



the RARA RAG

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VOL. 42

MARCH 1990

NO. 7

MARCH MEETING TO FEATURE DISCUSSION ON COMMERCIAL TELEVISION

Due to the cancellation of the February meeting due to snow, the March meeting will feature the presentation by David Schwitek, NW2T, Assistant Chief Engineer at WHEC, Channel 10. Topics such as High Definition TV, Stereo TV, the change of affiliates, and the new Doppler Weather Radar will be discussed.

So let's give Dave another chance to give his presentation on March 2, at the 40 & 8 Club, 933 University Avenue, at 8:00 p.m. We hope to see you there, coffee and donuts will be served after the meeting.

RDXA MEETING — MARCH 20th


All hams interested in DXing and contesting are invited to our next meeting, 7:30 p.m., 111 Westfall Road, March 20, 1990.

A forum discussion by big gun DXers on five-band DX awards chasing will be our main program. Here is our chance to gain valuable tips to attain the 5BDXCC and 5BWAZ awards.

Bring your recent QSL cards for group mailing to the outgoing bureau and your list of DX stations to address from our 1990 International Callbook and join us for a super evening.

For more information call Bob, WE2T, RDXA Secretary/Treasurer at 334-1103.

SILENT KEYS
ROBERT McCARTY
 W2EJ
 January 13, 1990


MILTON R. MILLER, SR.
 W2SHJ

LOCAL AMATEUR PUBLISHER ARTICLE ON HAM RADIO

February 17, 1990 was a great day for ham radio in the Rochester area. Philip Mulivor, N2HVI, had his article on Amateur radio published in the *Democrat & Chronicle* and *Times-Union*. The article, which occupied almost half a page, showed what amateur radio is all about.

It is our understanding that it is against Gannett policy to mention local clubs in articles. Phil fought for, and got accepted, the mention of the national organization, the ARRL along with the story. Phil then contacted the league, and FAXED them a packet of information on RaRa classes and testing sessions, for anybody who may contact them as a result of the article.

As a result of his writing of this article, the RaRa Board of Directors has sent Phil a letter of appreciation for his exemplary effort in forwarding the cause of ham radio. For those of you that have not seen the article, copies will be available at the March meeting.

RVHFG/RRRA AUCTION

MARCH 16, 1990



OH, ALL RIGHT --- YOU CAN HAVE ONE OF THOSE LITTLE HANDHELDS, LIKE THE REST OF THE GUYS! WORLD RADIO...JANUARY 1987

from Pioneer Amateur Radio Club, Fremont, NE
via Auto-Call

the **RARA RAG**

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MODEM FEES FCC AT IT AGAIN

Two years ago the FCC tried and (with your help and letters of protest) failed to institute regulations that would impose additional costs on modem users for data communications. Now, they are at it again. A new regulation that the FCC is quietly working on will directly affect you as the user of a computer and modem.

The FCC proposes that users of modems should pay extra charges for use of the public telephone network which carry their data. In addition, computer network services such as CompuServ, Tymnet, & Telenet would also be charged as much as \$6.00 per hour per user for use of the public telephone network.

These charges would very likely be passed on to the subscribers. The money is to be collected and given to the telephone company in an effort to raise funds lost to deregulation. It is important that you act now. The bureaucrats already have it in their heads that modem users should subsidize the phone company and are now listening to public comment. Please stand up and make it clear that we will not stand for any government restriction on the free exchange of information.

Write now to: Chairman Federal Communications Commission, 1919 M Street N.W., Washington, D.C. 20554, Chairman Senate Communication Subcommittee SH-227 Hart Building Washington, D.C. 20510.

Tnx The Readout

VOL. 42 MARCH 1990 NO. 7

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Amateur Radio News Service

FOR SALE - Realistic DX-150 General Coverage Communications Receiver. Great for novice who wants to listen to Morse Code. All this for only \$40. Call Neal, WB2EKP, 359-2672.

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TECH TALK

by Bob, K6PIY

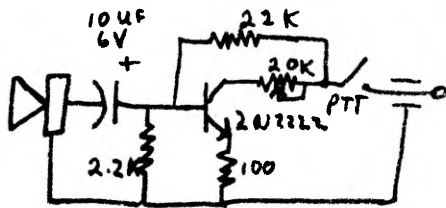
A short time ago, I had a requirement for an external mike to use with my Icom HT's, of which I have two, a 2AT and a 04AT. The Icom Speaker/mike was going to cost more than \$50, which I thought was outrageous, but not unlike any of the Icom accessory items, which all seem to be typically overpriced. (I'm convinced that most of the profits are made on these accessory items!)

A quick inventory of my junk box yielded 4 old hand microphones, all of which were of the dynamic variety. Just to satisfy myself, a test proved that the output of the dynamic mikes was insufficient to drive the Icom mike circuit, designed for electret-condenser mikes.

Being driven by the cost of the Icom mike and the fact that I had four perfectly good hand mikes, I set out to build an amplifier. The input circuit of the Icom HT is a little unique in that the PTT switch and the mike element are required to be in series. The circuit requires a path to ground for base current to turn on a PNP transistor to transmit. Audio is passed through a coupling capacitor from the same circuit into the mike amplifier.

The circuit which I've been using quite successfully is shown below. The circuit was built on a very small piece of Vector board and installed inside the mike case. The gain of the amplifier is set by the collector resistor. Initially, I used a small trim pot which I was able to adjust with a small screwdriver through a hole drilled in the mike case. This proved to be difficult due to the hysteresis of the pot and the critical value of the resistance to yield the proper gain. I think that less total gain of the circuit would make adjustment easier. This can be accomplished by raising the value of the emitter resistor.

*Tnx Hughes ARC Bulletin
via Lockheed ERC Bulletin*



FOR SALE: Heath SB300/400 transceiver with matching speaker and microphone—\$250.00
Call Bob, N2EVG, 624-3368.

RaRa CALENDAR FOR MARCH

- 2 - RaRa meeting, 8:00 p.m.
40 & 8 Club, 933 University Avenue
- 8 - Packet Group meeting- 111 Westfall Road
- 16 - RVHFG/RRRA Auction, 8:00 p.m.
Police/Fire Training Academy,
1190 Scottsville Road
- 20 - RDXA meeting, 7:30 p.m., 111 Westfall

LEVELS OF CURRENT

PERCEPTION CURRENT

1 Milliampere will be felt by most individuals as a slight tingling sensation. A defective hand drill might allow this amount of current to flow through a person standing on a dry wooden floor. The person may not be bothered by this current until he touches a water connection, metal window sash or another grounded metal object. He has now completed the circuit to ground and a much larger current will flow through his body.

SHOCK LEVEL

5 Milliamperes (1/43 of the current required to operate a 25 watt lamp) flowing through the body causes a violent muscle reaction throwing the operator away from the tool.

LET-GO CURRENT

10 Milliamperes will cause the person to lose ability to release grip on the tool. While the heart can continue to function, fatigue sets in, followed by death if no help is available.

ELECTROCUTION

100 Milliamperes (less the 1/2 that used by a 25 watt lamp) will cause ventricular fibrillation to occur in the heart, the muscle fibers lose control and the heart is no longer able to pump blood.

From Black & Decker's "THE GRINDER", Vol. 1, No. 4, December, 1989.

100 mils at 15 volts in only 1.5 watts. 15 - 20 mils can kill, at any voltage. ALWAYS keep one hand in your back pocket when checking circuits. Have the shack protected by a GROUND FAULT CIRCUIT BREAKER.

Wally Roworth, N2GDD

ROCHESTER HAMFEST

MAY 18, 19, 20, 1990

ALL YOU EVER WANTED TO KNOW ABOUT NICADS, but were afraid to ask..

(The following item is from USENET and written by I7SWX.)

On one previous note (on USENET), an article was mentioned, published by *Ham Radio* or *QST*, about a battery charger and the recharging problems. I would like to enlighten an extract by G3VA, Pat Hawker, the famous editor of the column "Technical Topics" of Radio Communication the magazine of the UK hamradio association RSGB. "NICAD BATTERIES - FACTS AND FALLACIES", published in *Radio Communication* May 1988, TT.

Rechargeable nickel cadmium batteries, have, with reasons, become a popular source of power for portable and hand-portable equipment. They can provide reliable service over many years if due account is taken of their peculiarities. Yet it remains true that many amateurs are failing to appreciate not only the full capabilities but also the limitations of nicad cells used in battery packs.

J. Fielding, ZS5JF, in "Nickel cadmium batteries for amateur radio equipment", (*Radio ZS*, September 1987, pp 4-5) provides a useful survey of the facts and foibles of nicads. The following extracts from his article attack some of the common myths and also provide some safety hints.

1) "Rapid charging causes a decline in cell capacity". NOT TRUE provided that the charge is always terminated at a safe point.

2) "You should not charge only partially discharged cells as this causes a loss in capacity". NOT TRUE. It is not necessary to fully discharge nicad batteries before charging. In fact, THE OPPOSITE is true. Repeated partial charging gives an increase in the number of charge/discharge cycles compared with full-discharged cells.

3) "White crystals growing on the tops of nicad cells mean that the seal is faulty and the cell should be scrapped". NOT TRUE. The electrolyte (potassium hydroxide) is extremely searching and can penetrate the seals used in minute quantities. These crystals are potassium carbonate, which is harmless and can be removed with soap and water. The action of the carbon dioxide in the atmosphere reacts with the electrolyte to form the crystals. After removing the crystals, it is recommended that a smear of silicon grease is applied to slow down the growth of new

crystals. The amount of electrolyte lost in this way is insignificant.

4) "I have a cell which appears to take a charge, but after the normal charging period the open circuit voltage is very low. I have been told I should throw it away". NOT TRUE. The reason the cell won't take a charge is usually due to minute crystalline growth across the internal electrodes, caused by prolonged storage. A cure that nearly always works is to pass a very high current for very short time through the affected cell. This fuses the internal "whisker". Discharging a large electrolytic capacitor is one method of doing this. But note - that in a battery the faulty cell MUST be isolated from the other cells since zapping the complete battery will not usually result in a cure. Charge the capacitor to about 30v and then discharge it through the faulty cell. Several attempts may be required to clear a stubborn cell.

5) "A battery contains a cell with reversed polarity. The only cure is to replace it". NOT TRUE. The reversed cell can usually be corrected by a similar technique as that given for 4). After re-polarizing the cell, the complete battery can be recharged in the normal way. Full capacity can be regained after about five cycles.

6) "A nicad battery should be stored only in a discharge state". NOT TRUE. It can be stored in any state of charge. Due to its inherent self-discharging characteristics it will eventually become fully discharged after a sufficiently long period of storage. To recharge the battery before returning it to service, a "conditioning" charge of 20h at the normal charging rate is recommended. Afterwards charge normally; full capacity can again be expected after about five cycles.

7) "It is not advisable to keep a nicad battery on permanent trickle charge as this causes permanent degradation of the cells". NOT TRUE. So long as the trickle charge current is adjusted correctly, the charge can continue indefinitely without loss in cell capacity. The safe current can usually be obtained from the manufacturer's data, but 0.025C is a reasonable guide (ie. about 100mA for a 4Ah cell and PRO-RATA). This enables the battery to remain fully charged.

ZS5JF also lists seven safety points that should be considered by users:

1) DO NOT short circuit a fully-charged battery. This, if prolonged, can cause excessive gas production with the danger of possible rupturing of the sealed case.

2) Nicads contain a caustic electrolyte: this is perfectly safe as long as common sense is used in use and handling of the cells.

3) A nicad can supply a very high current for a short period (a 4Ah cell can supply over 500A for a few seconds). Sufficient thought should be given when selecting a fuse between the battery and the equipment. The connecting wire should be capable of passing enough current to ensure the fuse blows quickly in the event of a short circuit.

4) DO NOT use partially-discharged cells with fully-charged ones to assemble a battery. Assemble the battery with all the cells discharged and then charge them as a battery.

5) DO NOT carry a fully- or partially-charged battery on an aircraft without taking proper safety precautions. A short-circuited battery pack can be a time bomb in such situations. Consult the relevant IATA regulations or ask at the airline check-in.

6) DO NOT subject battery packs to very high or low temperatures. Never dispose of a battery pack in a fire or throw it out with domestic waste. If it cannot be disposed of properly it is probably best to bury it in the garden in a safe spot.

7) DO NOT discharge battery packs below about 1 V per cell, otherwise there is a possibility of cell reversal.

ZSSJF provides a good deal of other information on charging nicad batteries, and gives as a reference a Varta publication of 1982 "Sealed Nickel Cadmium Batteries" from which some of his notes may have been derived. (G3VA)

Tnx KPARC Newsletter

THE RaRa RAG 20 YEARS AGO — MARCH 1970

by Ed Gable, K2MP

RaRa and the Kodak Park ARA plan a joint meeting for March at Kodak Park. Bob Pavlock, WA2ECD, KPARA Prez made the arrangements. The Valentine Dinner-Dance was announced a success with 128 RaRa members showing up at the Brittany Restaurant for a fine meal and dancing to the Fil Laurinni orchestra. Eddie Meath was the Master of Ceremony. The East Coast VHF Society held their 12th Annual Hamfest and Dinner in Paramus, New Jersey, with several Rochester hams in attendance. Will Herzog, K2AHB, announced that regular 10 meter transmitter hunts were held on Wednesday evenings on 29.2 Mcs. The results of the 1970 VHF Contest were listed with the top five scorers being K2YCO, W2UTH, WA2GCF, K2YRZ and WA2KND. Oscar 5's beacon transmissions were a challenge to copy but locally Bob Jeffers, W2ALL, using a phase locked receiver, was successful. *CQ Magazine*, at six dollars a year, remains a long term advertiser.

AMATEUR AUCTION — MARCH 16th RVHFG/RRRA NEXT ANNUAL JOINT MEETING, EXCHANGE

Police/Fire Training Academy, 1190 Scottsville Road doors open for entry at 7:30 p.m., and the start up will be 8:00 p.m. Park and enter from the parking lot in the rear of the building.

As in the past the seller will collect the auctioned price, from the buyer at the treasurer's table. The treasurer will collect 10% of the full price from the seller, and the clubs accept no responsibility for the condition of any thing bought or sold or traded.

Our clubs are responsible for setup and clean-up, for this auction and the November auction. Please be careful. At the end of the auction the treasurer will count up the moneys, and divide them in half, for each club.

In past years there have been donations for specific groups go to auction. This makes for a terrible accounting problem for the treasurer, so we request that all donated equipments moneys go to the regular split of 50% per club.

If you bring a old boat anchor something or other that does not sell, please don't leave it on the floor. There is a trash bin outside the back door. At this writing I do not know who the auctioneer will be.

"WA2ZNC", Len

ROCHESTER HAMFEST MAY 18, 19, 20, 1990

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SATELLITE SCOOP

by Dick Campbell, N3FKV
from Anne Arundel Ham News via Autocall

What's all this about satellites, anyway? To some, they may be regarded as the ultimate in DX. How nice would it be to have an antenna up 1000 miles? How about 23,000 miles?

For the technical experimenter, the field is wide open, from building low noise receivers to antenna design, packet, computer programming and orbital mechanics. Brass pounders take heart, most telemetry and a good percentage of communicating is done with CW. It's exciting to just be able to find a satellite and listen in on it (leave your 2-M rig on 143.625 sometime and you might catch the Mir Space Station cosmonauts).

This brief introduction will explain the basics of Amateur Satellites and give you some pointers to begin listening right now without getting technical. The capabilities of satellites in orbit today are a far cry from the Morse beeper of OSCAR 1 (Orbital Satellite Carrying Amateur Radio). Since that event in 1961, eleven other Oscars have been launched, including two by Great Britain and one by Japan. The Russians are also very active, having launched 9 Sputniks.

In general, each "bird" will carry some type of computer controller, transponders, beacons and power supplies. When discussing modes of operation, the terms "uplink" and "downlink" frequency are used to denote the transmitted signal from the earth station (uplink) or the satellite will "downlink" a telemetry beacon on a fixed frequency which may be used to determine availability of the satellite and reception/propagation conditions. But the real guts of the systems are the transponders.

These essentially real time, linear "repeaters" that accept an incoming uplink signal within a designated passband and retransmit that signal in a different passband. For example, Mode A is the designation for uplink on 2 meters and downlink on 10 meters. The newest Russian bird RS-10, when operating in Mode A, can be uplinked on 145.86-145.90 MHz. The downlink is heard on 29.36 - 29.40 MHz. CW and SSB only are used, since FM deviation is too broad and overtaxes the limited power resources of a satellite. Thus, any station that can "see" the bird can work it, and therefore work any ground station within the satellite horizon, up to several thousand miles or more.

OK, how do we get started? All that is needed to listen to some birds is a good HF receiver and dipole, or multi-mode 2 meter rig. I have even in-

tercepted some signals with my mobile FM rig in my car with a whip antenna. The low earth orbit birds are less than 1000 miles away and, therefore, can be picked up fairly easily, although their overhead time is usually less than 20 minutes. OSCAR 10, however, is in a highly elliptical orbit, which places it overheard for 10 hours or more, but at apogee (highest point), it is over 21,000 miles away. Special antennas, such as helixes or crossed Yagis with mast mounted preamps are normally required to receive the V/UHF downlink.

Next time we'll discuss the methods of satellite tracking in detail, but for now you can leave your receiver on when you are puttering about the shack and try to catch one when it is overhead. The "Satellite Experimenter's Handbook" published by the ARRL is an excellent reference and great for getting started. Also, satellite information is broadcast daily on the *ARRL Voice Bulletin*, or you may want to listen in on the weekly Amateur Satellite Net on Tuesdays at 2000 local on 3.840 MHz. Finally, a plug for AMSAT, the North American Amateur Satellite Corporation, which is the member organization of Hams that build, launch and operate the OSCARS.

THE BIRTH OF BROADCASTING

Rapid Vibration Theories Invention Of Vacuum Tubes

The birth of radio broadcasting was sparked by the efforts of creative experimenters and inventive tinkerers ... technical types. If you go way back to the beginning, you will find that it all began with an idea 300 years ago that there was something out there.

- 1678: Christian Juygens theorized that light was caused by the rapid vibration of invisible waves.
- 1750: Ben Franklin knew something was out there. He was struck by it.
- 1832: Michael Faraday theorized that the electricity in magnetism was sent through space by some sort of vibrations.
- 1873: James Clerk-Maxwell formulated a theory of electricity and magnetism – electromagnetic waves.
- 1883: Thomas Edison invented the electric light and discover the "Edison effect," electron flow in a vacuum.
- 1888: Heinrich Hertz proved the existence of Clerk-Maxwell's electromagnetic (radio) waves.

- 1896: Marconi put the electromagnetic theories of Clerk-Maxwell and Hertz into practice by discovering wireless communications.
- 1904: Ambrose Fleming applied the Edison effect to invent the vacuum diode tube.
- 1906: H. H. Dunwoody and G. W. Pickard discovered a solid-state semiconductor, the crystal detector.
- 1906: Lee De Forest invented the triode vacuum tube.
- 1912: Edwin Armstrong discovered regeneration (the positive feedback circuit).
- 1915: Irvin Langmuir discovered that improving the vacuum made electron tubes function better.
- 1918: Edwin Armstrong discovered the super-heterodyne circuit.
- 1919: The Radio Corporation of America (RCA) was formed by GE and AT&T. David Sarnoff conceived the idea of a radio as a home utility.
- 1920: KDKA and WWJ began broadcasting.
- 1924: RCA marketed an easy-to-use 6 tube superheterodyne radio.
- 1926: Radio became a home utility.
- 1933: Edwin H. Armstrong, discovered frequency modulation (FM).
- 1945: FM became broadcast radio's second technical innovation.

The development of the electronic vacuum tube was the technical innovation that signaled the beginning of radio broadcasting. The first broadcast technical innovation was the transmission and reception of amplitude modulation (AM).

by Ronald Balonis, Broadcast Engineering via The Readout

TRANSMITTER HUNTING

Radio Director Finding Simplified by Joseph D. Moeli, K0OV and Thomas N. Curlee, WB6UZZ (submitted by - Kay Wheeler).

This TAB book which was published in 1987 is one of the finest collections of practical hints which I have yet discovered. It is a book which is primarily intended for the hidden transmitter hunter. However, it contains practical antenna and circuit applications which will be of interest to most amateur radio operators.

The short chapters about the history of radio direction finding, getting started in RDF, and VHF mobile hunting techniques are well written and interesting. Then comes a full seventeen great chapters for the technically inclined. These chapters contain antenna projects, explanations of the more exotic systems, hints for the fox, and equipment such as attenuators and preamps.

One chapter which will be of special interest to the public service minded ham is that covering search and rescue hunting. This chapter contains all the necessary information for monitoring the Emergency Locator Transmitter (ELT) frequencies. ELT units are required on almost all aircraft and are activated by an impact of 5G or more. Activation of this unit is sometimes the only indication of an aircraft down.

The chapter on dealing with mischief and malice probably should be required reading for all ham operators. A number of practical real life examples are described as well as the pitfalls to avoid.

I would recommend this book to all radio amateurs. Read it for the interesting commentary, read it for the technical information, or read it just to be a well rounded and informed ham.

Tnx GRAM NEWS - Oct. 1989 via Spurious Emissions

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Attorney & Counselor-at-Law

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IMPORTANT FACTS AND TIPS ABOUT COAX

Many antenna installations quit working after about two years of use. Blame the coax?? More likely the problem is at the antenna connection point which deteriorates because it was left unprotected from the elements. The best coax sealant is called "Coax Seal" at about \$2.50 a roll, and available at all amateur radio stores. It goes on like silly putty and never hardens. It must be cool when applied or it will stick to your hands and make a real mess. Let's look at some coax specs:

Type	Jacket	dB loss
RG58/U	I	10.0
RG8X	II	8.0
RG8-MX	II	8.2
RG8/U	I	4.2
RG-213	II	4.7
9913	I	2.6

The dB loss (shown per 100 ft at 400 MHz) characteristics are important to insure that your transmitted power ultimately makes it to your antenna. That dB loss works in the other direction also! Although you may think you could live with a long run of coax and a half reduction (for each 3 dB) in output power, remember that all incoming weak signals will be similarly diminished. It works both ways.

The type of jacket, shown in the second column, is important in any exposed outdoor installations. The Type II is PVC and specifically suited for sunlight exposure without deteriorating. Type II also uses a solid dielectric that surrounds the center conductor, rather than foam. Foam dielectric is not acceptable in exposed environments because moisture quickly invades and ruins the otherwise excellent dry weather characteristics. The percentage of braid and center conductor size are also important. Cheap coax skimps on both counts. For short runs (under 30') RG8-MX is recommended. It is hard to find except at selected marine stores. Don't take the RG8X since it has a foam core. For longer runs RG-213 from Belden is the best choice. All the better ham stores carry this type.

Be especially wary of the hobby radio store's grade of RG8/U. For runs at 1296 MHz, go for the Belden 9913 which is easier to work than hard line, but still has decent characteristics. Good coax and proper feedpoint protection will insure a long-lasting installation. The trouble it takes to do the job twice is far greater than the extra cost of good materials. (Adapted from WorldRadio)

*de LARK Newsletter Livermore Amateur
Radio Klub via The Readout*

AMATEUR RADIO SCHOLARSHIPS AVAILABLE

The Foundation for Amateur Radio, Inc., a non-profit organization with headquarters in Washington, D.C., plans to award thirty-three (33) scholarships for the academic year 1990 - 1991 to assist licensed Radio Amateurs. The Foundation, composed of fifty local area Amateur Radio Clubs, fully funds five of these scholarships with the income from grants and its annual Hamfest. It administers, without cost to the donors, seven (7) scholarships for the Quarter Century Wireless Association, three (3) each for the Baltimore, (MD) Amateur Radio Club, the Radio Club of America, and the West Allis Radio Club of Milwaukee, (WI) and two (2) each for the Dade (FL) Radio Club, the Amateur Radio News Service, and the 10-10 International Net. It also administers one (1) each for the Richard G. Chichester Memorial, the Young Ladies' Radio League, the Columbia (MD) Amateur Radio Association, the Frederick (MD) Amateur Radio Club, the Vienna (VA) Wireless Society, the Goddard Amateur Radio Club and the Kevin B. Perdue Memorial.

Licensed Radio Amateurs may compete for these awards if they plan to pursue a full-time course of studies beyond high school and are enrolled in or have been accepted for enrollment at an accredited university, college or technical school. Some of the scholarships require the holding of at least an FCC GENERAL Class license or equivalent. The award range from \$500 to \$2000 with preference given in some cases to residents of specified geographical areas or the pursuit of certain study programs.

Additional information and an application form can be requested by letter or QSL card, postmarked prior to May 31, 1990 from:

FAR Scholarships
6903 Rhode Island Avenue
College Park, Maryland 20740

The Foundation for Amateur Radio, incorporated in the District of Columbia, is an exempt organization under Section 501(c)(3) of the Internal Revenue Code of 1954. It is devoted exclusively to promoting the interest of Amateur Radio and those scientific, literary and educational pursuits that advance the purpose of the Amateur Radio Service.

ROCHESTER HAMFEST

MAY 18, 19, 20, 1990