

NOVEMBER 2013

N4LNR

News & Views

P. O. Box 3276
Lenoir, NC 28645
<http://lenoir-arc.org>



*Serving Amateur Radio
in Caldwell County*

Last Meeting

Ted KF4FLY and James N4NIN reported progress made on the communications trailer and a workday was set for October 12.

James N4NIN reported recent repairs seemed to have the Repeater working well. Discussed a long-range project to replace the Repeater antenna, connectors and cable.

Tom KA4HKK discussed exhibit at the Caldwell County Fire and Safety Festival and radio support for The Bridge Incredible Challenge bike ride. Discussed need for alternate approaches to supporting these events in the future.

Nominations for 2014 Officers were made from the floor and will be offered to the members for election at the next meeting. Members will have the opportunity to offer write-in candidates at that meeting.

Constitution and Bylaws Committee offered changes for ratification at the next meeting.

Program included 2 videos on using an HT to work satellites and communicating with the International Space Station using APRS.

Election of 2014 Officers Highlights November Meeting

Article IV of the LARC Constitution requires the officers of the Club to be elected annually by a majority of members present at the November meeting. Michelle KD4YTU Secretary and Warren WU3Y Treasurer advised they did not wish to seek election as an officer. Nominations from the floor provided Ted KF4FLY President, Tom KA4HKK Vice President, Irv W4IWK Secretary, and Phil KG4BCC Treasurer be presented to the members for vote at the next meeting. Scott KC4SWL was nominated for the position of President; however, he declined nomination. Members will have the opportunity to write-in candidates at the election meeting. See *Meet The 2014 Officer Nominees* on page 4.

Save the Date!

Next Meeting

November 14

Gamewell Fire Dept

LARC Weekly Net

Fridays 9:00 PM

146.625 MHz
Minus PL 94.3
Backup 147.330 MHz
Plus PL 141.3

CARES Net

Sundays 9:00 PM

147.330 MHz
Plus PL 141.3



President's Message

In the Meet The 2014 Officer Nominees column, I mention what sparked my interest in Amateur Radio. I know each of us with our Ticket have a story to tell in answering the question "why did I get my ticket?"

Even before I really understood that one could get an amateur radio license and overcome CB radio limitations and issues, I had an experience that (unknown at the time) prepped me in building skills of radio protocol. It happened 23 years ago on my birthday (Oct. 26) in 1990. I was on the Outer Banks fishing and the week wasn't the best for fishing. A storm had moved in by mid-week and on the night of the 25th the wind was awesome. It was a "Nor-Easter" and it was driving sand across Hwy 12 and waves were washing over the dunes. That night a dredge barge broke loose from its anchor and slammed into the Bonner Bridge, causing 370 ft. of the bridge to fall into the ocean. That was the only road off the outer banks.

We were stranded in Avon without power or phone. We only had CB equipped vehicles. In the early morning of Friday 26th we took our 3-vehicle caravan and went south to Hatteras and caught the overnight ferry over to Ocracoke island. After driving about 20 miles, traffic blocked the remaining 5 miles into town (and the ferry to the mainland) The weather had cleared by then but it took us till early Monday before we were able to board the Ocracoke ferry to cross to Swan Quarter and the mainland. During that 2+ day wait sitting in our vehicles on Hwy 12, the National Guard fed us and they also provided us sleeping bags for the cold nights.

We spent time on the radio, but due to its limitations and the unstructured traffic, I was able to organize some basic simple procedures. 1) Channel 19 would continue to be for unstructured general traffic. 2) Channel 9 was for emergency assistance/requests only. 3) Channel 13 was for structured relay of messages. We were able to coordinate with other vehicles from Ocracoke all the way back north to the upper part of Hatteras Island. We aided the National Guard by informing them of a pregnant lady who would later be airlifted as well as assisted the local residents on food distribution coordination. It felt good to be using what technology we had for a better purpose.

Many in the Amateur Radio world generally look down upon CB, but when used correctly, all forms of communication can be beneficial and are encouraged. Shortly before boarding our last ferry, I had an "eyeball" with some of the others whom I had got to know on the air over the previous days, and they got to meet me--The Fisherman.

If you want to read more details of that event, you can go here...

<http://islandfreepress.org/2010Archives/10.25.2010-20YearsAgoARunawayDredgeToreAHoleInTheBonnerBridgeAndIslandersAndVisitorsReliedOnTemporaryFerriesForMonths.html>

Club to Vote on Changes to Constitution and By-Laws



Section 7 of the By-Laws requires an annual review of the LARC Constitution and Bylaws. The committee appointed at the September meeting offered 6 changes for consideration, including 1 change approved in 2011, which had not been ratified in error. After discussion, those members present agreed to request ratification at the next meeting pursuant to Article VI of the Constitution.


The proposed changes are:

1. Article IV Election/Removal of Officers
Currently reads in part: Elections, special or regular, may be conducted by a quorum of seven full members, of the general membership, present at any one meeting.
Amended 11/10/2011 to read: Elections, special or regular, may be conducted by a quorum of five full members, of the general membership, present at any one meeting.
2. Article I Preamble
Currently reads in part: (hereafter referred to as the Club, and/or LARC).
Amended 11/14/2013 to read: (hereafter referred to as the "Club", "corporation", and/or "LARC")
3. Article IX Funds
Currently reads in part: No substantial part.
Amended 11/14/2013 to read: No part.
4. Article IX Funds
Currently reads in part: New members coming into the club after that date must be members in good standing for a period of no less than five years continuous before being allowed to vote on such matters.
Amended 11/14/2013 to read: New members coming into the club after that date must be members in good standing for a period of no less than three years continuous before being allowed to vote on such matters.
5. Article XII Club Newsletter
Currently reads in part: In the event a member does not have internet access for retrieval of the newsletter, a printed copy will be made available and presented to the member at the next regularly scheduled meeting.
Amended 11/14/2013 to remove the sentence in entirety.
6. Section 11 Funds
Amended 11/14/2013 to stay consistent with the language of the Constitution Article IX Funds.

At the meeting, members will have the opportunity to discuss the proposed changes prior to voting.

Meet the 2014 Officer Nominees

Ted Manuel KL4FLY -- President



My interest in Amateur Radio began with a trip to the Outer Banks of North Carolina in summer of 1995. I was traveling with a couple of other vehicles and we used CB for communications but we didn't like the crudeness of language we'd sometimes hear and traveling with family made it less pleasant. We also were limited a little in range due to power restrictions. My brother Tony suggested we look into "HAM" radio. Within a few weeks I got my ticket (no-code tech) and by next summer my brother Tony KF4FTW had his. I wasn't affiliated with a club for a while but best I remember I joined the LARC around late 90's for a couple of years. During that time I got an interest in Packet communications and with the aid of Floyd Key AD4FK I explored that aspect of amateur radio and I'd also rag-chew with Jim Rogers SK N4EUX most every morning on my commute to work. Later I became somewhat radio "dormant" with just occasional communications, mainly 2-meter. I haven't upgraded my ticket because my original purpose and desire was to find an avenue of mobile structured communication. Both 2-meter and 70cm meet those qualifications. My "shack" consists of a couple of older Yaesu 2-meter mobiles, my recent BaoFeng dual band HT, a Kenwood TS-430 HF rig, a butternut multi-band vertical, and assorted homemade 2-meter antennas. I rejoined the LARC a couple of years ago and also have completed the ICS supplemental course for ARES coordination efforts with local and regional emergency response groups. I don't have a strong technical base in radio, but I do have an interest in using what I do know to assist with local events and being available for emergency response, but I guess my main reason for wiliness to serve in the nominated capacity is because I'm needed. I think it's not technical skills that holds one back from serving, but just the plain wiliness to be available to help in whatever capacity is needed. I don't have leadership skills but I hope to have the ability to support and encourage folks to work together.

Tom Land KA4HKK -- Vice-President

I was licensed in 1978 as a Novice, and later added my General, the Advanced and my Extra. I have made an effort to work the amateur satellites and the space shuttle. I have worked SSB, CW, digital modes, SSTV, digital SSTV, packet and most recently-Winmor. I have achieved my WAS award on HF mixed mode and band, and I have worked all continents. I was in a radio club that participated in VHF/UHF contests and achieved several first place certificates for those contests. I have also served as a VE.

I have been a member (off and on) of the Lenoir Amateur Radio Club since a little after it was first formed. I remember meeting at the old Blackwelder Hospital in Lenoir, the Bank in Lenoir, the EOC and the ambulance building near the Westgate Cinema.

I have served as the President, Vice President, and Secretary of LARC. I coordinated a Special Event Station for the Club for the Caldwell Sesquicentennial. I am currently the Emergency Coordinator for Caldwell County.

I currently work at Broyhill Furniture in Lenoir. I have two grown children; Philip and Travis and a grandson, Jayden.

My wish list for amateur radio includes involving more licensed hams in public service, demonstrating amateur radio to the public, participating in contests (some serious and some not so serious), and group electronics projects aimed at amateur radio.



Irv Kanode W4IWK -- Secretary

I received my novice license while in junior high school but made only a handful of contacts. My father was active in Navy Mars and we always had a basement full of military surplus radios and old TVs. I received my general license 17 months ago. It has taken me most of that time to get equipment and antennas up and running. I've recently started checking into the local Friday and Sunday nets.



On HF, my main interest is digital modes. I've been playing with PSK, SIM31 (a PSK31 variant), WSPR, Winmor, and various Flidigi modes. I'm more interested in playing with equipment, antennas, and the multitude of digital modes than rag chewing or contesting.

I support what I perceive to be the current direction of the club: getting the trailer finished, shorter business sessions, and having a radio related presentation at each meeting.

My main qualification for office is that I've shown up for all but one meeting in the last 17 months.

Phil Crump KG4BCC -- Treasurer

When I was 10, I started learning about technology from Gene Norman as we ran the sound system for our church. Our friendship continued to grow, and before long I was learning all sorts of things about electronics, radios, and computers. In 1998, at the ripe old age of 12, I received my Technician amateur radio license. I gained interest in amateur radio after participating in Field Day at the Hudson Fire Department. If I only had realized how a hobby like amateur radio would set the stage for one of my life's passion--technology!

From traveling the US with a FEMA contractor in emergency management to working on mountaintops across North Carolina, ham radio has taken me literally around the globe. My skills learned through amateur radio proved invaluable as I worked on anything from 2 way satellite systems for a FEMA contractor to repeater systems covering our state for Blue Ridge Electric. Duane Ayers, my coworker became my electronics and radio mentor; teaching me more about electronics and life than I learned anywhere else. He also sold me the Hibriten 2 meter repeater.

I enjoy being a member of the LARC, and hope to learn and share information about our awesome hobby. My experience in emergency management technology and Fire Fighting/EMT tend to 'pull' me in the direction of the 'public service' aspect of our hobby. I would like to see LARC business sessions minimized, and our learning/sharing sessions expanded. We could take field trips to places like the statewide EOC to see what amateur radio frequencies and modes they monitor 24/7. We also have a lot of experience right in our club; we could start having learning/sharing sessions at each meeting, with different club members leading the sessions.



While the Internet and cell service is rapidly replacing our hobby, I hope to never forget the spark within me the first time I picked up a microphone and talked around the globe. I hope to share my exciting hobby with others allowing a small escape from reality as the mind travels to worlds unseen across the airwaves. 73's and God Bless!

APRS: A Fun Tool in the Box

Guest Column By Todd Morgan AL0I



Todd was first licensed in 1980 as KA4QWI. He enjoys the more unusual opportunities that amateur radio presents including HAARP moon bounce and saying "HI" to Juno or whatever balloon or spacecraft that happens by.

What do balloons, a Tennessee black bear, Roan Mountain, the International Space Station, a man-made satellite named Pollux and the Bridge Incredible Challenge Bike Ride have in common? Well, these things represent aspects of my experience with a digital amateur radio communication mode called the Automatic Packet Reporting System or APRS. After a brief description of APRS and what an APRS station includes, I will describe some of the diverse ways I have used and enjoyed APRS over the last five years.

APRS was developed over twenty years ago by Robert Bruninga WB4APR for "local tactical digital communications, situational awareness and two-way information exchange" as an application of earlier packet radio technology. While some folks may simply equate APRS with map displays and the use of GPS devices for position plotting, Bruninga has always been quick to point out that this view misses the two-way communications and information sharing aspects that are central to the system.

APRS stations are quite diverse in terms of components and how tightly integrated those components may be, but conceptually, an APRS station consists of the following (1) a radio (usually a transceiver) and antenna, (2) a user terminal which might be a computer, a dumb terminal or a GPS-type display, and (3) an interface between the radio and user terminal known as a terminal node controller or TNC (sometimes referred to as a radio modem). If this sounds like a packet radio setup, then you're right, it is in most respects, and many amateur radio operators have pressed their packet equipment into use in an APRS station. An APRS station can optionally include a GPS for automatic update of the station position if the station is mobile.

So what exactly can this APRS station do? An amateur can use such a station to participate in a worldwide digital network of on-air stations and a system of Internet servers that gather and distribute APRS packet data for a variety of purposes including use by non-amateurs. An APRS station might be receive-only, transmit-only or capable of both receiving and forwarding APRS data packets to other stations, an operation known as digipeating (a digital repeater). Most APRS stations are capable of transmitting a beacon indicating the current station status and location. Many APRS stations are capable of sending and receiving station-to-station text messages of up to 67 characters per message. These APRS stations can also send text bulletins to a group of stations.

Some APRS stations are connected to the Internet and are referred to as Internet Gateways or I-Gates. Most I-Gates pass all of the APRS packet data they receive to a system of Internet servers where the information can be accessed directly by individuals or through sites such as <http://aprs.fi> or <http://www.findu.com>. These sites provide public map displays of APRS (and other) stations and other information such as raw APRS packets. Some I-Gates can transmit information such as upcoming satellite pass predictions to local APRS stations.

My first experience with APRS involved setting up a receive-only I-Gate with the intent of listening to amateur radio high altitude balloons. In 2008 I was surprised to discover that hundreds of individuals and organizations were sending helium- or hydrogen-filled balloons to heights often exceeding 100,000 ft. and sometimes over distances of thousands of miles, and many of these folks were amateur radio operators using APRS as a means to track their balloons. One such organization is the Physics Dept. at Western Carolina University. With the help of the local amateur radio club (Catamount Amateur Radio Group or CARGO), the Dept. has launched five flights over the last couple of years to measure cosmic and gamma radiation and take photographs. I have been able to receive APRS packets from dozens of such flights.

I have also used my receive-only I-Gate to capture APRS packets from orbiting satellites. On 30 July 2009 the U.S. Space Shuttle Endeavour launched the Atmospheric Neutral Density Experiment (ANDE-2) after it had departed the International Space Station (ISS). This U.S. Naval Research Laboratory project involved the release of two spherical satellites named Castor and Pollux that were used to measure the density and composition of the lower Earth atmosphere in an effort to improve predictions of orbital decay for satellites. The researchers had installed APRS transmitters on the satellites and requested that amateur radio operators forward any telemetry captured for examination. Several dozen amateurs (including myself) who forwarded APRS mission data were rewarded several months later not only with QSL cards, but also with ANDE-2 mission patches that actually flew aboard the STS-127 Endeavour flight that launched the two satellites. Not only was APRS used for the telemetry from the satellites, researchers also used APRS to send commands to the satellites. On one occasion I monitored researchers sending APRS packets through the ISS to Castor in an effort to restore communications with the satellite.



Earlier this year I had an opportunity to assist Russian researchers with part of an experiment that made use of amateur radio APRS equipment installed in the Russian segment of the ISS. The Russian Federal Space Agency and its leading research organization, TSNIIMASH, want to determine if the plasma ejected by an electric thruster has any significant impact on the communication capabilities of a spacecraft. An RF "dead zone" due to such a plasma exhaust could mean that the electric thruster technology might not be suitable for use in some or all cases. In order to determine if APRS packets could be used to test this idea, amateurs around the world were asked to capture APRS packets transmitted by select "master" APRS ground stations which were digipeated (relayed) by the ISS back to "field" stations on the ground in February 2013. Participating stations that forwarded data to the researchers received an RS0ISS QSL card signed by Russian cosmonaut and Expedition 34 Flight Engineer Roman Romanenko who oversaw this phase of the experiment aboard the ISS.



In 2012 I finally purchased a proper APRS transceiver. I chose a Kenwood TH-D72A that incorporates 2 Meter and 70 Centimeter transceivers, a TNC and a GPS in a single hand-held package with 5 watts output. Over the next several months I hiked the Appalachian Trail (AT) between Damascus, VA and Hampton, TN in segments, a total distance of fifty miles. Bruninga has requested that amateurs who hike the AT with APRS equipment let him know so that APRS coverage for the entire length of the trail can be determined. On one of these hikes near U.S. 421, I had my first (and only) encounter with a black bear in the wild. The meeting ended amicably with the bear and me fleeing in opposite directions. APRS also proved useful as a means to send (but not receive) brief health and welfare emails to non-amateur relatives during my hikes.



Bruninga's annual Appalachian Trail Golden Packet event is another opportunity to enjoy APRS outdoors, and I have been participating in some way every year since 2009. The object of the event is to set up a chain of 15 APRS

stations along the crest of the AT for the entire length of the trail and send an APRS packet (the Golden Packet) from Georgia to Maine and back. The closest the participants have ever come to achieving this was in 2012 when only a New Hampshire relay station was missing to complete the chain. I have used my receive-only I-Gate to send event packets to the APRS Internet system every year, and from 2010 to 2012 I joined Eric Davenport, KZ5ED, and Steve Williams, KI4ZUI, on Roan Mountain at the NC/TN border as one of the 15 summit stations.



The 2013 Bridge Incredible Challenge Bike Ride was the first and only time I have participated in a public event using APRS. The fact that I was a last-minute volunteer and the fact that there really wasn't a great deal of time to plan exactly how we would use APRS meant that it was not as effective a tool as it could have been. But it was a useful learning experience, and I met a lot of interesting people among the support volunteers and event participants.

So dust off that old unused packet radio equipment, and put it to good use. You can meet all sorts of interesting people (and bears) through APRS. You might end up doing experiments with scientists or cosmonauts. And you might learn some things you didn't know about amateur radio and have a great time doing it. I certainly did.



Renew your LARC membership for 2014
Pay your dues in person to the Treasurer or by mail
At the LARC address shown on Page 1



LARC Demonstrates Amateur Radio at Caldwell County Fire and Safety Festival

Tom KA4HFF, assisted by Irv W4IWK and Scott KC4SWL, manned the LARC booth at the 2013 Fire & Safety Festival, sponsored by the Caldwell County Fire Rescue Association, held October 5, on the campus of Caldwell Community College. Over 4,000 attended the Festival which featured fire prevention activities, an antique fire truck show, firefighter competitions, an old-timey bucket brigade challenge, demonstrations by fire, EMS, Rescue and Law Enforcement personnel, the former NYFD Rescue 5 which survived the World Trade Center attacks, the Pink Heals Cancer Tour, over 150 booths and vendors, bounce houses, live music, great food and lots of fun.

The LARC booth provided educational brochures on amateur radio, explanations and demonstrations of radio communications using VHF, UHF and HF, including digital. Visitors to the booth had the opportunity to make on-air contacts with local amateurs.

In his post-mortem of the event, Tom KA4HKK expressed concern for the low foot traffic to the LARC booth and opined that additional planning is needed to generate interest in amateur radio at the Festival.



CONTESTS

Information relating to all ARRL and non-ARRL Contests is available at www.arrl.org/contest-calendar. Under the section titled ARRL CONTESTS, click on the month of interest in the section labeled CONTEST CORRAL. Additional information on upcoming contests is also available under the section titled THIRD-PARTY CALENDARS. You do not have to be an ARRL member to access this information.

My First Radio

By James Bradshaw N4NIN

The first 2-meter radio I ever purchased was in early 1986 and it was an ICOM IC-O2AT handie talkie. I have purchased numerous 2-meter radios since, including other handie talkies, mobile rigs, and base stations; but I have never had a better one than the IC-O2AT. The numbers and symbols have worn off the buttons on the keypad, the radio has been dropped numerous times (sometimes on concrete), but it performs today as good as ever. I have used it as a mobile in automobiles, on motorcycles, ATV's, horses, tractors, etc. Today it is normally not in use because of its size and weight (about like a brick), but if I had to take only one handie talkie on a venture where communications were critical, the IC-O2AT would be the radio of choice. I purchased one for Susan N4OJN about the same time, and it also has performed flawlessly. Susan's looks much better than mine, because she has taken better care of it. Neither radio has ever developed any problem and neither has had to be repaired. We also have the version for the 220 band (IC-O3AT) and it is just as dependable. Radios available today have more features, but they are not in the same ballpark when it comes to durability and dependability.



Work Continues on LARC Mobile Command

The "amateur" construction crew continued to make progress finishing out the communications trailer at the October 12 workday. The interior plywood panels were installed and the "crew" is ready to begin finishing the ceiling and building cabinets and worktables.



From the Achieves...

A little history regarding events that led to the formation of the LARC. Several individuals, including James Bradshaw N4NIN and Mark Bradshaw KJ4WY, were interested in getting ham tickets. Gary Hartley K4HTV attempted to get a class started at Caldwell Community College on at least two occasions and several students showed up for classes that ultimately did not form due to insufficient student interest. Finally, in the fall of 1985, another effort to form a class was made by Jim Rogers N4EUX SK. The class was held even though only 8 students enrolled. The college did not pay Jim to teach since not enough students enrolled. Jim taught code and Jerry Hedspeth N4BDI handled Radio Theory. All 8 students got their licenses and later obtained their General from a class also taught by Jim and Jerry.

Jim organized a breakfast club that consisted mostly of his students, their relatives who were amateur operators, and any other local interested amateurs. The first meeting of the breakfast club was February 1, 1986 at the Burger King of Lenoir. At the breakfast club meetings held March 1, 1986 at Tastee Freez in Lenoir, the group in attendance discussed forming a local amateur radio club. It was decided to have a special meeting March 17, 1986 for the purpose of organizing an amateur radio club. The first officers of the newly formed Lenoir Amateur Radio Club were: President Jim Rogers N4EUX, Vice President Duane Ayers N4AVU, Secretary-Treasurer Susan Bradshaw KB4SFY (at that time), Newsletter Editor Jim Rogers N4EUX and Assistant Newsletter Editor Charlie Eaker KB4SGO (at that time). The Club continued to meet at Blackwelder Hospital for several months. The breakfast club continued as a social gathering separate from the radio club. It ended in August 1986 due to lack of attendance.

Back in the early days of the LARC members would occasionally go to Morganton to attend a meeting of the Western Piedmont Radio Club, and they in turn would come to Lenoir and attend LARC meetings. The ham bands were very busy and members interacted a lot with people outside the local area. At times, the Mt. Mitchell repeater (145.190) was so busy that it was almost impossible to find it not in use.

Without question, Jim Rogers N4EUX was the person most responsible for the formation of Lenoir Amateur Radio Club and, without his efforts; several of its members would not have amateur radio licenses. Jim became SK in 2008.

LARC 2013 Officers

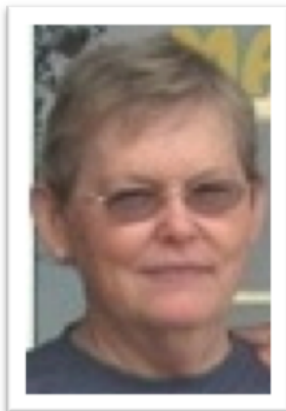
Ted Manuel
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KF4FLY

Tom Land
Vice President
KA4HKK

Michelle Suddreth
Secretary
KD4YTU

Warren Gruber
Treasurer
WU3Y

Editor for a Final



Several years ago, a ham friend (with 50 years of amateur radio) was helping me install a loop antenna and lots of soldered joints were required. Being "self-taught" in soldering, I provided the day's entertainment as I struggled to make an "acceptable" soldered

joint. My "Elmer" kept saying, "It's a very simple process. If you are going to be a ham, you best learn how to solder today!" So I am sharing some of the lessons here.

When you think of soldering, think SHINY! Shiny is good. Trying to solder something that is dull and oxidized will just not allow solder to flow and adhere to the parts that you are trying to solder. Take a knife or Scotch Pad and rough up the surface to be soldered -- make it SHINY and solder will love it. If solder will not stick, it is either dirty or not copper.

Be sure the screws holding the tip on the soldering iron are TIGHT. When you pull the trigger on a soldering gun, the tip should be smoking in 3-4 seconds. If not, tighten the screws that hold the tip in place -- tight.

Using a soldering instrument that is too BIG or too SMALL can be a problem. Delicate items (transistors, ICs, etc.) should be soldered with a

soldering iron no bigger than 20watts. Antenna connectors (like PL259 used on coax) require much more heat -- use a 200watt iron. Soldering copper pipe (such as for a J-Pole antenna) will require a propane torch or a Mepp's gas torch. The Mepp's torch burns much hotter and makes short work of soldering copper pipe. Use a wire brush to clean the joints or remove oxidization from copper pipe before soldering.

Use a WET paper towel to clean a tarnished soldering iron tip. Just wipe the hot tip on the wet paper towel and then apply a bit of solder to the tip to make the tip SHINY.

Get the tight tip of the iron shiny with solder, place the tip between the parts that you want to solder, press down to apply pressure on the two parts, then apply solder. Solder should never be used to stick two items together -- first make a strong mechanical joint and then solder them together.

Lead-Tin solder used outdoors will deteriorate with time, especially if in contact with the ground. Silver solder will stand up outside pretty well but it is expensive. If you make a solder joint that will be exposed to the weather, protect it with GE silicone or other means.

Try it, it's easy.

Send comments concerning the LARC NEWSLETTER
to Ro K4HRM hrmaddox@nettally.com
Suggestions for articles are appreciated.