



# the **RARA RAG**

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NO. 6

## Antennas

### Former Rochester Resident and Past President Talks On Antennas

Keith Freeberg, N2BEL

The February 4, 2000 RaRa meeting will feature Ron Jakubowski, K2RJ, sharing some leading edge technology affecting antenna design and fabrication today. 'More Power' often equates to 'more efficient antenna'.

Ron had lived in the Rochester area for many years while working at RF Harris. A few years ago he relocated to Cleveland, Ohio to take a position with Antenna Specialist. Through this company buying and selling parts of their business Ron ended up working in the Buffalo area. He is a past President of RaRa and a past *Rag* Editor.

## RaRa Amateur Radio License Testing

**Novice - Tech - Tech Plus  
General - Advanced - Extra**

**Saturday February 19, 2000**

**Registration — 8:30AM**

**Testing — 9:00AM**

**Social Services Building**

**111 Westfall Rd., Rochester**

**Inquires (716) 334-4488**

**aa2fo@rpa.net**

## RaRa Meeting

**February 4, 2000**

**8:00 P.M.**

**Henrietta Fire Hall**

**3129 East Henrietta Road**

**Antennas**

**By Ron Jakubowski**

## Spring 2000 License Class Announcement

Tim Magee, WB2KAO

Spring class registration will be held on Monday February 14<sup>th</sup>, 7 PM at the Monroe County Social Services Building, 111 Westfall Rd., in the auditorium. Classes will run through Monday May 22<sup>nd</sup>.

This semester we will be aligning our course offerings in accordance with the newly announced license restructuring. Each test element under the new structure will be covered by a particular course. We will offer 5 WPM CW, Technician, General and Extra theory. In addition to these required elements, we will offer a "high speed" CW class for those desiring to continue on above 5 WPM. CW and Extra theory will be taught the first hour starting at 7 PM followed by Technician and General theory the second hour.

The timing of the effective date for license restructuring, April 15, 2000, has some interesting implications. First, it is expected that the question pools will be updated, to allow testing on the modified theory elements after April 15<sup>th</sup>. Second, it is doubtful that new preparation materials will be published quite that fast. Thirdly, the demand for the current manuals, which are no longer in production, may exceed supply.

Since the new theory elements are not anticipated to be vastly different from those they replace, it is our intention to continue to teach theory elements from the current materials and make every attempt to accommodate mid-stream course corrections, if necessary, when the new question pools become available. Hopefully, we will be able to provide the manuals to everyone.

I am hoping for a record turnout this semester. Under the new license structure 5 WPM CW and General theory gives you lots of HF privileges from 160 to 10 m. We're looking forward to seeing you for an upgrade, or a family member or a friend. Please pass the word. Thanks.

**NEXT RAG DEADLINE  
FEBRUARY 11, 2000**

# the **RARA RAG**

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## The Prez Says

Bob Moore, N2USB

Probably the most significant change in the amateur radio hobby since incentive licenses has just been announced. I have heard or read just about every possible scenario of what is going to happen to amateur radio because of the most recent changes. There are the naysayers that predict amateur radio is on the road to destruction. They say these changes will turn the Amateur radio service into the same state as the Citizen Band service. And then there are those who say this will be the savior of amateur radio. I guess everyone is entitled to his or her opinion including me. To those who think this most recent ruling will open the floodgates to a profusion of new undisciplined operators I would say that the entry-level requirements have changed very little. Today you can obtain an amateur license with out the knowledge or skill in sending or receiving Morse code and you can enjoy operating on the HF bands with a one-time demonstration of your code mastery at five words per minute. Seems to me that the entry-level requirements will be about the same as they are now. As a matter of fact I hope this change will spur a new wave of interest in amateur radio. Most of us have been bemoaning the fact that population of Amateur Radio Operators has been declining and we feel the pressure of losing band and privileges. The fear of a great influx of unruly, unknowing, and uncaring operators I think is overstated. Amateur Radio Operators are by in large a self disciplined and self regulated group of people and I do not foresee any great change in that mode of operation. This change in the regulation is a great boon to many amateurs, myself included, and will present a less restrictive avenue to expanded privileges. I don't feel this will make us less professional or less courteous operators but will provide those of us who wish to expand their horizons an opportunity to do so. As with any change of a long-standing practice there will always be those who see change as the ruin of their way of life. Try to imagine yourself in the early 1900's driving your team of horses and wagon when one of those new fangled contraptions called an automobile came by and scared your team nearly out of control. That was the start of a drastic change in your way of life. If that change had not been accepted we would still be depending on the horse and wagon as our primary means of transportation. This change is not nearly as drastic, but just think you do not have to prove you can drive a horse and wagon to qualify for a driver's license. For those of you who have not reached the pinnacle of amateur radio license this is a great opportunity for you to move ahead, so break out the books, learn the material, and visit George, AA2FO and our other VE's at one of the testing

*continued on page 6*

*Have you ever heard of someone getting into ham radio because of doing the laundry? Well, Lia, WA2NFY, a YL ham radio mainstay, describes how this happened to her. Thanks, Lia.*

To the YLs:

For many years I was a Nanny, taking care of babies and young children. I didn't know about ham radio until I came to America in 1965. I had worked in Germany, Italy, and Switzerland many years but the day came when I found a family in the U.S. who wanted a Nanny.

On the boat to the U.S., I got my first contact via radio – a message from the father of the baby saying his wife would pick me up in New York.

Years passed and I loved my job and enjoyed the surroundings of Greenwich, Connecticut.

On my first vacation in the Adirondacks, I met my future husband Lee, W2WPF. For several years after we were married, I would hear the now familiar sound of CW while doing the wash in the cellar where Lee had his station. The high notes bothered me at first, but I kept listening and started copying CW. This was the start and there was nothing stopping me.

The code came easily to me, but the technical part meant lots of difficult studying and reading, and taking a class at Edwards Store.

I passed the Novice in 1973 and one year later, the General, and the next year, the Advanced. Then, after a pause of 11 years, I decided I wanted it all and became an Extra, which made me feel very, very happy.

Working CW is still my favored mode. I have fun in YL contests and have many awards and Gold Cups for working many countries, YLs, etc.

I went to many conventions of YLRL, emergency, and public events. The last YLRL meeting was on the Queen Mary in California where 148 YLs from 12 countries got together.

I encourage any YL to follow me and make it to the Extra class with all the privileges this class license gives you.

For me, it is the best hobby in the world. Knowing four languages gives me the satisfaction of practicing what I know and making friends the world over. I am active on many YL nets – ask me when and where, frequency and time, etc.

I am ready, QRV – are YOU??

*I'm sure other YLs also have great stories to tell of their ham radio experiences. Let us hear from you. Contact me at [jstonehi@frontiernet.net](mailto:jstonehi@frontiernet.net) or (716) 582-2074.*

*continued on page 6*

By now everyone is well aware of the FCC's *Report and Order* on the Amateur license restructuring that was released on December 30<sup>th</sup>. Starting April 15<sup>th</sup> there will only be three class licenses for amateurs and the code requirement will be reduced to 5 words per minute for all. Some of us may be very happy about this news and others may be upset by it. In either case it is here and everyone will have to make the best of it. Lets hope that we can all deal with it in a positive manner so as to help Amateur Radio grow.

For many hams and ham "want-a-be" this is a good move. It will help people get a license or upgrade without the code being a deterrent. For some Techs licensed prior to March 21, 1987 the upgrade process will be as easy as showing proof of your license date and filling out form 605 at a VE session after April 15<sup>th</sup>. This will allow them to become a General Class operator. This is a very positive thing for them. It is also positive for the rest of us in that no one loses any operating privileges their current license holds. They are grand fathered for life in their current class license unless they want to upgrade. If you don't see this as a positive thing, at least it should be seen as status quo. No matter what you feel though, be positive and use this to encourage and help people get into Amateur Radio. Your Elmering can be very beneficial now.

Of course there are those that didn't lose a thing but feel that it is not fair that you had to learn the 13 or 20 word per minute code to be a General, Advanced or Extra operator. Maybe it was harder learning code for you, but now that is in your past and the experience didn't hurt you. The theory test may be getting more difficult for the newer Hams than it was for you. If you learned the code and never used it what good was it to you anyway. If you do use the code, you can continue to do so as that mode is still available and a lot of operators will continue using it. Use your knowledge to encourage others and teach them how to enjoy this mode. Everyone will have learned it at 5 WPM so they will have the basics. Show them how it helps make contacts in poor conditions or that is the place to work rare DX. It is again up to you to be their Elmer and show them that it can be fun to use code just like it is fun to use Phone, ATV, Packet, or any other mode. Help them by practicing it with them and encouraging them to increase their speed. You may find that they may enjoy the code more than those of us that had it forced on us. Remember we all had to know about, but not prove (other than in theory), we could use all the other modes to get our license. It was then through the help of others that we learned to use and enjoy them. Don't just sit back

*-continued on page 4*

# RRRA

Tom English, N2YJY

The RRRA is welcoming Mr. Joe Doyle this month (January) and are anticipating a great turn out to hear him.

In February, We are tentatively scheduled to meet at WXXI for a tour and update on HDTV. We will have more information on this program as the day draws near.

As I have been saying for the past few months, the annual auction is on the way. Hope everyone has saved up their overstocks or gear they don't need any longer (come on people we all have two or three of everything). Lets clear out the stuff you're not using any longer and help the club out with their annual auction. Remember, the auction is only as good as YOU make it.

With the winter weather finally upon us, and also remembering last year, cancellations are possible. If bad weather forces a cancellation of a planned meeting or other event, listen on the local repeaters for information regarding cancellations. If we know about the event, we can alert people that there has been a change. Also check the amateur radio hotline at 426-1156 (cannot be accessed from the auto patches on the repeaters). We will attempt to have updated information in the local club mailboxes. Above all, if in doubt ask.

That's it for this month, folks. We will have more information regarding the February meeting on the airwaves as soon as we have them confirmed. See you at the meeting.

# Amateur Television-Part 3 Profiling a Point to Point Radio Link

Bill McDonnell, KG2F

Well Christmas is now over and the New Year is here. I hope you all had a great Holiday season. We did, but now that it is behind us I had better get going on this years information. Last month we introduced the Decibel and it's use in analyzing a microwave path. This month we will start our analysis at the receiver. Well lets get started!

All aspects of the Amateur Operators Fast Scan Television Station should be fine tuned to obtain maximum distance and picture quality. The best place to start is at the receiving end. This part of the article will examine the capabilities of a well-designed receiving station. We will look at the typical receiving antenna, feed line, receiver and examine in detail how each component enhances our Television operation.

In chapters one and two the concept of signal to noise ratio was introduced. This ratio is expressed in the following mathematical expression:

$$S/N = \frac{RX(dbm)+noise}{NOISE}$$

where:

**RX**= receive level measured in dBm

**noise**= noise generated by receiver

**NOISE**= Theoretical noise floor

In this case the RX level is the signal level applied to the antenna. The lower case symbol **noise** is the degradation introduced by our system components. These components include transmission line loss and amplifier noise figure. Additional sources of degradation could also be man made noise introduced to the receiving system.

At this time the RX level figure is not known, as the Rx levels is the sum of the transmission power in dBm, plus transmit antenna gain, minus transmission line loss, plus path loss, and losses due to refraction and defraction. We will look at these entities later, but for now we will just represent this entity by the symbol "RX".

The **lower case noise** symbol is the combination of transmission line loss and the noise figure of the receiving amplifier. Transmission line loss can be easily measured or *determined by a chart published by the transmission line manufacturer.* In the case

*continued on page 7*

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## RagChew *continued from page 3*

and get bitter about **not losing** a thing that you have because the only person who will get hurt is you!! Your enjoyment of this great hobby will dwindle with self pity and your resentment to others will not be tolerated for long before you lose people to communicate with. Don't let this happen to you or to a friend. Become a good example and Elmer to all new and upgrade operators.

## Rochester Hamfest---Part II

Lloyd R. Caves, WB2EFU

Do you have June 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> marked on your calendars. You better have, as they are very important dates. This is the weekend of the Rochester Hamfest/Atlantic Division Conference for the year 2000. This will be the in place to be so you don't want to miss it. There will be a lot of interesting programs for you to attend this year. Make sure you mark down the ones of interest to you so you won't forget them, or miss them.

As most of you know Bill Thompson, W2MTA, retired as the Western New York Section Manager as of January 1<sup>st</sup>. Bill is continuing on with his position as NTS Eastern Area Staff Chairman. In doing so he will moderate a program titled **Celebrate The National Traffic System Anniversary, or Have You Worked NOKIA Lately??** If you are interested in handling traffic or thinking about getting information on doing so, this is the place to be. This is the 50<sup>th</sup> year of the National Traffic System and Bill will be looking at the past, present and future of the NTS in this rapidly expanding world of public telecommunications. Come and help celebrate this memorable event.

Many hams are a bit lost when their favorite piece of equipment goes up in smoke or they need to track down an elusive electronics problem. Ed Hare, W1RFI, of the ARRL Laboratory will be with us to help with this situation. Ed brings many years of bench troubleshooting experience that will help solve many problems. Join Ed and learn how some things can be easier than you think.

The **Western New York Section Meeting** will be continued this year even if Bill Thompson did retire as Section Manager. The new Section Manager Scott Bauer, W2LC, will host this meeting. Scott assumed the duties as Section Manager as of January 1<sup>st</sup>. This is a great time to meet Scott and give him a chance to meet each of you. Find out what Scott's vision is for the Section under his leadership and what you can do to help him make it happen. Scott lived in the Rochester area a few years ago and was a member of RaRa at the time. Many of you may remember him, and this will give you a chance to say hello.

Don't forget to submit your nominations for the "Ham of The Year", "Grand Ole Ham", and "Technical Achievement Award". These nominations must be sent to Bernie Fuller, N3EFN, Vice Director, Atlantic Division before April 1<sup>st</sup>. This is an easy process and you know who the deserving Hams are so lets give them the credit they deserve. Applications can be obtained from Bernie. Just send him request at is address found in QST or see one of RaRa's board members.

## DX Happenings

Ed Gable, K2MP

Exciting news this month includes the final plans for Clipperton 2000, a DXpedition sponsored by the N7CQQ Amateur Radio Club, Inc. and ICOM America. Scheduled to depart W6 land on the January 23<sup>rd</sup>, they should be QRV by March 1<sup>st</sup> for eight days. Callsign is not available yet. Look for them on all bands and modes including six meters and Satellite.

Also announced from the active Lyons DX Gang is their Tromelin Island (AF-031) operation scheduled for July-August this year.

More funny calls; HF70 is Poland, HB2's are HB9, 3Z8 is SP, and CF's and CG's are really VE's. Enough, already!!

The poorest joke of the DX season was the announcement of super rare Macquarie Island going QRT a year ahead of schedule after only hours of operation. The real announcement was the change of callsign on January first to VK0MM. He is operational (I worked him this morning at 0400 local on 20 CW) and sticks to a strict schedule. VK0MM has a geocities web site.

As you read this, the XZ0A Myanmar operation should have a few more days to go before going QRT, after three weeks of operating eight stations simultaneously. XZ should be way down on the most needed list after this.

A reminder that we are now in the DXCC 2000 Millennium Award time frame. This special ARRL DXCC award is for working 100 countries between January 1 and December 31, 2000. No QSL's required. See QST for details.

Short note, YI2CL is a Pirate.

The next meeting of the *Rochester DX Association* is February 15<sup>th</sup>, 7:30 p.m., at the usual 111 Westfall Road site. Anyone interested in DX'ing or contesting can obtain a new Rochester DX Association brochure by contacting Ed Gable, K2MP, at 716 392-3088 or k2mp@eznet.net. Tnx ARRL and 425 DX News.

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# RaRa Rag 20 Years Ago

Ed Gable K2MP

February 1980: Program this month was on DX'ing and was presented in a forum style headed by Bob Roberts, WA2QAU, assisted by Al Keltz, W2TXB, Gene Fuller, W2LU, Rick Berg, WA2RLQ and Corny Unruh, WA2EOQ. The venue for this meeting was the Gleason Recreation Center and RaRa was hosted by GEARS, the Gleason Employees Amateur Radio Society, with Bill Buchanan, WA2ELC, Chairman. The 1980 RaRa Dinner-Dance was scheduled for February 9<sup>th</sup> at the Hospitality House on Penfield Road. Continuing the DX theme, Rick Berg, WA2RLQ, wrote a long article on DX operating techniques. Hamtronics, of (and still) Moul Road in Hilton, announced their new 24 page catalog of VHF/UHF FM products. RaRa sponsored a beginners Road Rally on April 27<sup>th</sup> with Roger (You bet) Haarnart, WB2BWQ, heading up the popular event. Code practice at 22, 15 and 7 WPM were started on the WB2PYI/R repeater by Herb Penner, A12R. On the same repeater a Swap Net was started with Roger Dennis, WB2HWO and Ralph Brown, N2VAD. Also starting this month was the WNY CW Traffic Training Net on 28.160 Mhz, with George Heron, N2APB, as net control. (Hey, what are these new funny call signs beginning with an "N" ? -Ed) From the Want-Ads you could buy a TenTec 544 with Remote VFO from John Schooley, K2NC.

**FOR SALE:** ICOM 751A, Competition grade, full featured HF transceiver. All mode, general coverage receiver, built-in keyer, new cost ~\$1500. As new condition, only \$495, including ICOM power supply, both desk and hand held microphones, external ICOM speaker, original packing boxes. Ed Gable k2mp, 392-3088 or k2mp@eznet.net Also have Hustler 5BTV vertical antenna. 80 thru 10 meters. Needs new base hardware. Current list >\$200, today \$25.00!

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# QRZ To The Rescue

QRZ.com offers look-up service for pre-1987 Techs: In response to numerous recent requests by amateurs seeking to obtain information regarding licenses that existed before 1987, QRZ has placed a copy of the March 1993 edition of the QRZ Ham Radio CDROM Ver. 1 on line for public access. This collection, the oldest available from QRZ, contains listings of more than 195,000 licenses issued between 1983 and 1987. Call sign and name searches are available.

Visit <http://www.qrz.com/search1993.html>.

## RaRa at RMSC



**RaRa's Peter Fournia demonstrates special project for two young visitors at the Rochester Museum & Science Center.**

## The Prez Says-continued from page 2

sessions. By the time you read this that is exactly what I will have done.

We have a great hobby. Talk it up and bring a new person into amateur radio.

## YL Forum-continued from page 3

Lia asked me to tell everyone of a couple of fun contests that are coming up in February. The YL-OM CW contest runs from 1400Z Feb 5 to 0200Z Feb 7. Men call "CQ-YL" and women call "CQ-OM".

Prefer phone over CW? The YL-OM Phone contest is one week later. It runs from 1400Z Feb 12 to 0200Z, Feb 14. The rules are the same as those for the CW contest. Details for both contests are on page 96 of the February 2000 QST.

of older cable it would be preferred to measure the loss. This can be readily accomplished by using a transmitter in the same frequency band as the receiver and a suitable wattmeter. First measure the transmitters power output into a 50 dummy load. It is important the dummy load be designed for use in this frequency range (No Heathkit Cantenna's or light bulbs). Likewise the wattmeter should be designed with the frequency range in mind. Note the power output in watts. Next remove the dummy load, substitute the transmission line, and terminate the far end of the transmission line with the dummy load. It's a good idea to first make a measurement between the transmitter and the input to the transmission line. It should agree very closely to the first reading. If not either the coaxial connectors may be installed improperly or the cable may be damaged. Note the reading in watts. **We will call this measurement watts1.** Now move the wattmeter to the far end of the cable and terminate the output side of the wattmeter with the dummy load. Be sure to use good quality adapters, if required, and be sure they are clean and tight. Now note the second reading. **We will call this measurement watts 2.** To calculate the loss in dB use the following formula:

$$\text{Transmission line loss in dB} = 10 \log$$

First divide the second measurement, watts2 into the first measurement watts1. The next step is to determine the natural base 10 log of the ratio. This can be accomplished two ways. The easiest is to use a scientific calculator, Windows 95 and 98 have one. The second way, albeit old fashioned, is to use a logarithm table. If you elect this method for nostalgia sake you may want to use a slide rule.

Once the log is determined multiply this value by 10 to arrive at the answer. For our example lets assume the transmitter was putting out 10 watts and at the far end of the cable we measured 5 watts. Let's see what the answer is.

$$\begin{aligned} \text{Transmission line loss in dB} &= 10 \log \\ \text{which} &= 10 \log 2 \\ \text{which} &= 10 * .301 \\ \text{Transmission line loss in dB} &= 3.01 \text{ dB} \end{aligned}$$

Well, if this were your station it would be a good idea to obtain some new hard line.

The next step in evaluating our station is to determine the noise figure of our station. This is a little harder to do unless you have access to a very expensive piece of test gear. The easiest way to determine the noise figure is to consult the manufacturer of the receiver. The first RF stage is the biggest contributor to noise figure as is usually where we are the most concerned. Most state of the art amplifiers at

*continued*

434 MHz should be capable of noise figures under 1 dB. If you can't measure the noise figure just take the value given by the manufacturer. For our investigation of Walt's system let's assume a receiver noise figure of 1 dB.

The final determination is the **theoretical noise floor** of the receiving system. The theoretical noise floor of the system is the minimum detectable signal level. This signal level is dependent upon the bandwidth of the receiving system. The IF filter is usually the determining factor in a receiving system. In a television receiver the composite video signal includes the video modulating waveform plus the audio sub-carrier. The highest video modulating frequency in NTSC is band limited at 4.2 MHz. The audio signal rides on a 4.5 MHz sub-carrier. The typical IF bandwidth in a well designed television receiver is typically 6 MHz. The theoretical noise floor in a 1 Hz bandwidth is defined as -174 dBm. What this means is a signal of -173 dBm (1Hz) would have a 1 dB signal to noise ratio. To determine the theoretical noise floor we need to weight the noise floor in a 1 Hz bandwidth with a correction factor. We will use the following formula to determine the noise floor of our receiver:

$$\text{Theoretical noise floor} = -174\text{dBm} - ((10\log \text{BW}) + \text{NF})$$

where:

$$\begin{aligned} 174 \text{ dBm} &= \text{noise floor in a 1 Hz bandwidth} \\ \text{BW} &= \text{F bandwidth in Hz} \\ \text{NF} &= \text{Noise figure in decibels} \end{aligned}$$

$$\begin{aligned} \text{Theoretical noise floor} &= -174\text{dBm} - ((10\log 6*10) + 1\text{dB}) \\ &= 174\text{dBm} - ((10 * 6.778) + 1\text{dB}) \\ &= 174\text{dBm} - (67.78 + 1\text{dB}) \\ &= -174\text{dBm} - 68.78\text{dB} \\ &= -105.22\text{dBm} \end{aligned}$$

-105.22 dB is the noise floor of Walt's receiver. This represents the best possible performance that can be expected. The only way to improve performance would be to lower the noise figure or reduce the bandwidth. A noise figure of 1 dB is about the standard to be expected. Reducing the bandwidth is not practical for receiving color video and simultaneous audio reception.

When we analyze Walt's receive performance we will look at the signal to noise ratio. Specifically after the following articles we will be able to determine the actual receive level applied to Walts receiver. From this level in dBm we will be able to obtain the received signal to noise ratio, and from that figure a tangible basis of station performance will be known. So, see you next month.

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## GLENWOOD

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