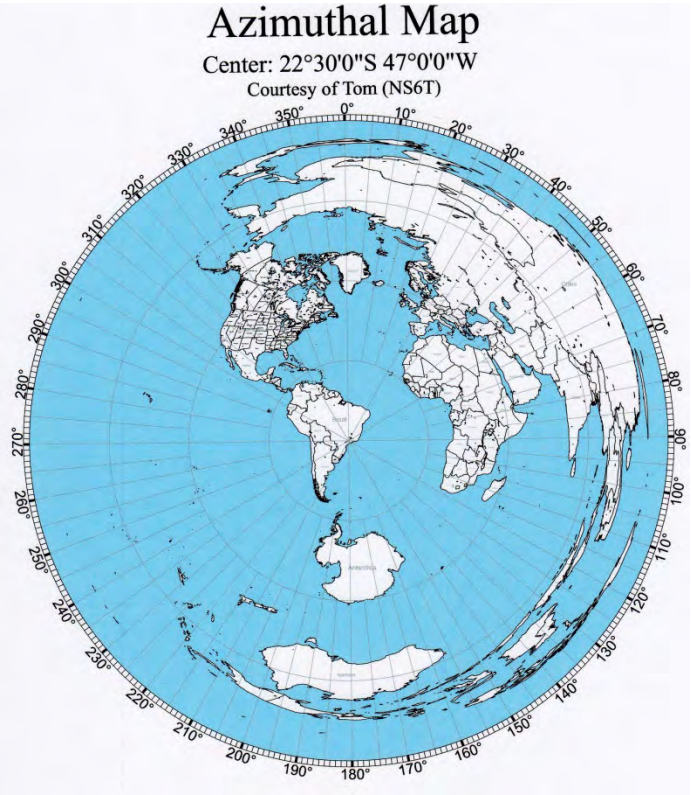
Note the true direction from my QTH to the DX locations as shown in the photos and on the azimuth map below. They are nothing like the Mercator map shows! You can see that the real azimuth to Europe is north-north-east from me, and not due east. England is at 38 degrees, over the northern polar region. South Africa is almost due east at 97 degrees, far from the south east bearing that the Mercator map suggests. Western Australia is nearly due west. India is nearly due north of me at 348 degrees, directly over the North Pole.

Below is an azimuth map centered on my location in Utah, followed by sample maps centered on Europe, Japan and Brazil. They were created courtesy of NS6T at http://ns6t.net/azimuth/azimuth.html and are used with Tom's kind permission.




Azimuthal Map
Center: 48°51'35"N 2°20'23"E
Courtesy of Tom (NS6T)


Azimuthal Map
Center: 35°40'12"N 139°46'12"E
Courtesy of Tom (NS6T)



There is another program available to create an azimuth map from VE6YP as freeware at: http://www.qsl.net/ve6yp/ . Download the Azimuth3.zip file from this site and install it. It is also a very nice free program.

The ARRL sells a large and colorful azimuth wall map that I own. See www.arrl.org . There are many other sources of azimuth maps available on the web.

If you prefer numerical data, here is a free source to create a personalized beam heading chart for your QTH: http://www.njdxa.org/dx-tools/beam-headings.php .

As I mentioned earlier, radio waves usually follow the most direct path to distant locations. Note that I said usually. It is very common for signals from the most distant locations to go the other way around the Earth. This happens on different bands because of daylight or night paths. In the early morning the Earth is dark to the west. The 40 M band works best at night. Therefore by sending your signal into the darkness it just might propagate around the entire dark half of the Earth and come out at the sunset end of the dark path – on the other side of the world! During the winter it is common for me to work Europe via this "long path" on 40 M. The "long path" is exactly 180 degrees from the azimuth shown on our map. Don't count yourself out if you don't have a beam antenna. Even without a directional antenna something good might come in via the long path. In the mornings look for propagation over the dark side of the Earth to your west.

The Indian Ocean is located at the most distant point on the planet from W7 (antipode). The outermost circle on my azimuth map is actually a single point in the Indian Ocean. That point is FT5Z – Amsterdam Island. **This place is as far away as it gets from me and is virtually the same distance in any direction!**

What I'm getting at is that signals from the antipode may arrive at your location from any direction!

Most of the time a signal will come either via the short path or the 180 degree opposite long path. Once in a while this isn't true. Odd propagation via a "crooked path" sometimes occurs. By this I mean that you find that your beam peaks in a direction that is neither the short nor the long path. It does happen. Sometimes signals get bent around the aurora zone at the poles. Other times a highly ionized spot occurs directly under the Sun that has nothing to do with either regular path. In these cases it may be possible to do a "bank shot" (just like in billiards) to get to a remote location when no normal propagation exists. An excellent example of this sometimes happens for me over the Atlantic Ocean. I can't hear Europe at north-north-east, but I can at south east! This usually happens on the higher bands like 15M.

Astronomers call the boundary between day and night the "terminator." In radio we call that zone the **"grey line."** There is a big propagation enhancement along the grey line at sunrise and sunset. During that time of twilight something wonderful happens! Far away signals can increase dramatically in strength! Watch out for this as the grey line passes over you. Good things will happen. That knowledge can be especially useful in working distant locations along that boundary. However, those openings may be very brief, like three minutes! I have made some of my very best contacts along that line into the Indian Ocean using this mode. By plotting where the grey line occurs at other places on the Earth, you can also frequently predict signal peaks from DX stations. This peak may still occur when

their grey line does not run over your location. You can use this tool to track the Sun's location over the Earth and the grey line: http://www.timeanddate.com/worldclock/sunearth.html . **Always keep an eye open for good things to happen over the grey line.**

My point to all of this is to make you aware that signal propagation is kind of fickle. Weird things also happen through "ducting" and other odd phenomena that are too complicated for this short chapter. Just remember to use your azimuth map to aim your beam and don't forget the long path and the grey line. The antipode is a wild card and so is crooked path propagation!

Propagation prediction is very difficult to do. There are, however, some basic indicators that help. Scientists are always tracking what is happening with the Sun. Without getting complicated there are three very useful parameters to use to predict band conditions. They are solar flux and the "A" and "K" indexes. In general, the higher the solar flux the better. The lower the A and K indexes the better. The indexes indicate activity in the Earth's geomagnetic field. When the geomagnetic field gets agitated by the Sun, propagation degrades. Solar storms really mess up HF propagation and are indicated by high indexes.

The ARRL has a good article written for hams on this subject at:
http://www.arrl.org/files/file/Technology/tis/info/pdf/0209038.pdf

See this site for lots of information on this science:
http://dx.qsl.net/propagation/ and if you want even more information check out
http://www.swpc.noaa.gov/ .

Beacons:

The International Amateur Radio Union represents amateur radio's interests world-wide. Each member country has a representative organization within the IARU. The IARU has established a "beacon network" to research HF propagation. The network consists of automated stations in several locations around the world that transmit on a closely synchronized schedule. The beacons operate on frequencies of: 14.100, 18.110, 21.150, 24.930 and 28.200 Mhz. By monitoring these frequencies it is easy to detect band openings to the various beacon locations.
See: http://www.ncdxf.org/pages/beacons.html for information on the beacon project.

Propagation prediction programs:

The U. S. government has spent enormous amounts of time and money in creating a very accurate modeling program for predicting HF propagation. This software (VOACAP) is freeware from the U. S. government, but it is cumbersome to use without some sort of an interface program. All of the propagation prediction programs use the U.S. government calculation engine so they all come up with pretty much the same results. The differences are in how the data is presented.

I use the DX Atlas suite of programs written by VE3NEA - (the same guy who provides CW Skimmer). See: http://www.dxatlas.com/ . This suite consists of four separate programs that work together and among its features it includes very nice propagation software.

Many of my friends are using the DX Labs software suite. It includes a propagation tool named ViewProp. See http://www.dxlabsuite.com/ .

Others use the free W6EL Prop tool available at: http://www.qsl.net/w6elprop/ .

There is also a nice free online propagation prediction service that uses Google Maps to specify the exact locations for the transmitter and receiver sites. It is called VOACap Online. See: http://www.voacap.com/prediction.html . Once the path end points are specified, the online display then shows a color graph of times and frequencies with probabilities of success for communications between the two locations. Very nice.

Any of these propagation prediction programs will give you **very** useful data. **I highly recommend that every DXer obtain access to some form of accurate propagation prediction data.**

Once you have a good understanding of propagation it will certainly improve your odds of working more DX!

CHAPTER - 7

Phonetics: Using phonetics is the best way to make your call sign understood on phone. Everybody knows that. The aviation world and NATO use the same standardized set of words: Alpha, Bravo, Charlie, Delta,…. etc. This phonetic alphabet was designed to be used internationally. It is not, however, the only one that was ever created. The US military used to use a different one: Able, Baker, Charlie, Dog…etc. Some police forces use: Adam, Boy, Charlie, David…, etc. There are also ones using geographic names: Amsterdam, Boston, Casablanca, Denmark,…etc. What should you use? In general the NATO-aviation- ICAO phonetic alphabet is the best.

From http://en.wikipedia.org/wiki/NATO_phonetic_alphabet

CHARACTER	*MORSE CODE*	*TELEPHONY*	*PHONIC (PRONUNCIATION)*
A	• —	Alfa	(AL-FAH)
B	— • • •	Bravo	(BRAH-VOH)
C	— • — •	Charlie	(CHAR-LEE) or (SHAR-LEE)
D	— • •	Delta	(DELL-TAH)
E	•	Echo	(ECK-OH)
F	• • — •	Foxtrot	(FOKS-TROT)
G	— — •	Golf	(GOLF)
H	• • • •	Hotel	(HOH-TEL)
I	• •	India	(IN-DEE-AH)
J	• — — —	Juliett	(JEW-LEE-ETT)
K	— • —	Kilo	(KEY-LOH)
L	• — • •	Lima	(LEE-MAH)
M	— —	Mike	(MIKE)
N	— •	November	(NO-VEM-BER)
O	— — —	Oscar	(OSS-CAH)
P	• — — •	Papa	(PAH-PAH)
Q	— — • —	Quebec	(KEH-BECK)
R	• — •	Romeo	(ROW-ME-OH)
S	• • •	Sierra	(SEE-AIR-RAH)
T	—	Tango	(TANG-GO)
U	• • —	Uniform	(YOU-NEE-FORM) or (OO-NEE-FORM)
V	• • • —	Victor	(VIK-TAH)
W	• — —	Whiskey	(WISS-KEY)
X	— • • —	Xray	(ECKS-RAY)
Y	— • — —	Yankee	(YANG-KEY)
Z	— — • •	Zulu	(ZOO-LOO)
1	• — — — —	One	(WUN)
2	• • — — —	Two	(TOO)
3	• • • — —	Three	(TREE)
4	• • • • —	Four	(FOW-ER)
5	• • • • •	Five	(FIFE)
6	— • • • •	Six	(SIX)
7	— — • • •	Seven	(SEV-EN)
8	— — — • •	Eight	(AIT)
9	— — — — •	Nine	(NIN-ER)
0	— — — — —	Zero	(ZEE-RO)

From personal experience I don't like to use "Sierra." I think that it was a poor choice for an international phonetic. Sierra just does not make a letter "S" sound. My old call was K7SAI. Americans and Spanish language speakers understood Sierra for "S". Asian operators in particular took it like it sounds…. as the letter "C". What to do? I tried several options and finally settled on "sugar." Commonly used, but not standard anywhere. Later as K7UA, I used Kilowatt Seven Uniform Alpha. Back when there were no calls starting with KW (like KW7A) it was fine. Now sometimes it gets mistaken for KW and not K. I have had contest log exception items sent to me showing a mismatch of QSO data because I was logged as KW7UA. ☹ I quit using it. Some words just work better for international contacts than the standard phonetic alphabet. For example: Everybody knows the USA is the United States of America. United is now a very common phonetic for U. The same with America for A. "Radio" is more common for R than Romeo. It is a great one for radio amateurs.

So, what's my point? Use phonetics that work! If the DX station is struggling with your call don't keep beating them with the same phonetics. Shift to something else. Shift from Kilo Seven Uniform Alpha, to Kentucky Seven United America. Also, help them out by giving it more than once. You get the point. Some cities and other geographical locations work well. Yokohama, Honolulu, London and Norway come to mind. Stay flexible.

There isn't anything like phonetics for numbers. In general there isn't as much confusion with them. A wise DXer still has a couple of tricks in his arsenal. If the DX station is struggling with the number in your call, count up to it. This is: Kilo Seven, -----one, two, three, four, five, six, seven ---- Uniform Alpha.

Knowing how to pronounce your number in the DX station's native language can also be useful. For me my number "7" is "Siete" in Spanish, "Sette" in Italian, "Sieben" in German, etc. If you have the skill to speak to a DX station in their native language that is always welcomed. All of us would be well advised to constantly improve our international language skills.

CHAPTER - 8

The Art of QSLing: QSL cards have been a part of ham radio from the very beginning. It has been a tradition to post them above your station to catch the eye of visitors and to remind the operator of his accomplishments. If you are interested in DXCC or many other awards you are required to have proof that the contacts necessary for the award took place. In this chapter we are going to talk about the traditional ways to get those cards and then bring the subject into the 21st century with electronic QSLing. The ARRL has always had very stringent rules on the validation of QSLs for the DXCC award. These high standards have preserved the integrity of the award.

Paper QSL cards

Almost all stations, DX and otherwise, will issue paper QSL cards. The trick is to get the DX station to answer your card. There are a variety of ways to increase your odds of getting a paper QSL card.

The surest route is to send your card directly to the DX station. The cost of foreign postage is high. The price to send a letter from the USA to foreign destinations is well over $1.00. It is even higher from many countries. Most DX stations will reply to you if you supply a self addressed envelope and pay for the return postage.

All nations who receive mail are members of the Universal Postal Union (UPU). In the past there was a document called an international reply coupon (IRC) that could be purchased at the local post office and sent to the DX station as payment for the return postage. In theory they still exist, but the USA and many other countries no longer sell them. Cashing them in has also become a problem. This has aggravated an already difficult situation. The whole IRC thing is no longer viable in many countries. As a substitute many DX stations now ask for "green stamps" (GS). A green stamp is a US dollar. It takes $2 to $3 to cover a letter from most countries now. Most DX stations direct addresses are available at www.qrz.com . Frequently the DX station tells you how they want to receive QSLs at that site. It is incredibly useful.

Now for a few things that I have learned about sending letters to foreign countries and getting a return back. First, mail theft is rampant in many less developed countries. The chance of having your letter looted is a certainty in some of them. To reduce the chance of that happening, do not do anything that gives the mail thieves a clue that your letter has anything valuable in it. Start by NEVER using station call letters in the addresses. Don't do anything else to the envelope that makes it stand out. Mail thieves may well handle the letter and see if they can feel anything inside other than the usual papers. Something thick inside or being able to see through the envelope and detect your dollar bills is asking for trouble. Always use envelopes that do not let a person see through the paper! Be sure that the envelope is well sealed. Taping the envelope flap shut might help keep the crooks out in problem areas. Sometimes the station will explain exactly how to improve the odds of non-pilfered delivery on their QRZ page. For a guarantee of delivery to real trouble spots you may have to resort to "registered mail." This process requires a written audit trail of every stop that the mail makes. It is expensive, but crooks probably don't want to be caught by disclosing who lost or tampered with the letter.

I use foreign airmail envelopes from Bill Plum DX Supplies (plumdx@msn.com). Bill sells sets of envelopes for outgoing and returning airmail that nest neatly inside of each other. The price is reasonable. By using those I don't give a clue to mail thieves that there is anything special inside. The inner envelope is not noticeable and it is also light in weight. Many countries use envelopes that are smaller and lighter than we use in the USA. They may charge much more for a little extra weight. I used to use standard #10 US business envelopes for the returns. I kept getting them back cut down in size and taped together or folded over to decrease their dimensions. I wised up and quit using them. Bill also sells foreign postage stamps that may make the return process easier for the DX station. I have not used that service, but I really do like Bill's nested airmail envelopes.

Some DX stations use a QSL manager. This is simply another ham who has volunteered to take over the DX stations QSLing chores. QSL managers are very reliable and you will almost certainly get an answer from them if you are in the DX station's log. The best thing that can happen to you is that the DX station uses a QSL manager in your own country! Cheap postage and sure delivery!

The Daily DX offers a link to help find various QSL routes at: http://www.dailydx.com/routes.html . There are several good resource links on this site. The various DX bulletins also frequently list QSL routes in their publications. We will be talking about DX bulletins in a later chapter.

Online QSL Request – OQRS

In the past few years a new direct QSL idea has come into existence called "online QSL request." This is offered by Club Log. See www.clublog.org . Club Log is a wonderful service that allows you to upload your log data and then analyze it. They have a massive data base of world-wide logs. I use it to track my award status. Once it even discovered a DXCC country that I had confirmed, but hadn't noticed in my station records. I was delighted! Many DXpeditions are now uploading their log, some even in real time, to Club Log. Then DXers can check to see if they have been logged correctly by the expedition. It can be a relief and prevent duplicate QSOs when you can see that you are in fact "in the log." Expeditions may use the OQRS service for their QSL requests. It works great. You just access the OQRS, enter your call sign, and it shows a list of your contacts with the expedition. Then you can request your QSL card online without sending anything through the mail. There is a fee set by the DX station for their card, but it is less than dealing with postage and "green stamps." You can pay with PayPal or some other way. It is all very slick and cost effective. **Donations are accepted by Club Log and I recommend supporting them.**

Some DX stations have implemented their own version of OQRS. Those can usually be accessed from www.qrz.com .

All of this is kind of discouraging because of the expense involved. Luckily there are some alternatives that are a lot less expensive.

The first to consider is the **QSL bureau system**. Many countries offer a slow speed, but cheap QSL delivery system called the QSL Bureau. It is usually referred to as the "buro." I'm going to explain how it works in my area. Many national ham organizations have something similar. Wherever you are, there is probably some way to use your "buro". Check it out on the web.

In the USA the ARRL is the sponsor of this system. In the W7 area the ARRL affiliated club "The Willamette Valley DX Club" http://www.wvdxc.org/dotnetnuke/ handles incoming QSL chores. They handle all of the cards for the US seventh call area. For any Americans with a "7" in their call they are the contact. Other areas have other sponsoring clubs. These guys are practically saints providing this valuable service free of charge. If you go to their web site and click on the "QSL bureau" tab they tell you everything that you need to know to sign up.

In a nutshell, this is how the QSL bureau system works. The national organizations exchange QSL cards in bulk shipments that cuts way down on postage. It is slow, but cheap. In the W7 call area, I opened an account at WVDXC and bought postage credits and envelopes to ship my cards in. Free of charge they receive, sort, and then forward the cards directly to me. Active stations will get lots of cards from all over the world. Since Utah is one of the rarer states, many foreign hams want my card for their Worked All States (WAS) award. I get hundreds of bureau cards each year. ARRL membership is not required for this incoming service and the WVDXC has done the labor since the 1960s. This service of WVDXC is only for INCOMING cards. To send your replies via the bureau the ARRL offers an OUTGOING QSL service. See http://www.arrl.org/outgoing-qsl-service . The ARRL accepts cards in bulk and forwards them on to all of the other countries' QSL bureaus. Some countries do not have a QSL bureau so this service won't work for those cards. ARRL membership **is required** for the outgoing service, but the rates are cheap compared to mailing the cards yourself. In my humble opinion this service alone is worth the price of ARRL membership for a DXer.

Electronic QSLs

Two modern computerized systems have come into existence to cut out all of the expense and delays of sending paper QSLs. The ARRL invested a lot of time and money to develop their Logbook of the World (LoTW) electronic QSL system. See http://www.arrl.org/logbook-of-the-world . This system maintains the ARRL's high integrity for DXCC verifications. It may also be used for other ARRL awards like WAS and the Triple Play award. The League's site tells you all about this service, but here is the basic idea. A ham must register with them through a rigorous process to prove that they are the real holder of the call sign. Once you have proven who you are, an electronic digital certificate is issued to you. You can then use that certificate to securely sign and upload your log data to the LoTW system. This can be done with manual entries, but it is much more convenient to use a computer logging program. I use Logic 9. Once the certificate was installed on my computer it only takes a couple of mouse clicks in Logic to upload the file. The LoTW system then matches your log entries against the uploaded data from other stations and if it finds a reasonable match (band, mode, and time within one-half hour) you get credit for a confirmed QSL. This is all shown in your LoTW records. I also use Logic to download those new confirmations into my logging program, but that isn't necessary to use the system. The real records are

maintained on the LoTW system. When you get around to claiming credit for an award, you pay a fee for each credit. It is very reasonable compared to the expense of postage for paper QSLs.

There is another electronic QSL system called eQSL. See www.eqsl.cc . This system works differently than the LoTW system. A user registers with eQSL and then you are allowed to send electronic QSLs that look like an actual paper QSL to the stations that you work. (Again I use my logging program to very easily upload and download the eQSL data.) Call signs can be registered without any proof of who actually holds the license, but these are not taken very seriously. One can obtain "authenticity guaranteed" (AG) status by submitting a copy of your license to eQSL for verification. eQSL claims that AG confirmations are more safe than paper QSLs because there is so little chance of forgery. They are probably right. The eQSL system differs from LoTW in that it does not make any attempt to match QSO data with the other station. A deal was in the works with the ARRL to accept eQSLs for DXCC credit, but the negotiations broke down. The League wanted security used that was unreasonable to the people who run eQSL. It is now very unlikely that the ARRL will ever accept eQSLs. CQ Magazine, however, DOES accept eQSLs for their awards. The eQSL service is free, but they accept donations and will upgrade your status if you contribute. To utilize CQ's award system one must be a "bronze" member. That only requires a small donation. "Silver" membership costs $30 per year and allows fancier QSL designs. Besides CQ other groups including eQSL itself offer awards qualified by eQSL confirmations. Only AG user's confirmations count for the awards. Everyone that uses eQSL should help them out by becoming at least a bronze member.

CHAPTER - 9

DX Intelligence: I'm not talking about your IQ, but in the context of gathering information. The more that you know about what is going on in the DX world, the more successful you will be.

Back in the 1970's I ran to the mail box every week to get my few badly copied pages of "The West Coast DX Bulletin." The art has advanced since then. Now there are a number of DX bulletins and services that you can subscribe to.

For knowing what is going on in the DX world every day subscribe to "The Daily DX," an Internet publication by Bernie McClenny W3UR. See: http://www.dailydx.com/ . Bernie also publishes another similar publication "The Weekly DX." For a fee The Daily DX subscription comes every week day via email.

Another paid subscription bulletin is by Carl Smith N4AA called "QRZ DX." It is sent weekly either via email or postal mail. See: http://www.dxpub.com/ . N4AA also publishes a bimonthly DX Magazine that is very nice. It arrives via postal mail.

There are also some really good DX bulletins that are free of charge! See "The 425 DX Bulletin" at http://www.425dxn.org/ . The Italian 425 group also puts out a monthly magazine accessible at http://www.425dxn.org/monthly/index.html that shows what happened the past month. It has lots of interesting pictures, QSL cards, etc. It is really fun to look over.

Another excellent free bulletin is the OPDX Bulletin (Ohio & Pennsylvania) http://www.papays.com/opdx.html .

The Daily DX has a calendar of expeditions that is available to anyone for free at: http://www.dailydx.com/calendar.html .

And finally, there is another excellent DX bulletin out of Italy called "DX Coffee" that is free of charge. See it at http://www.dxcoffee.com .

Check them out! There is a lot of duplication, but each has its own sources and unique style.
It has never been easier to know what is going on in the world of DX!

For even more DXing knowledge:

Great information on DXing is also available from the DX University.

See www.dxuniversity.com . **Be sure to check out the "best practices" for Dxers and Dxpeditioners.**

If you want to learn a whole lot about DXing, no matter how experienced you are, get a copy of "The Complete DXer" written by Bob Locher, W9KNI. It is available from Idiom Press at http://www.idiompress.com/books-complete-dxer.html . I highly recommend this book! It was out of print for a time, but is now again available in the 3rd Edition. It is simply awesome.