The Minuteman

Volume 24 Number One -- September, 1994

The Official Newsletter of the M.M.R.A.

PRESIDENT'S CORNER

Another Year...

1994 is here....only six years to the new millennium. The MMRA will be 30 years old then.... With any luck, most of us will be still alive and kicking. This is another Boxboro Convention year, and once again we have been asked to provide the talk-in for the event. We'll have a room where members can come and sit down to get a little break from walking around the flea market and vendor exhibits. We'll need some help Saturday and Sunday to run the talk-in station -- if you can spare a few hours on either day, let us know on one of the upcoming Tuesday night nets.

We had a good Field Day this summer; we operated 2A and scored about 2800 points. This year we perfected the cooking and relaxation shelter...after one of the fox hunts just before Field Day, we came up with a design using black water pipe and tarpaulins. It worked out really well -- this time, there was no frustration level associated with trying to keep a shelter up against the force of summer southwest winds. The shelter will come in handy for any other events we plan....it goes up in about 45 minutes and can cover a 14 by 20 foot area.

Once again, Bob Feltmate, WA1ZJE, provided power with his 10 KW diesel generator. He was also instrumental in the preparation of shelter components, doing some welding to make it easy to assemble. We're lucky to have a guy like him around....

It's budget time again; we delayed the SCOM 7K controller for Quincy until this year, so that is the largest budget item this year. Plans are in the works to get it in place this fall. The budget summary is on page 7; it will be submitted for members' approval at the meeting. Also on the program will be presentations about foxhunting, detailing what we have learned about techniques...we've gotten pretty good at it as a group. I'm sure you will also hear a few amusing anecdotes as well.

You may have noticed that Stoneham, 146.715 is linkable now. Chris and Clark Conti, N1NVL and N1NVK, went up to Stoneham on Labor Day and got the link working. As soon as we have completed the controller and interface boxes for Stoneham, the 440 machine will also be linked. The 2 meter link will be part-time, and 440 link full time. Hopefully by the end of the year the Quincy repeater will also be linkable, after we install the SCOM 7K.

Also before the end of the year, we will publish the user linking codes. for the Stoneham, Quincy and Weston 2 meter

Continued on Page 5.........

Electromagnetic Interactions with Materials

By Dave Croll, KT1X

PART I

As a ham, you are probably used to thinking about electromagnetic waves and fields in terms of their generation and their interactions with wires and aluminum tubing...the stuff of antennas. While important to a basic understanding of radio communications, these topics are not the complete story when it comes to electromagnetic waves and their interaction with the materials all around you.... all materials, including those classified as biological.
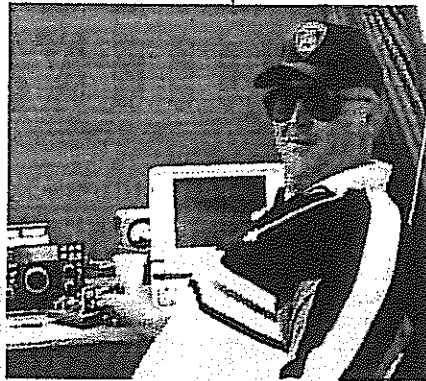
If you think about it, you will find that you have all sorts of experiences with electromagnetic waves and how they interact with matter. Tropospheric propagation such as ducting and reflections of RF off of buildings and large metal structures are common examples. Also, foliage and "general tree" attenuation of signals to and from repeaters. are common when the leaves are plentiful during the warmer months. In the summer, these effects can keep you from using a repeater from a fringe area.

The principles behind these effects are the foundation of new technologies such as Magnetic Resonance Imaging (MRI) which gives medicine one of its most powerful tools by providing uncannily accurate pictures of the internal structures of the human body. These same principles are also behind an increasing body of knowledge about the adverse effects of exposing living tissue to electromagnetic fields.

You may have read about the dangers of RF or Extra Low Frequency (ELF) fields; it is certainly a topic of interest to all hams. We would all like to understand the real risks. This series of articles will develop the subject of electromagnetic fields and their interactions with matter, biological and otherwise. Our objective is to convey an understanding of what is behind effects we notice everyday as hams -- the magic of MRI and

"I OWE IT ALL TO KB1FZ'S CHILI..."
W1JDO Photo

Continued on Page 2......

Meeting: Wednesday, Sept. 21, 1930 Hours - Campion Center

Interactions....Continued.

the dangers of RF field exposure.

An understanding of all of these topics depends on grasping the principles of electromagnetic fields interacting with materials, including those which are biological in origin. This first part will review the nature of electromagnetic waves and fields and the organization of matter in both living and inanimate forms.

From your study of radio waves you know electromagnetic radiation can be represented as waves propagating through space with a velocity, "c", of about 186,300 mph or in the metric system about 300,000,000 meters per second. The velocity "c" is the value normally used in calculating electromagnetic behavior in air. However, the true velocity of wave propagation varies significantly depending on the material through which it propagates.

For instance, the humidity content and temperature of air can effect the velocity of electromagnetic propagation. This gives rise to the refraction or bending of the direction of propagation of radio waves by the troposphere. This refraction effect is critically important to terrestrial VHF/UHF/SHF propagation beyond the line of sight.

Another example of variable electromagnetic wave velocity is the velocity of propagation on coaxial transmission lines, a concept familiar to many amateurs. The speed of electromagnetic propagation on the coaxial transmission line is decreased to a velocity which depends on the velocity factor of the transmission line. This is why the electrical length of a transmission line is different from the physical length and must be calculated using the velocity factor of the line.

Electromagnetic propagation velocity through a medium depends on how it interacts with that medium. Two concepts define that interaction: *"relative permittivity and magnetic permeability."* Part two will deal with

LEFT TO RIGHT: ANDY, N1BHI; TOM, WB1GMA, DOTTIE, N1BHA; BOB, WA1ZJE; CLARK, N1NVK; FRANK, W1JDO. NOT SHOWN: FRANK, KB1FZ; CHRIS, N1NVL; WALTER, N1HBR; MIKE, KD1OA (SEE PAGE 1). THE SHELTER HOUSED ALL OUR GOODIES, INCLUDING A VAT OF KB1FZ CHILI, LOTS OF COFFEE, HOT DOGS, HAMBURGS AND OTHER EDIBLES....
W1JDO Photo

permeability and other magnetic properties of matter.

Relative permittivity, or dielectric constant, is a ratio which measures the ability of a medium to support an electrostatic field with reference to a vacuum. In the case of a material, the interaction of an electric field with the atoms and molecules which make up the material determines the permittivity.

If an insulator, also called a dielectric, is placed between the plates of a charged capacitor, the electric field generated by the separated, oppositely charged, plates will polarize the insulator. This will decrease the electric field between the plates of the capacitor. This effect is dependent on the structures of the molecules which make up the material of interest. A perfect dielectric would not decrease that field...we'll have more to say about dielectrics in subsequent articles.

When placed in an electric field molecules will orient to generate an induced electric field that opposes the applied electric field. This effect varies in different materials, further affecting their quality as dielectrics -- as more opposition to the applied field occurs, the applied field is opposed, and the effective charge on the capacitor plates is less.

Electromagnetic waves consist of electric and magnetic fields which oscillate perpendicularly to each other, and to the direction of travel of the wave. The wave front is the plane which contains the oscillating electrical and magnetic components of the wave. Therefore, when a wave front interacts with any sort of dielectric, living or inanimate, oscillating interactions similar to the field effects caused by dielectrics in capacitors will occur.

These interactions cause a phenomenon called "scattering". It is this effect that manifests itself as reflections and refraction. Whenever material is impinged on by electromagnetic waves, the polarization of the electrons determines the relative permittivity or dielectric constant. The rapidly oscillating electric field component of the wave. causes electrons in the molecules to oscillate at the frequency of that wave. The nonuniform motion of charges (acceleration) causes the radiation of electromagnetic waves at the frequency of the incident wave. This process of radiation by accelerating charges is exactly what occurs when antenna currents produce an electromagnetic wave! It is this effect that makes resonant parasitic elements ("reflectors" and "directors") in a Yagi re-radiate. The physical design of the antenna sort of "organizes" the scattering effect to produce gain.

The nature of scattering and the effects that are seen from it are dependent on the material doing the scattering and the dimensions of the scattering surfaces relative to the wavelength of the electromagnetic radiation (this is a fundamental rule behind gain antenna design using parasitic elements). A good example of this is seen with fog. Very high frequency electromagnetic waves, i.e. light, are scattered from the beams of your headlights to make a diffuse glow in the fog ahead of you. Longer wavelengths, i.e. radio waves, pass through with little or no scattering. The lower the frequency the less scattering. At UHF and microwave frequencies scattering from objects does start to become noticeable, whereas on 40 m there is no scattering from most manmade objects or tropospheric effects.

The organization of the material causes the scattering phenomenon to occur as transmission through the medium (transparency), reflection or refraction. In the case of transparency, radiation striking a uniform medium is scattered so that all of the scattered waves cancel each other and only the forward wave propagates.

Interactions....Continued.

In reflection, two materials of different properties create a scattering discontinuity and at least some of the scattering occurs in a backwards direction.

The most complicated event involving scattering is refraction, which is responsible for the change in propagation velocity mentioned above. Here the scattered electromagnetic wave, known as a secondary wave, is phase-shifted relative to the incident wave. This means that the incident and scattered waves add to cause a phase shift and. time delay, so the velocity of propagation slows down! The ratio of the velocity of electromagnetic propagation to that in a vacuum is the refractive index. It is frequency dependent and, not surprisingly, is related to the induced polarization which contributes to the dielectric constant.

The slowing down of the wavefront propagating through the medium will not be uniform if there is a boundary between two materials of different refractive index, or if the refractive index varies throughout the medium. When this happens, the direction of propagation of the wavefront is bent. This effect is similar to that experienced by a formation of soldiers marching abreast over uneven terrain. Since the velocity of the individual soldiers will vary depending on the terrain, the movement of the formation will become distorted or bent. Differences in the pressure, temperature and humidity of the lower part of the atmosphere contribute to variation of the refractive index as a function of altitude. If the rate of change of refractive index with height is great enough, electromagnetic waves can be refracted back to toward the surface of the earth.

The region where atmospheric conditions make this refraction possible constitutes a tropospheric duct.

In the next article we will look at some additional topics such as magnetic phenomena, absorption and resonance. In subsequent articles we'll see how the phenomena we have discussed can be extended and applied to a variety of topics -- from the foliage/tree effect to microwave cooking, the operation of MRI imagers and the interaction of RF and ELF with living things.

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Editor's Note: This series will continue in the next and following issues. If you have any questions for Dave, hunt him down, he'll be glad to answer them.
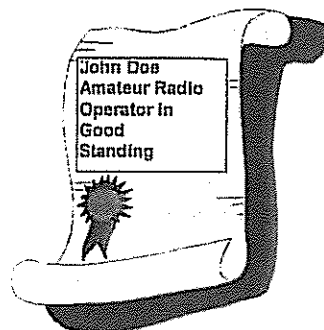
MMRA V.E. Sessions Announced for 1994 - 1995 — K1IJZ Presiding.....

The MMRA will conduct its monthly Amateur Radio license exam sessions on the second Saturday of the month. The next sessions will be held on September 10 and October 8, 1994, at 9AM. The tests are held in the auditorium at the Marlboro Public Library. Talk-in is available on the 146.61 repeater. Please bring:

- your license if you are already licensed, along with a photocopy of the license,
- any original CSCE's and a photcopy of each CSCE,
- a pen or pencil,
- a calculator,
- and $5.75 in cash or check payable to "William Wade / ARRL VEC".

At least one form of legal photo ID is required, such as a valid drivers license. Two non-photo ID's may be substituted in lieu of a photo ID. If you are unsure about ID, please call in advance. Morse Code exams are administered using headphones and answers are in multiple-choice format. To reserve a space or for further information, contact Bill Wade, K1IJZ, at 617-891-9079 between 6PM and 10PM weekdays or between 8AM and 10PM weekends. The MMRA VE team is accredited under the ARRL VE Coordinator Program.

de K1IJZ

We all owe Bill Wade, K1IJZ a vote of thanks for continuing the tradition started by Bob Levine, KD1GG. If you are a VE, or would like to become one to help out, get in touch with Bill.

SPEAKING OF VOLUNTEERISM.....

We can sure use help in any of the areas involved in managing a repeater group of this size. The best way to get involved is to jump in with both feet. We've got a bit of everything...Field Day, the Flea Sale, tech crew activities, fox hunting -- the list goes on. If we don't have an activity that you are interested in, gang up with people with that interest in common and get something going...the MMRA will support anything that is reasonable and is supportive of the Amateur Radio Service. Remember: Board meetings are open to members. You are always welcome to come with ideas, gripes or suggestions!

THE PUZZLE CORNER

by Frank Morrison, KB1FZ

Only two responses were received to the last Puzzle Corner, Carter W1TCD and Walter, N1BHR. Both had correct answers to Problem #1; my solution is shown in Figure 1.

The solution to Problem #2, concerning the three runners, is: Let the distance between A and C be d. Then the distance between A and B, and B and C, is d/2. A catches up to C in 4 minutes, and B catches up to C in 6 minutes, therefore

$$V_A - V_C = d/4 \text{ and } V_B - V_C = d/12$$
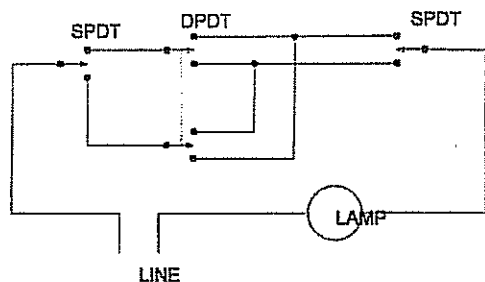

SPDT   DPDT   SPDT

LAMP

LINE

Figure 1

Subtracting the second equation from the first gives

$$V_A - V_B = d/6.$$

Since the distance traveled for A to catch B is d/2, the time required is 3 minutes. QED.

The solution to Problem #3, Part a:

In one hour, A will do 1/12 of the job and B will do 1/8 of the job. Therefor in one hour working together they will do 1/12 + 1/8 = 20/96 of the job. Hence working together the job will take 96/20 = 4.8 hours = 4 hours 48 minutes.

Problem #3, Part b:

In 2 hours, A does 2/12 = 1/6 of the job. Thus when B joins up, there is 5/6 of the job remaining. A can do this in (5/6)×12 = 10 hours, and B can do it in (5/6)×8 = 40/6 hours. Hence in 1 hour they together will do 1/10 + 6/40 = 1/4 of the remaining job. Hence the total time will be 2 + 4 = 6 hours.

Problem #4 has caused considerable discussion. W1TCD did not come up with the correct answer; N1HBR gave a correct answer for the first part of the question, but arrived at this correct answer through faulty reasoning, and was incorrect for the second part of the question. The correct answers are: The object dropped

from a height above the surface will fall to the East and slightly South of the point directly under the object at release. The object launched vertically upward will fall to the earth to the West and slightly North of the launch point, as long as the sub-release point and the launch point are not at either Pole. The reason behind these results is the effect of Coriolis acceleration, which is a phenomenon caused by the fact that the earth is rotating, and is the cause of the clockwise rotation of winds about a high pressure area and the counter-clockwise rotation of winds about a low pressure area, in the Northern hemisphere. These directions are reversed in the Southern hemisphere. A mathematical derivation of the Coriolis acceleration is available; if anyone is interested, please contact KB1FZ.

Now for some new brain teasers. I hope that more of you will take an interest in these puzzles, so that your responses can make the Puzzle Column more interesting to all.

Problem 1.

Three persons were stranded on a uninhabited atoll in the South Pacific after a shipwreck. Since coconut palms were in abundance, they decided to pick a supply of nuts for sustenance. At the end of the day, they had a sizable pile of nuts. However, the atoll was populated by a tribe of monkeys who also depended on coconuts for their food, and these monkeys were smart enough to realize that they could steal the nuts from the collected pile rather than having to climb the palms to get them. Recognizing this, the three persons decided that they had better keep a watch on their pile of nuts throughout the night to prevent the monkeys from stealing their coconuts.

The first person took up his coconut watch at sunset. While sitting there, he thought to himself, "If I take my third now and hide it away from the monkeys, I'll be ahead of the game." So, he counted the coconuts and found that if he threw one nut to the monkeys, the remaining number was divisible by three. So he tossed one to the monkeys, who were very grateful, took his third of the remaining nuts, and stashed them in a safe place.

The second person came on watch, and his thoughts were identical to those of the first watcher. He counted the nuts, found that there was one too many to be divided by three, threw one to the grateful monkeys, took his third of the remaining nuts, and stashed them away.

The third person came on watch early in the morning, and (you know it!) did exactly the same as the other that the pile of nuts was obviously diminished led him to realize that the others had taken their shares. So he did the same: threw one to the monkeys, took a third, and stashed them away in a safe place.

In the morning, the three woke up and decided to divide the (remaining) nuts among themselves. They found again that there were one too many to divide by three, so they threw another to the monkeys and each took his third.

The question is: How many nuts did they originally collect, and how many did each get at the final sharing?

Problem 2.

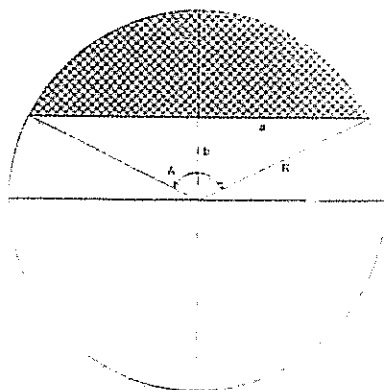Referring to Figure 2, show that the area of the shaded circular

Figure 3

segment above the chord is

$$Area = \frac{1}{2} R^2 [A - \sin(A)]$$

where A is the angle (in radians) subtended at the center by the two radii to the ends of the chord. The chord is 2a units in length, and is located b units above the diameter, which is 2R units.
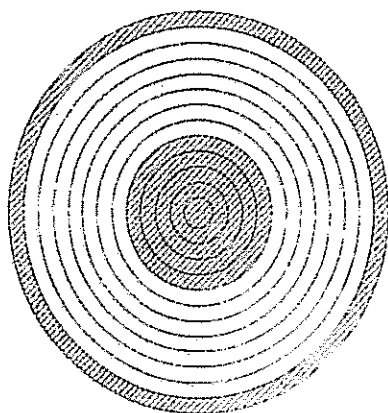
Problem 3.

Figure 2

Given a series of concentric circles, with a constant difference in radii, as shown in Figure 3. Show that the shaded areas are equal.

DURING WHAT CELESTIAL EVENT DOES THE PHENOMENON "BAILEYS BEADS" OCCUR?

The President's Corner...Continued

machines. The user code will bring the repeater into the network, and after a short period of inactivity, the repeater will return to the unlinked state. This will allow a member to bring the machine he or she is using into the network. If one should forget to unlink, that will happen automatically after 2 minutes of inactivity.

Setting all this up is a lot of work. Walter Ching, N1HBR has made major contributions in the SCOM programming area. Chris and Clark Conti, N1NVL and N1NVK, have worked on the software and the physical aspects of the linking. And we mustn't forget the original contributions of Scott Bullock, KA1CLX, who started the linking with the original software and hardware. Working with all these guys is a pleasure. Chris and Clark are fond of of the saying "We're not professionals...we're amateurs." Well....the results of their efforts are pretty professional....and Walter, working quietly in the background, does more for the MMRA than any other 3 guys.

One of the least pleasant jobs is done by Mark, AA1IA. He's the guy who assembles and mails out the newsletter. He hangs out on 440, and usually listens to 449.925. So if you hear him and get the chance, add your thanks to mine.

We are planning a flea market again this year. We are tentatively scheduled for Sunday, March 19, 1995, pending final approval by Westboro High School. We'll know for sure by the next newsletter publishing date. Assuming the Westboro High School is available, that will be the location.

On a lighter note....too bad more of you didn't join us for the summer's fox hunts. We had a ball, both on Tuesday nights and Saturdays. Our foxes honed the fine art of busting hunters chops to a fine edge, slicing and dicing the egos of those who stumbled around....at one time or another, that could have been any of us. Ed, N1NOM, became quite fond of the "testiness" that became evident as a hunt progressed with less than satisfactory results for the hunters. The hunts will continue on Saturdays, and we are giving some thought to a real challenge for the fox hunting afficionados in the area. We'll solicit ideas at the meeting.

I'll close with the annual plea for more member involvement. We're a big group....lots of resources untapped. The way to get involved is to just jump in. When you hear that a work party is forming up to work at a site, join in. Once you get involved with the group of guys that make it happen, you'll find that we try to maximize the fun content. Almost invariably a work party is as much a social occasion as it is work.

The best way to find out what's going on is to check into the Tuesday evening Technical and Information Net. When something is about to happen, it's usually mentioned there. The net fills the gap between newsletters for information about what's going on, and its also a good way to meet other members. The net starts at 2000 hours each Tuesday night, and all the links that can be are brought up. So join in.

See you at the meeting.....de N1BHI.

IT'S REAL NICE TO HAVE THE RIGHT TOOLS HANDY......

Chris, N1NVL, who is in the Cellular phone business, had a nice toy with him one afternoon after doing some site work. That toy is a Time Domain Reflectometer, otherwise known as a "TDR." So what's a TDR? Its a box that sends pulses up the line, measures impedance, gives the length of the line and spots anything along the way that can affect the impedance of the line. Kinks, open connectors, shorts, bad dielectric all will have a signature that will tell you what's wrong. When sweeping one of the lines in Weston, the chart showed a dead short -- zero ohms impedance -- immediately after the jumper being used. Andy, N1BHI, pulled apart the connector and found that who ever had installed it never soldered the pin to the center conductor.

If you look at the charts to the right you can see what We are talking about. The top chart is a sweep of the 449.925 feedline. The bottom chart shows the sweep of 147.27, also located at Slygo. Note the flat line leading to the vertical line -- that marks the feedpoint of the antenna. When a line is good, that's what it looks like. Below is a wavey line that indicates a line that probably is just getting old....things like kinks show up as more of a spikey looking perturbation.

The lines at Slygo Hill, Weston and Quincy have been swept....an interesting finding at Quincy arose from all this. The link radio hardline is 72 ohm line. There are pieces of 50 ohm line on each end, but the big chunk in the middle is Cable TV transmission line. This isn't really a problem -- the link works well -- but it did come as a bit of a surprise.

The bottom line is that we have been lucky to have guys involved who have access to this type of equipment. Scott, KA1CLX, and now Chris have been able to apply some of their professional tools to our systems. The TDR Chris used is a key tool in maintaining UHF stuff like cellular telephone antenna systems. At UHF, transmission lines have to be nearly perfect, or coverage suffers seriously.

Chris recently changed jobs, and now works in the cellular phone industry. His recent job change forced him to keep a low profile for a while, but he's getting back into things in fine style.

The TDR has both an LCD display and a small fax style heat process printer. The charts are produced as strips, popping out of a slot on the front of the machine.
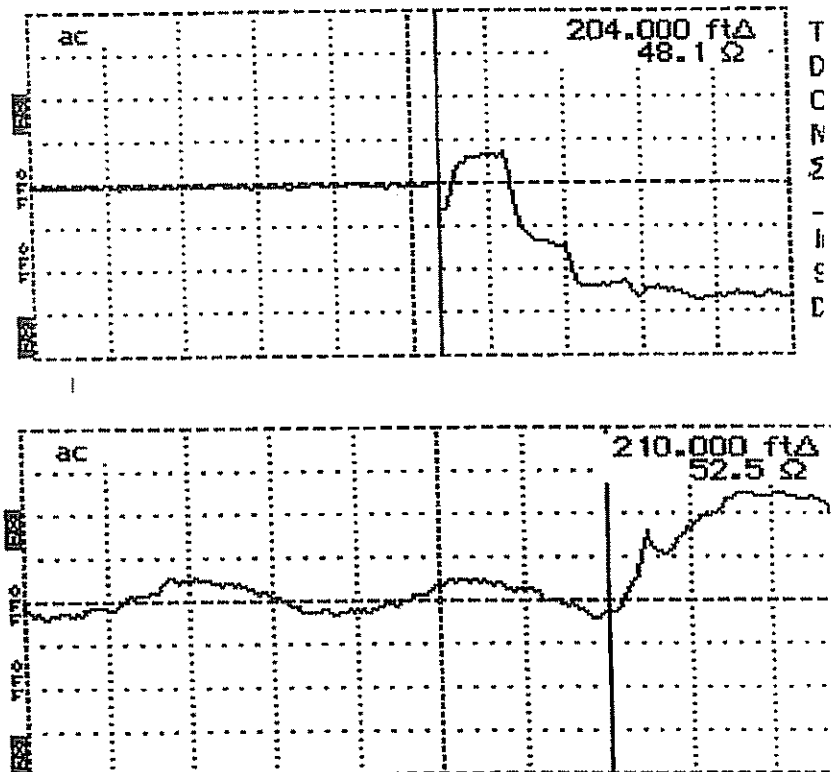
By the way...don't forget that the MMRA has some toys of its own...and at the meeting, you can get your HT checked out with the club IFR 1000S.

MMRA Annual Budget -- Fiscal Year September 1994 -- September 1995

Income:	93-94 Budget	93-94 Actual	94 - 95 Budget	Comments
Dues	7500.00	8025.25	7750.00	
Flea Market	1000.00	1456.90	1300.00	
Raffles	200.00	107.45	200.00	
Misc.		600.00	0.00	Actual: income from finder kits
Total	8700.00	10189.60	9250.00	
Expenses:				
Administration	3900.00	4146.17	4100.00	
N1BHI-146.61	540.00	289.01	540.00	
KA1HKP-146.67	1130.00	391.25	1130.00	Budget: SCOM 7K Controller
N1NVL-146.715	530.00	406.67	530.00	
KA1AL-146.82	480.00	368.54	480.00	
N1BHI-223.94	200.00	18.51	250.00	Budget: HamTronics Receiver
N1KUG-224.40	100.00	64.00	100.00	
N1HBR-224.70	100.00	307.85	100.00	
N1NVK-446.725		104.22	100.00	
N1HBR-449.925	800.00	1513.37	800.00	
KA1OUI-145.03	150.00	0.00	100.00	
R&D/Contingency	500.00	1767.40	1000.00	Actual: 446.725 rptr, kits, doppler
Field Day	250.00	590.00	0.00	
Total	8680.00	9966.99	9230.00	
Administration				
Newsletter	1500.00		1500.00	
Meetings	300.00		300.00	
President's Account	50.00		50.00	
Secretary's Account	300.00		300.00	
Treasurer's Account	100.00		200.00	
Flea Market	400.00		500.00	
Insurance	950.00		950.00	
P.O. Box	100.00		100.00	
Miscellaneous	200.00		200.00	
Total	3900.00		4100.00	
Bank Balance - Sept 1, 1994			6874.50	
Test Equipment Fund- remains from money raised by raffles		711.00		Actual includes IFR repair.- 1045.99 left in fund

Flea Market Schedule   © 1994 W1GSL Re-printed with permission.

25 Sept Framingham MA	@ HS $14@8 $10tg $5@9 $2@10	Lew K1AZE 508 879 7456 F
25 Sept Yonkers NY	@Lincoln HS $5@9 $25/T@7	Otto WB2SLQ 914 969 1053 F
1,2 Oct Boxboro MA NE Div Conv.	@Host Hotel 8AM	Gene W1VRK 617 631 7388 F+
2 Oct Queens NY	@Hall of Science 47-01 111st	Arnie WB2YXB 718 343 0172
7,8 Oct Rochester NH Hoss Traders	@FG x13 rt16 $20@9A $5@3PM fri	Joe K1RQG
8,9 Oct Durham CT Nutmeg	@FG Opens 4PM sat $5-25	Jim N1IZF 203 349 3353 F
16 Oct Cambridge MA	FLEA at MIT	Nick 617 253 3776 F
16 Oct Old Westbury NY LIMARC	@NYIT $15@6 $6@9	Neil WE2V 516 462 2446 +
29 Oct Nashua NH NE Antique RC $5	@9 $1@10 @ Res Ctr Church	617 923 2665 F+
29 Oct Waterford CT Tri-City ARC Auct	@SRctr RT85 @10 noTG	Bob 203 739 8016
30 Oct Poughkeepsie NY Mt B ARC	@Arl HS s@6 b@8	Ken KL7JCQ 914 485 9617
12 Nov Plymouth MA Mayflower RC	@Mem Hall 9-3 sell@8	Jon WS1K 508 746-0162
13 Nov Branford CT SCARA	@intrm sch	Brad WA1TAS 203 265 9983 T
19 Nov Billerica MA 1200RC	@Bull HN Auction b@11A	Eliot W1MJ 508 851 0183 +
4 Dec Fall River MA BCRA	@Bank St Ar $2@9 $5/15@8	Tom WA1LBK 508 674 4163 T

Repeater Report....
de Chris Conti, N1NVL

A couple of guys offerred to help work on the Quincy machine this spring. Because of all the confusion and changes associated with my job change, I lost your info....I'm sorry for the lapse; please get back in touch. We need all the help we can get. Call the voice mail line (508-489-2282) and leave me a message; I'll be in touch.

449.925--N1HBR/R Marlboro

The power amp was croaked by lightening. Walter removed the amp and is proceeding with repairs.

446.725--N1NVK/R Stoneham

Changes in audio feed points and thorough alignment of the exciter by Brian, KA1YQB, netted a nifty running machine. Clark, N1NVL, and I did some antenna work; there seems to be some coverage improvement.

224.70--N1HBR/R Weston

The link freakiness was being caused by the bad connector found by the TDR sweep. We switched to the alternate link antenna, and things have been doing fine since.

224.40--N1KUG/R Quincy

Our newest trustee, Bill, N1KUG, dove right in and did some nifty fixes to the 220 machine. We need better grounding of the hardline and replacement of jumpers (in progress)... and I have to make a public apology to Bill for being forgetful and letting him wait three hours for me one evening. Sorry Bill! At least the site did get aired out and cleaned. Thanks, Bill.

223.94--N1BHI/R Hopkinton

Andy apologizes for the long delay in getting the machine back online...he's been as busy as the rest of us this summer. He's made arrangements with Tenneco to get the machine back in place in the next few weeks.

146.82--KA1AL/R Weston

Another power amp died -- at least it went intermittent. Walter loaned Weston his 170 watt mobile amp so we can run 50 watts. Brian, KA1YQB, is going to take that amp and wring it out for us.

146.715--N1NVL/R Stoneham

The link is up! We can now link the repeater back up to 449.925, bringing it into the network. Clark, N1NVK, helped me get it working on Labor Day. We had it up for the first net in September. Note: If the link is up when a user initiates the autopatch, the link goes down. That's as it should be... the link just doesn't come back up like it should -- a minor bug to be fixed.

146.67--KA1HKP/R Quincy

We haven't forgotten the new controller. That will be the first order of business after budget approval, along with re-working the grounding for the whole site. Most of our problems with interference and desense are caused by noise that good grounds should get rid of.

146.61--N1BHI/R Marlboro

'61 continues to work well; Andy is planning a work party before it gets too cold to re-align everything and do winter preparation.

General Comments......

I want to know what you think! send comments, submit ideas or suggestions to the MMRA, check into the net or see me at the meeting.

Remember: at the meeting you are always welcome to see the repeaters at the Campion Center. We generally hold a tour of the repeater room after the meeting. Just ask!

One of our members asked about having autodial on the autopatches for each repeater. It would be nice...but memory limitations and the difficulty of maintaining a list of member oriented autodial macros make it more work than we have the time or people for.

It's Time to Renew Your Membership for 1994-1995! Frank, KB1FZ, and Walter, N1HBR, collaborated to design a new spiffy membership card. So be the first on your repeater to get one of the new cards! We need your continuing support!

MMRA Information - Repeaters, Officers and Board Members

MMRA Repeaters:

Marlboro	146.61	N1BHI/R	FTL	P	
Marlboro	449.925	N1HBR/R	FTL	P	
Quincy	146.67	KA1HKP/R	PTL	P	
Quincy	224.40	N1KUG/R	FTL	L	PL - 103.5 in, none out
Weston	146.82	KA1AL/R	PTL	P	
Weston	224.70	N1HBR/R	FTL	L	
Hopkinton	223.94	N1BHI/R	FTL	L	
Stoneham	146.715	N1NVL/R	PTL	P	PL - 146.2 out, none in.
Stoneham	446.725	N1NVK/R	PTL	L	PL - 88.5 in, none out

[FTL = Full Time Linked   PTL = Part Time Linked]
[L = Patch available via link]   P = Local Autopatch]

MMRA Officers:

President:	Andy Morrison, N1BHI	To Contact Officers
Vice President:	Walter Ching, N1HBR	or Board Members
Secretary:	Frank Morrison, KB1FZ	Call MMRA Voice
Treasurer:	Ian MacLennon, AF1R	Mail Line:
Clerk:	Clark Conti, N1NVK	
Directors:	Tom Qualtieri, WB1GMA	508 - 489 - 2282
	Al Kunian, KA1AL	Toll Free from
	Chris Conti, N1NVL	508 and 617 Areas
	Mike Ryan, KD1OA	
Newsletter Editor:	Andy Morrison, N1BHI	

Important MMRA Club Information:

Membership Meetings:	3rd Wed of Sept, Nov, Jan, Mar, May at Campion Center, Weston at 7:30 PM
	Meeting Dates for 1994-95 Season: September 21, November 16, January 18, March 15, & May 17.
Board Meetings:	3rd Wed of Oct, Dec, Feb, Apr. Meetings are open and members are welcome.
	If a visiting member wants to be on the agenda, please contact Andy Morrison beforehand.
MMRA Voice Mailbox	(508) 489-2282. -- This is a local call to any 508 exchange phone.

Newsletter Information	September issue	November issue	January Issue	March Issue	May issue
Mailing Date	Sept 14, 1994!	Nov 9, 1994	Jan 11, 1994	Mar 8, 1994	May 10, 1994
Submission Deadline	Sept 10, 1994	Oct 26, 1994	Dec 28, 1994	Feb 22, 1994	Apr 26, 1994

The MMRA is dedicated to Amateur Radio and the public service. The MMRA is a registered non-profit Massachusetts corporation. Membership is open to all amateurs. Annual dues are $25.00 individual, $35.00 family.

September Meeting Agenda

Wednesday, September 21, 1994

Campion Center, Weston - 1930 Hours

Annual Budget

Fox Hunting Experiences and Anecdotes

HT Clinic with Club IFR 1000S

Upcoming Events

Mail Return Address:

MMRA
P.O. Box 2282
Lexington, MA 02173

TO:

First Class Mail