

Central Oklahoma Radio Amateurs

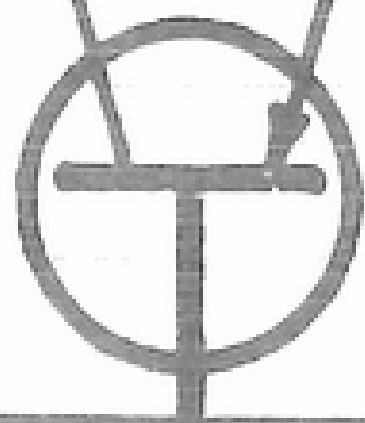
COLLECTOR

AND

EMITTER

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AN INFORMATIVE MAGAZINE
PUBLISHED MONTHLY BY AND
FOR OKLAHOMA RADIO
AMATEURS

AND ANYONE INTERESTED IN
LEARNING ABOUT IT

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Central Oklahoma Radio Amateurs

COLLECTOR AND EMITTER



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Central Oklahoma Radio Amateurs, Inc. (CORA) is a not-for profit association of radio amateurs, founded for the promotion of interest in amateur radio communication and experimentation, for the advancement of the radio art and of the public welfare and operates to enhance the cooperation of member clubs in sponsoring activities of mutual interest to the clubs and all radio amateurs.

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BIARC EDIE DAY	WB5YHG	691-1194			

PARTICIPATING CLUBS FOR CORA COLLECTOR & EMITTER:

AERONAUTICAL CENTER AMATEUR RADIO CLUB

Poatal Station 18, Okla City OK 73169

MEETS: 8:00 PM First Friday each month

Flight Standards Bldg, FAA Aero Center

Pres	Robert Graham	WB5NSV	677-8685
V-P	Robert Runyon	W5JES	373-1818
Sec/Tr	Bob James	K5FW	787-5793
Assist	Paul Asplin	WA5HTL	685-6590

MID-OKLAHOMA REPEATOR

MEETS: 8:00 PM Tuesday, first full week in month. Okla City EOC, 4600 N Eastern

Pres	John Huckaby	K5QDR	672-4706
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Dues:	Sid Gerber, 829 E Bouse, MWC		73110

OKLAHOMA UNIVERSITY AMATEUR RADIO CLUB

202 W Boyd, Room 219, Norman OK 73069

MEETS: 1st & 3rd Wednesday, 8:00 PM

STUDENT UNION, Room 161

Pres	Kenny Hutchison	WB5RXZ
V-P	Kirk Kirkland	WB5MJM
Sec	Nathan Kirby	WD5GWG
Treas	Mike Salem	WA5EPK

BICENTENNIAL AMATEUR RADIO CLUB

MEETS: 3rd Tuesday each month 7:00 PM

AIR National Guard, Will Rogers Airport

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V-P	Dick Baker	WB5TMW	685-2867
Sec	Mark Northcutt	WD5DYI	842-1086
Treas	Joe Ramage	WB5TDW	685-4814
Activities	Bill Riddles, WA5MZW		

OKLAHOMA CENTRAL AMATEUR RADIO CLUB

323 NW 10th, Okla City OK 73103

MEETS: 8:00 PM third Friday each month

American Red Cross Bldg, 10th & Hudson

Pres	Ken Ford	WB5KHU	528-8770
V-P	Al Prince	WB5KCU	
Sec	Joe Buswell	K5JB	732-0676
Treas	Ellard Foster	W5KE	789-6702

OKLAHOMA CITY AUTOPATCH ASSOCIATION

MEETS: 7:30 PM 3rd Tuesday, Monthly
Oklahoma Military Academy 36th & Grand

Pres	Jim Denman	WB5OEL	681-6048
V-P	Joe Hustak	WA5ZNQ	789-8587
Sec/Tr	Hobe Burgan	WB5MLN	751-1646

CENTRAL OKLAHOMA RADIO AMATEURS,

MEETS: 7:30 PM, fourth Wednesday

Red Cross Bldg., 10th & Hudson.

Come to the alley entrance.

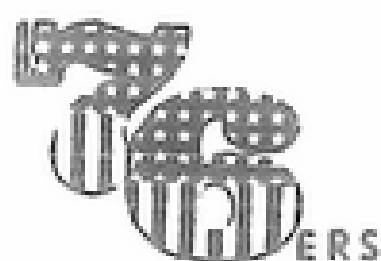
ALTUS HAM CLUB

MEETS 7:30 PM, 2nd Thursday,
North Main Fire Station (CD)

Pres	Bob Bratton	WD5BBW	782-3073
Sec/Tr	Richard Spencer	WB5PUF	477-1946



Amateur Radio News Service



THE BICENTENNIAL AMATEUR RADIO CLUB



For the most part, we had a pretty good meeting January 17, 1978 considering the weather.

One thing we decided was for the next meeting we will meet as the guest of the Autopatch Club at KWTW for the meeting of the Storm Weather Net on February 21, 1978. Therefore, our next meeting at Air National Guard Base will be March 21, 1978.

For the next meeting we should start planning for Field Day. Also, Bill Riddles N5WM promises an exciting program. So don't forget to mark your calendar.

Our ham school is now into full swing on Tuesdays and turn out has been pretty good.

Remember the Simulated Emergency Test (SET) is coming up the last of January so be ready to do your part.

BCNU, 73
Ken K5UAB
President

Early this summer Dad and I started on a project that took until Christmas to complete. We bought a 40 foot tower, a Ham II rotator, and a 10, 15 and 20 meter quad antenna. The easy part was paying for the equipment. The hard part was getting it all together and getting it to work properly. Without good friends like Coy Day and Bill Riddles who knew where to get the equipment and how to put it together, we wouldn't have gotten it up before the year 2000.

Mr. Riddles stressed digging a deep hole for the tower base. Dad and I dug so deep we struck oil! (Not really) Once the cement set, the tower went up quickly. The secret, of course, is to have everything level to start with.

Next came the rotator. Thanks to Mr. Day, we had enough information to mount and wire it so that it performed smoothly. You'd have thought my Dad was something from outer space as he scrambled up the tower with the rotator strapped to his back. He said later he wished he'd been born an octopus. Seems like you never have enough hands when you are working on a tower.

We built the quad in two sections right on the ground. Dad added a 2 meter antenna (home brew) but we haven't tested it yet. We measured and calibrated everything about ten times to make sure it all worked the way it was supposed to. As we added parts, the monster kept getting bigger and bigger. We started having doubts about getting it to the top of the tower. The spreader arms, for example, were twenty-four feet from tip to tip. Fortunately, each section weighed only twenty-one pounds so the whole thing weighed only forty-two pounds. By the way, as all of you know, the two sections are called the reflector and driven elements.

On "H-Day" (hoist day), we put a pipe and pulley assembly (again a home brew type) atop the tower inserted into the rotator pipe which was a part of the boom-to-mast bracket. We started hoisting away. Did you ever notice that the wind can be dead calm and the weather just like spring until you get on a tower? Right away the wind gets up to about a hundred miles an hour, rain clouds come up out of nowhere and there you are clinging on for dear life! To make it even more fun a whole flock of Monarch butterflies decided to migrate and used my tower as a reference point. We had a little trouble with two large birds which we decided were vultures. This didn't help our morale.

The pulley only broke once. Fortunately we had tied the safety rope securely so that the quad half didn't fall far enough to do any damage. When we installed the new pulley everything went smoothly. I hoisted from the ground and Dad "walked" the monster to the top.

We bolted each half into the boom-to-mast bracket and only forgot to detach one section of nylon rope which was out of reach and still waving. It does make a nice wind indicator but adds nothing to the functional use or ethnic beauty of the quad.

After securing the co-ax and rotator cables properly all the way up and down the tower and wiring them into my radio room, I "fired up" the rotator control unit. It worked but I still can't get used to that monster moving so easily and silently just where you want it to.



We got the quad up on December 23rd. I started out calling "CQ DX" right away. I pointed the quad to the south and in a few minutes Bill (CE2AZ) who is located in Valparaiso, Chile, answered. We were both 59. It was quite a thrill. Since then I've been getting a lot of foreign contacts from places I had never heard of before. Most of it is on 15 meters and on the phone band.

This monster is supposed to "ride out" one hundred mile an hour winds. I turn it 90° to the wind when I'm not using it and there is no appreciable sway or movement. Time will tell as to whether it can survive the Oklahoma winds.

I'm keeping my fingers crossed.

Greg Peck WB5PNV

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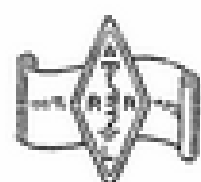
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ED BLACKWELL

WD5FKG

Manager



WS PAA

DAY	GMT	ORG	MODE	NET-CONTR.	NET
Sunday	0300	3,775	SSB	-----	Middle & South American DX
	0345	7,085	SSB	5Z4KL VP1BH	Afro-Caribbean
	0400	14,265	SSB	-----	Pandora's Box DX
	0600	14,115	SSB	S79DF	Indian Ocean
	0700	14,180	SSB	TU2DO	Africa
	0700	21,225	SSB	VK3PA ZL1BKX	VK/ZL/Africana
	0800	3,780	SSB	-----	HB Net
	0900	3,660	SSB	-----	DM DX NET (2.&4.) Sunday
	0900	3,702	SSB	-----	OK DX NET
	0930	3,570	CW	-----	ISWL NET
	1100	14,175	SSB	HI8XUP XU1DX	Asia/Caribbean
	1730	14,280	SSB	G3IOR	Africa/Europa AMSAT
	1800	14,280	SSB	W3ZM	International AMSAT
	1800	21,250	SSB	-----	Antarctica Net
	1900	21,280	SSB	W3ZM	International AMSAT
MONDAY	1400	14,250	SSB	-----	Arabian Knight
	1800	3,750	SSB	DKØDX	South German DX Group
TUESDAY	2100	3,720	SSB	-----	ISWL NET
	0200	3,845	SSB	-----	North Carolina DX
	0600	14,265	SSB	-----	Pacific DX
WEDNESDAY	0830	14,305	SSB	-----	Micronesia Net
	1500	7,000	SSB	9M2DQ	SE Asia Net
	0900	3,650	SSB	-----	VK NET
	1100	14,175	SSB	HI8XUP XU1DX	Asia/Caribbean
	1700	14,197	SSB	-----	Caribbean Net
THURSDAY	1900	3,700	SSB	YU3CM	YU DX
	0400	14,265	SSB	-----	Pandora's Box DX
FRIDAY	0430	14,250	SSB	UW9WR	World DX
	0500	14,195	SSB	7Z3AB	Arabian
	0500	14,250	SSB	JY3ZH	International DX
	0600	14,265	SSB	-----	Pacific DX
	1100	14,175	SSB	HI8XKP XU1DX	Asia-Caribbean
	1330	14,195	SSB	JY3ZH	Arabian Knight
	1400	14,250	SSB	UK5MAF	DX NET
	1500	7,000	SSB	9M2DQ	SE ASIA NET
	1740	3,750	SSB	DKØDX	DX INFO/DL
	1900	3,750	SSB	DL6KA DK3GI	SDXG NET
SATURDAY	2120	3,602	SSB	-----	Dutch DX Information
	0200	3,845	SSB	-----	North Carolina DX Info
	0345	7,085	SSB	5Z4KL	Afro-Caribbean
	0400	14,265	SSB	-----	Pandora's Box DX
	0500	14,347	SSB	-----	Pacific Net
	0700	21,225	SSB	ZL1BKX	VK/ZL/AFRICANA
	1000	14,250	SSB	UI8LL	USSR DX
	1000	14,280	SSB	G3IOP	Western Europe AMSAT
	1100	14,175	SSB	XU1DX HI8XKP	Asia-Caribbean
	1100	14,280	SSB	TU2EF	African Net
	1130	21,280	SSB	TU2EF	African Net
	1800	21,250	SSB	-----	Antarctica Net
DAILY	0700	14,315	SSB	KG6JFC	Inter Island
	1100	21,320	SSB	-----	SE Asia
	1430	21,354	SSB	G3LQP	British Commonwealth



1730	21,335	SSB	WØGX	Africana Net
1800	14,170	SSB	6W8DY	French Net
1800	21,335	SSB	-----	Africana Net
1900	21,335	SSB	-----	Africana Net
1930	21,300	SSB	W8KGR	West Africa Net
2300	3,790	SSB	YO3JW	Asia Net
2030	3,780	SSB	-----	DX info Net
2100	3,620	SSB	-----	USSR Net
2100	3,795	SSB	ON4UN	European 80m DX Info Net
2100	21,360	SSB	4X4HF	4X4 Net

This is the Dx net listing I promised you last time. While it is not a complete listing, it should serve as a good reference for finding those rare DX stations.

Best DX and 73

Joe, WB5YKD

WANTED: Good used rotary beam, 10, 15, 20 meters. Other radio equipment. Also Guns. Ivan, W5HFU. Phone 942-4160.

FOR SALE: Collins 75S1 receiver in good condition-\$275. Heath SB 303 receiver w/filters & speaker - \$290. Bill Riddles.WA5MZW. 842-0092.

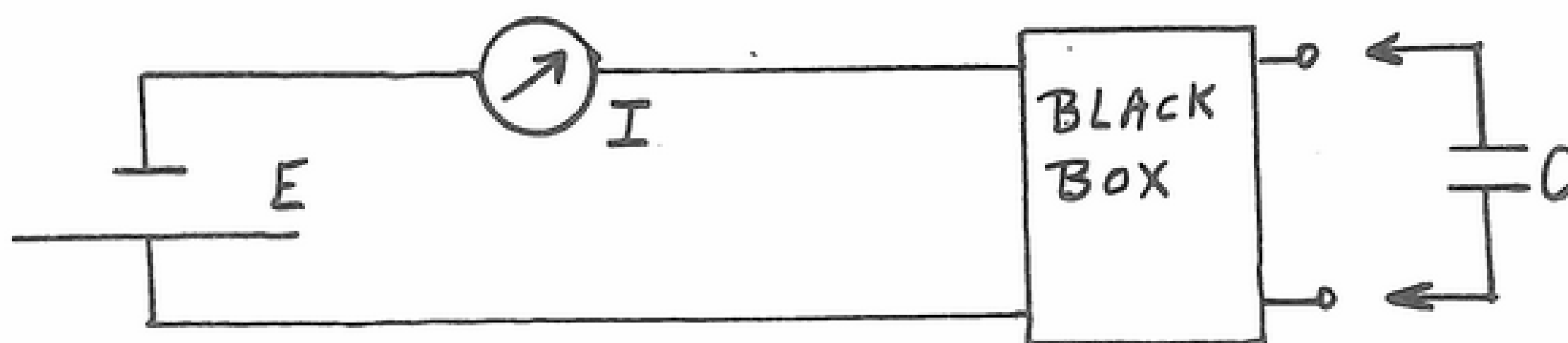
FOR SALE: Signal Generator, General Radio 202B, AM/FM, 10 mHz - 216 mHz. \$100. Dave, W5HMT, 848-2185.

01/61 Wheat straw repeater provides code practice at 5-20 WPM 8:00-8:30 p.m. Mon-Wed-Fri.

FOR SALE: SB-101 W/P.S. Speaker and CW filter. Call Howard at 685-4805. \$350.00

FOR SALE: Yaesu phone patch/speaker, Digital display, Antenna, Tower, Rotor, Beam, Station control, Tektronix 545A scope, Tube checker, Signal generator, Digital voltmeter, Desk, Glass, Chair, Shelf, Work bench, Digital clock. Bob McClain, W5QFH, phone 528-6461.

NEED TO SELL: Dentron 160-10 Super Tuner, tunes all types antennas, 1 kw. Swan SWR-1 combination SWR & power meter. Both Mint for \$120. New 2 position antenna switch free. Robbie, WB5VXL, 321-0077, Norman.



When "C" is connected, "I" is reduced by a factor of approximately 2.

WHAT IS IN THE BOX?

Answer will be in next month's issue.



Robby's Swan Song:

Annual elections are over, and this is my last official act as your sec/treas. I'm more than a little relieved at the prospect of turning over this office to my good friend Bob James K5FW. I've not been able to devote the time and attention to this very important job that it deserved during the past year. Many and complex personal problems and demands intervened; and the prospect of another year or more of even higher levels of demands made the future even worse.

Bob Graham, WB5NSV has been elected President for the coming year. Bob works in Hangar 9 as an aircraft mechanic, and is an Advanced Class Amateur. He has built a rather impressive micro-computer (not a kit), and has some unique ideas for the club during the coming year. I just don't know how we could have made a better choice for the top job.

Bob James K5FW (formerly WB5TKF) will be taking on the most important and demanding job of Secretary-Treasurer. Bob goes back a long ways in electronics, with interest in Amateur radio a rather recent development. Like many people working professionally in the field, he found himself long on theory, and a bit short on the code requirements. My own absence from the field was of such length that the only thing I retained was a rather decent code proficiency, so Bob and I teamed up; climbed the Mount Everest of hamdom, and made our Amateur Extra's together with him pushing on the theory, and me pulling on the code. Bob will make a much better Secretary than I did. He will have considerably more time to devote to the chores. The club is in a new era now. We are a creature of the DOT, and as such have acquired a special relationship with the Department which requires quarterly audits, and liaisons with Labor Relations people and other levels of our bureaucracy. All this means that the Secretary-Treasurer of this club has to be singly on top of a wide range of things involved with these special relationships not common to other clubs.

I'm grateful for your expression of confidence in me for letting me serve as Vice-President during this next year. In this capacity, I can back-stop both other men in their duties. This club enjoys a rather large proportion of total membership from the Associate Members. Of such value to us are these members that we accord them full voting privilages through rules suspension at each club election. In recognition of their position, and ex-officio officer is elected from the Associate ranks. This year Paul Asplin, WA5HTL, who is an active amateur on all bands will fill this position. Paul will represent the Associate members very well, I'm sure.

Looking at this line-up makes one wonder if the club will be Bob-Bob-Bob'ing along with Paul's help this year...73, Robby W5JES

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WORKING THE 10-METER CONTEST

According to the West Coast DX Bulletin, band conditions were going to be dismal for the ARRL 10-meter contest December 10 - 11, but a decision was made to work it hard from the WB5TZZ shack. Joining in the multi-op effort were WA5MLT and WB5UWB.

Promptly at 1200 Z on Saturday, I keyed the TS820S feeding an MLA 2500 to start the grind. It was dark outside and just as dark on the band at this hour and about all we accomplished the first few minutes was learning that WB5UWB lives too close to me to serve as a spotter; the Dentron's big signal swamped him all over the band. So much for trying anything sophisticated . . . and we had an exotic 2-meter frequency worked out for simplex "intercom" too.

First contact was at 1225 with a WD9 and Virginias and Marylands followed quickly, starting a pattern from 3s and 4s that would prevail for much of the contest. The band was sluggish opening and we didn't really imagine it would open much at all.

The first three and a half hours were like pulling teeth, although we did pick up 15 multipliers including Canal Zone and Puerto Rico. At about 1530, however, it began to pick up, mainly with more north-south skip, including Brazil and Argentina. By 1700 it was warming further with WA5MLT at the mic.

About 1800, I was back at the desk and the band shortly afterward opened magnificently into the northeast. Learned what DX stations feel like under those pileups, working four and five stations a minute. All of New England came in for multipliers during a fifteen minute stretch.

Things cooled a little later Saturday, but the skip moved east to west late in the day and we had a very nice run of 6s and 7s. Temperature was 30 degrees outside the shack and almost 80 inside. That Dentron may be the answer to the energy shortage as far as heating is concerned!

The band pretty well died on us shortly after 6 p.m. local and spot checks were the order of the day until 1100 Z Sunday. At that point yours truly got after it again, without the friendly reassurance of WB5UWB on that simplex frequency. WA5MLT did call a little later before assuming duties on the OPEN on 75.

Really tough early Sunday . . . spans of 40 minutes with silence on the band and excursions up and down didn't show much either. By 1600 discouragement was heavy and WB5UWB took the chair to bolster spirits a little by snaring a couple of nice ones including ZS3KC. Still, it was call-call-call and only pulse noise in response for long periods.

At 1930 -- more than 3 hours later than on Saturday -- the band began to come more alive. Skip was in Florida, Mississippi, and Georgia. But it was weird with a Nevada in there once, a few Colorados, and even -- surprise -- a Utah.

As the day wore on (and we wore down), it got better, though never quite as good as Saturday. UWB and MLT shared the chair for the last four hours, MLT taking most of it as net and church duties had held down his work earlier that day. The skip was going strongly into Virginia as official closing time came and 7 of our last 10 contacts came from there. (Continued)



Minutes of the ACARC Meeting 1/6/77

The meeting was called to order at 2000 hours by President Bill W5NI with 45 members and guests in attendance. The main business of the evening involved the election of officers for the ensuing year of 1978.

Prior to that H. O. Townsend, W5MLT, Sec., gave an update report on his activities. The state now has 32 of the 77 counties now covered by ECs.

Mr. Carl Aldridge, Disaster Preparedness Meteorologist with the National Weather Service, moderated a lively discussion concerning the VHF weather net operation nationally.

New business - W5JJ Carl reported on his new FT 227R YAESU two-meter transceiver.

W5JGU Charley reported on the new code and theory classes commencing at the Red Cross on January 18, 1978, under cosponsorship of ACARC and central Oklahoma Radio Club.

K5KDR Bill delivered the cora report.

Elections - W5WSW moved that the associate members be given voting privileges for the election of officers.

W5JHU seconded the motion. W5NTL George reported the nominating committee slate as follows:

Bob Graham, W5NSV for President
Bob Runyon, W5JES for Vice President
Bob James, K5FW for Secretary/Treasurer

There were no nominations from the floor. W5JJ moved the slate be elected by acclamation. WSW seconded and the motion carried. The Assistant for associate members was nominated from the floor and elected by acclamation motion by W5RML and seconded by W5KE. W5HTL Paul Asplin

Outgoing President W5NI turned the meeting over to the new President who properly adjourned for coffee and eyeballs at 2130 hours.

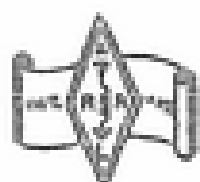
Robbie, W5JES

MORE 10 METER CONTENT

Daughter Lise made us a huge gingerbread cookie in the form of an interlocking CZ, and this was downed right after shut-down hour. We finished a little punchy, but satisfied that we had given it a good try.

How did we do? Well, see QST about next July when they publish the results. We hope we got enough to get listed . . . even if we have to hold the standings upside down to see ourselves at the top.

Jack, WB5TZZ



W5PAA

Random Words From The President

January is election month for most of the clubs in the area, and the Aeronautical Center Club is no exception. At our January meeting, Rob Runyon, W5JES, our former Secretary-Treasurer, was elected Vice-President, Bob James, K5FW, as our new Secretary-Treasurer, Paul Asplin, WA5HTL, as Associate Assistant to the President, and of course myself as your new President.

As most of you will remember Bill Hulse, W5NI, took over the Presidency of our club when Dave Langley, K5NC (W4YDY), accepted a position with the FAA in North Carolina. Both of these men have done outstanding jobs, and deserve our very greatest thanks and appreciation for a job well done!

The February meeting should definitely be an interesting one. Mike Riley, field engineer for Tektronics Corp. will be showing us some of the many uses of Tektronics' line of test equipment, including logic analysers and oscilloscopes. Mike may also have a spectrum analyser with him for demonstration purposes, and should present a very interesting program. I'm sure your time will be well invested, so come on out and join us.

We are still planning an antenna party in the very near future (as weather permits), so if you would like to lend a hand please contact George Lagaly, W5NTL, or myself.

One of the things that each of us enjoy most about our club meetings is the presentation of an interesting and appropriate program. If you have a suggestion, idea, or opinion concerning a good program, please let me know, or contact any of the club officers. It is in this way that we can best serve you.

73 Bob Graham, WB5NSV

SNAFU EQUATIONS

1. Given any problem containing "n" equations, there will be "n" + 1 unknowns.
2. An object or bit of information most needed, will be least available.
3. Any device requiring service or adjustment will be least accessible.
4. Interchangeable devices won't.
5. In any human endeavor, once you have exhausted all possibilities and fail, there will be one simple solution, obvious to everyone else.

From Mary Vallentyne's column, Anacortes American, 10-26-77

COVER STORY

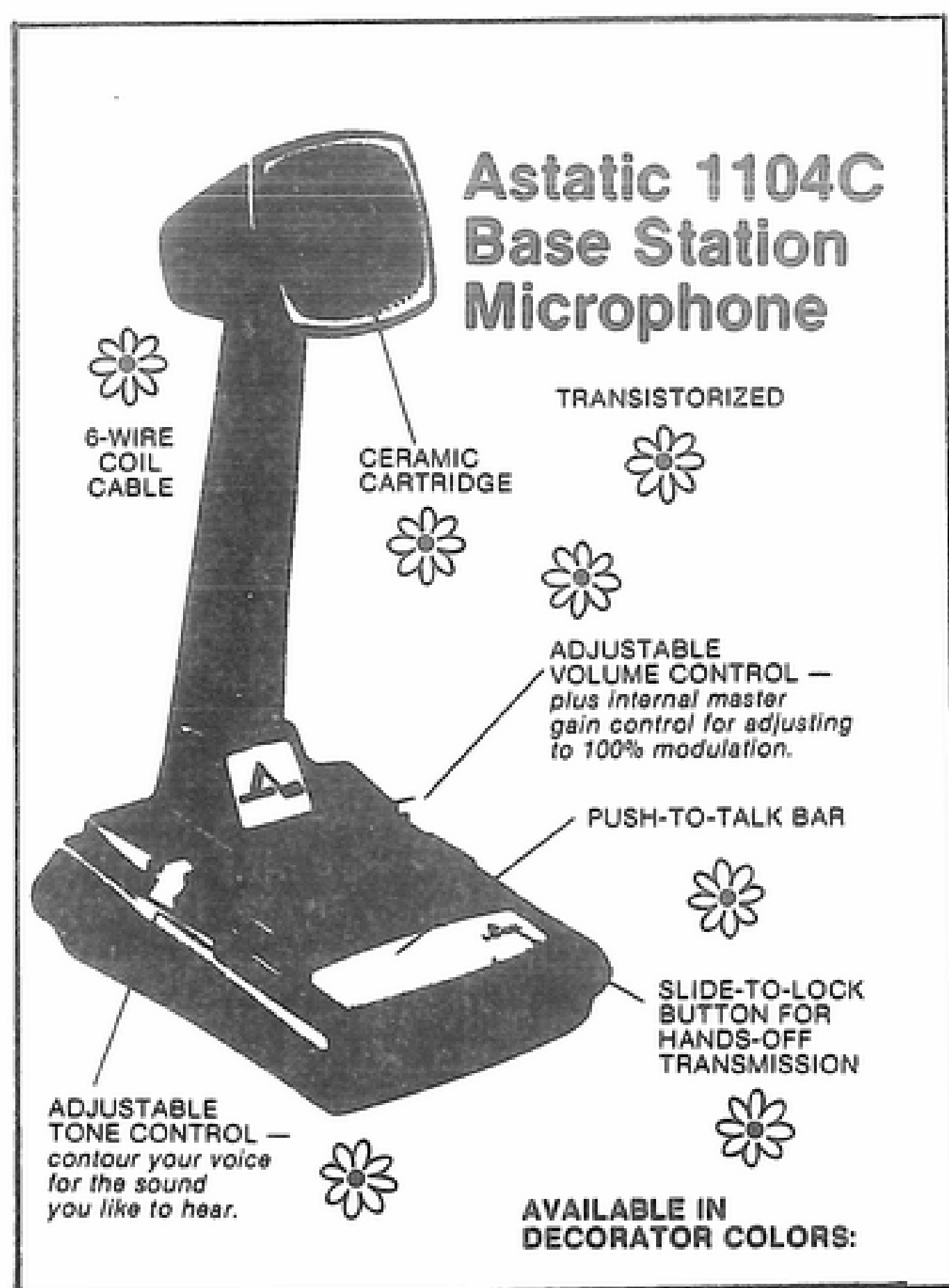
BECAUSE OF COMPLEXITY OF THE COVER ILLUSTRATION, THE EDITORS WERE UNABLE TO AGREE ON A TITLE. SUGGESTED WERE "SNOW" AND "IT'S UP TO MY PTT SWITCH HERE, HOW DEEP IS IT THERE?" LACKING FINAL AGREEMENT, THE TITLE WAS LEFT FOR YOU TO ADD. IN FACT, THE REST OF THE ILLUSTRATION WAS LEFT FOR YOU TO ADD IF YOU HAVE NOTHING ELSE TO DO SOME WINTER EVENING.

C&E EDITORS, HEH HEH

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WB5TKG

MON.-WED.-FRI.

8:00 A.M. — 5 W.P.M.

8:20 — 7½

8:34 — 10

8:41 — 13

8:49 — 15

9:00 A.M. — 18(B)

3:00 P.M. — 35 W.P.M.

3:11 — 30

3:18 — 25

3:26 — 20

3:34 — 15

3:42 — 13

3:50 — 10

4:00 P.M. — 18(B)

6:00 P.M. — 5 W.P.M.

6:20 — 7½

6:34 — 10

6:41 — 13

6:49 — 15

7:00 P.M. — 18(B)

9:00 P.M. — 35 W.P.M.

9:11 — 30

9:18 — 25

9:26 — 20

9:34 — 15

9:42 — 13

9:50 — 10

10:00 P.M. — 18(B)

TUE.-THUR.

8:00 A.M. — 35 W.P.M.

8:11 — 30

8:18 — 25

8:26 — 20

8:34 — 15

8:42 — 13

8:50 — 10

9:00 A.M. — 18(B)

TUE.-THUR.-SAT.-SUN.

3:00 P.M. — 5 W.P.M.

3:20 — 7½

3:34 — 10

3:41 — 13

3:49 — 15

4:00 P.M. — 18(B)

6:00 P.M. — 35 W.P.M.

6:11 — 30

6:18 — 25

6:26 — 20

6:34 — 15

6:42 — 13

6:50 — 10

7:00 P.M. — 18(B)

9:00 P.M. — 5 W.P.M.

9:20 — 7½

9:34 — 10

9:41 — 13

9:49 — 15

10:00 P.M. — 18(B)

BAND (METERS)	80	40	20	15	10
FREQ. (KHz) ^{ZERO} _{BEAT}	3,581.5	7,079.8	14,079.0	21,079.1	28,079.8



JANUARY MEETING

Perhaps the above title should have read "JANUARY MEETING OR THE LACK THEREOF." Last month, we had announced that beginning in January 1978, the Oklahoma City Autopatch Association would hold meetings each month and that a "flea-market" program would get the new year rolling. Mr. Murphy did it again! Old Man Winter kept a lot of events from taking place and our first meeting was no exception.

But wait.....Don't despair.....all is not lost. Keep those flea-market goodies out and available. Special arrangements have been made to hold a special get-together on Monday, February 6, 1978, beginning at 8:00 PM to make up for the lost January flea-market program. The event will take place on the drill floor of the Oklahoma Military Academy, NE 36th and Grand. You will be able to drive to the rear of the building for easier access. Come one, come all and have a go at those goodies none of us can live without.

As a memory jogger, don't forget to mark your calendar for the Weather-Net meeting at Channel 9 on February 21, 1978, starting promptly at 7:00 PM. Note that all amateurs are cordially invited to participate.

And.....we will stage another flea-market affair coupled with a short general meeting on March 21, 1978, at the same stand. Better be there!

NEW TO OUR GROUP

Oklahoma City Autopatch Association is happy to welcome the following amateurs into our fraternity:

Charles G. Sullivan - WB5YLZ
Martin Vinson - WD5FEI
Dolph Irick - WD5HUC

Chuck Holbrook - WD5BKT
John Prather - WA5THS

Take a little time to introduce yourself and extend a warm welcome to these new members in our group.

AND, a special note regarding memberships in OKCAP:

Membership rolls are due to close, shortly. If you have been giving serious thought to affiliating with the Oklahoma City Autopatch Association, please get in touch with Hobe Burgan - WB5MLN as soon as possible.

WELCOME BACK

We just learned that one of our former members, Mark D. Adams - WA5REC has returned to Oklahoma City to a position with G.E. Happy to have you back, Mark, and y'all come see us, hear?

SIX-METER NEWS

Frank McCollom - N5FM has reported that some of the newer innovations to our six-meter machine have not as yet been incorporated due to circumstances beyond his control. However, the current facilities are "off and running," thank you, so why not join the group on six? You might like it!

FROM HR REPORT

K5NY received an 18-month jail sentence and was fined \$500 by U.S. District Court Judge Edward J. Boyle, Jr. last November as a result of his pleading guilty to 3 counts of transmitting obscene language and interfering with a New Orleans repeater this past summer. K5NY must serve 90 days of his sentence after which the remainder will be suspended.....



SPECIAL FEBRUARY MEETING

As is customary, the February meeting of the Oklahoma City Autopatch Association is something special - - - the ever so important SEVERE WEATHER NET. This year is no exception. The meeting will be at KWTW, Channel 9, on February 21, 1978, at 7:00 PM sharp.

The public is invited to this event.....and, we especially extend a warm invitation to all statewide amateurs to participate in this noteworthy program. It has been and still is recognized that this is one of the more important nets in this area and certainly the input of all amateurs is vitally needed.

Let's all turn out to help Gary England, our popular meteorologist in developing and completing arrangements for another successful program. We know that the news media will be watching the results.

Remember, that's 7:00 PM, sharp, on February 21, 1978, at KWTW, Channel 9.

HAPPY GRADUATION

Last fall (September 9, 1977), Frank McCollom - N5FM and Bob May - WB5NYR started a class for prospective amateur operators. Classes met weekly and covered both theory and code. Happily we introduce the following successful entrants to our amateur ranks:

Fred Demerson	WD5IDA	Technician
Ms. Jerry Gorley	WD5HXM	Novice
Dean Gorley	WD5IHJ	Novice
Dolph Irick	WD5HUC	Technician*
Phil Ross	WD5IHI	Novice
Ken Stepp	WD5HXX	Novice
A. J. Sloan	WD5HXL	Novice
Ms. Lois Temple	WD5HXN	Novice
Howard Wise	WD5IDB	Novice
Ron Recer	WD5FRQ	General*
Ms. Karen Recer	WD5HBX	General*

*Indicates upgrading since the initial Novice tests were successfully completed. There may have been other upgradings but identity was not made known as of this printing.

Frank also called our attention to the fact that Stan Schoenberg - WB5ZOF and Leslie Stewart - WD5FUG, both graduates of previous class, have upgraded their tickets to Technician.

Our congratulations to all of these fine people and a warm round of applause to their instructors for a job well done.

FROM HR REPORT

THE ENVIRONMENTAL PROTECTION AGENCY may be in Amateur Radio's future - - the Senate Governmental Affairs Committee recommended giving the EPA authority over radiation hazards, including RF.

And, speaking of radiation, heed one of the Ten Commandments of Electronics Safety:

Prove to thyself that all circuits that radiateth
and upon which thou worketh are grounded lest
they lift thee to high frequency potential and
cause thee to radiate also.....

For you nostalgic buffs, the following was extracted from Mechanical Appliances, Mechanical Movements and Novelties of Construction, G. D. Hiscox, M.E. (1923):

[illegible]

Murphy, again: If you improve or tinker with something long enough, eventually it will break.



RESOLUTION

A RESOLUTION RELATING TO THE OUTSTANDING
PERFORMANCE AND CONTRIBUTIONS MADE BY
THE OKLAHOMA CITY AUTO-PATCH ASSOCIATION

WHEREAS, the Mayor and City Council of the City of Mustang recognize the Oklahoma City Auto-Patch Association and its members for their efforts in assisting the MUSTANG CIVIL DEFENSE DEPARTMENT in protecting the safety and welfare of the citizens of Mustang.

WHEREBY, the Oklahoma City Auto-Patch Association, a Radio Amateur group, provides the communication system and mobile observers, which is used by Mr. Gary England of KWTW Weather Department, to assist the MUSTANG CIVIL DEFENSE DEPARTMENT.

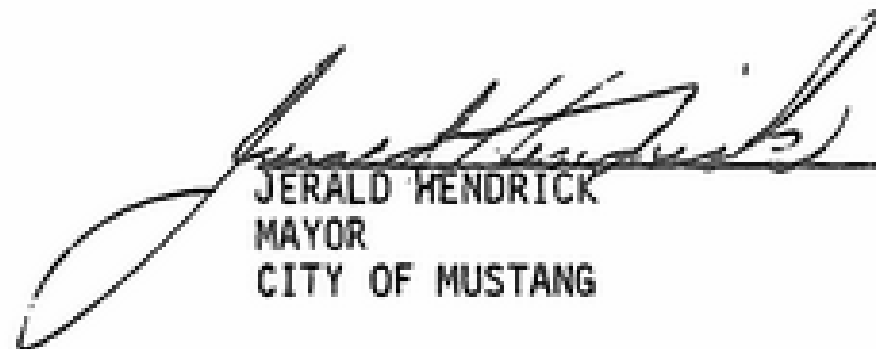
THEREFORE, be it resolved by the Mayor and City Council of the City of Mustang that their sincere appreciation be made known publicly to the citizens of Mustang, Oklahoma, for the outstanding accomplishments as outlined in this Resolution.

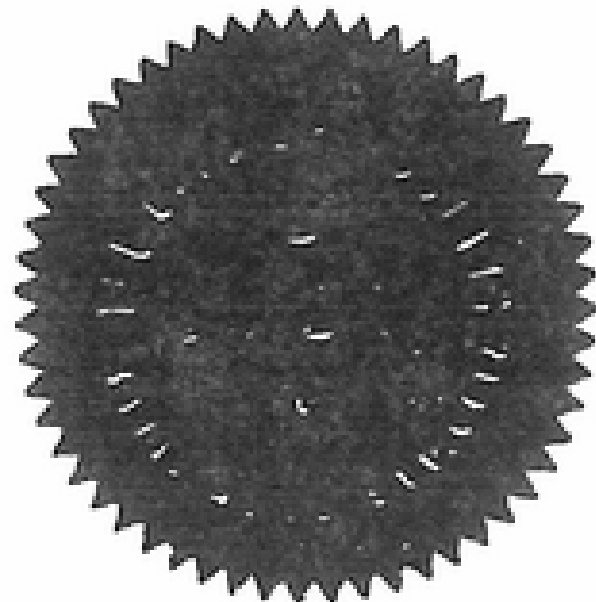
NOW, THEREFORE, BE IT RESOLVED, that the Mayor and City Council express their appreciation to the Oklahoma City Auto-Patch Association for their continued efforts in assisting the MUSTANG CIVIL DEFENSE DEPARTMENT.

PASSED and APPROVED by the Honorable Mayor and City Council in regular session this 1st day of November, 1977.

ATTEST:


Wilson B. Snipes
City Clerk


JERALD HENDRICK
MAYOR
CITY OF MUSTANG



Greetings from
Doc Goodhead
WA5CZN

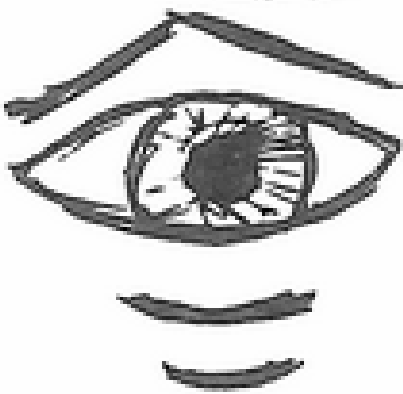
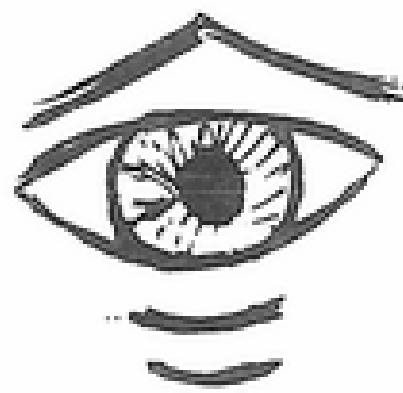
Making people see is my job,
but I also enjoy seeing people.
That's why I enjoy Amateur TV.
so much.

How would you like to be on T.V.?
It's not as hard as you may think.

For more information you need to call
Doc at 947-7874 9AM to 5PM

OR
Paul WB5EVO at 348-1414 after
6 P.M.

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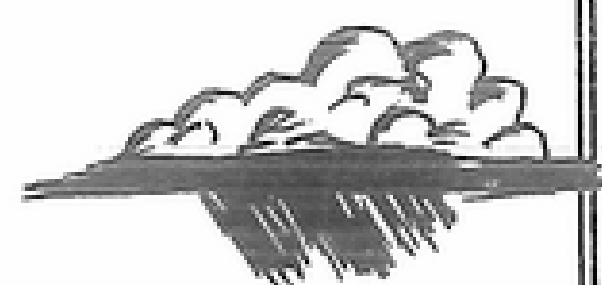
Doc wants an electronic
 Eyeball Q50 
with you
on 439.11 MHz Fast-Scan
Amateur Television

BUSINESS SECTION

ANNOUNCEMENTS



WEATHER NET



The annual WEATHER NET meeting will be in February. See the Auto - Patch section of this C&E for details. All those who are interested in OKLAHOMA WEATHER are urged to attend.

PROGRAM CHAIRPERSON Don, WA5TAW, is our new program chairperson. Don says to see him if anyone has an idea for a program that would be interesting to our group.

The next MEETING of MORI will be February 7, 1978 at 8 PM. Informal eyeball starts about 7:30. PLACE is the E.O.C., 4600 N. Eastern, OKC. Don expects to have an interesting program lined up.

MINUTES of the January 3, 1978 meeting. These minutes were scribbled by a substitute, Bill, WA5RAQ, while the secretary-treasurer, Rich, WB6FYL, was skiing in California.

The meeting was called to order by President John Huckaby, K5QDR, at 8:03 pm. There were 26 members and guests present. A call for a report on those who are sick revealed that Lloyd, K5YTW, was better, and that Frank, W5PDH, was OK, but his wife was sick.

Report from CORA by Jim, K5VRL. Ham Holiday will be July 29 and 30 at the Lincoln Plaza Inn. Registration will be \$3 for Pre and \$4 at the door. Rooms for sleeping will be \$25 to \$28. No quote available for exhibit room cost. The flea market space will be 10,000 square feet. There will be lots of room for the activities and lots of parking space.

Report on Repeaters:

07/67. Ken, K5VVZ, reports all OK.

34/94 and the UHF machine had no representatives.

Old Business - none

New Business. John said we need someone to head the coffee & donut committee. Don, WA5TAW, suggested we try having a different person to be responsible each month. Ellard, W5KE, volunteered for Feb. Also we need a program chairperson. Don, WA5TAW, volunteered.

The giving of Door Prizes at meetings was discussed. Pro and Con views were presented. Fred, K5HFN, moved and Ellard, W5KE, seconded that, at their next meeting, the Executive Committee consider offering door prizes twice a year. The committee will then come back to a regular meeting for further consideration. The motion carried.

An announcement was made that Bill, N5AH (WA5STC) wants a 100 WPM gear for Model 15 Teletype.

Operation on 220 MHz and Repeater Nets were discussed.

Illegal operators on repeaters were discussed. We were advised that it is preferable to track down the illegal operator rather than to run him or her off.

The meeting was adjourned for coffee, doughnuts and eyeballs at 9:08 PM.

= = End of MORI BUSINESS SECTION - - - Bill, WA5RAQ + + +

The Arizona Cactus Patch Award is presented by The Arizona Six Meter Association in recognition of operating achievement. The Award is available to all licensed amateurs and radio club stations.

To become a member of the Arizona Cactus Patch, it is necessary for the applicant to comply with the following:

- 1 Establish a two-way radio contact with the required number of members for a total of six (6) points.
 - A. Charter members worth (3) three points.
 - B. Regular members in Arizona worth (2) two points.
 - C. Regular members outside the State of Arizona worth (1) one point.
- 2 Any combination of Charter members, or regular members may be used in order to qualify for the award.
- 3 All radio contacts must be made on the six meter amateur radio band and any authorized mode of operation is permitted.
- 4 A log sheet or verification statement must be included with the application stating the following information:

Date	time	call	frequency	name	QTH	Cactus Patch No.
& points.						
- 5 An application fee of \$2 must accompany the request, checks payable to The Arizona Six Meter Association. This is a one-time charge for lifetime membership.
- 6 The request for membership must be sent to:

Mr. Lou Gagnon, W7LNX
Certificate Manager, Arizona Cactus Patch
3203 West Mandalay Lane
Phoenix, Arizona, 85023

A certificate will be sent by return mail and a Cactus Patch number issued that will remain for your exclusive use only.

The Arizona Cactus Patch sends out a quarterly newsletter to all members that have self addressed stamped envelopes on file and has an informal Net that meets at 50.125 each Sunday at 0900MST (1600 UTC) Won't you join with us ?

The objectives of our organization are primarily to promote activity on the six meter band, expand communication knowledge through experimentation on six meters, to provide service to the general public by maintaining a communications network in times of emergency, and to assist other groups in the protection of radio amateur frequencies and radio privileges.

From: M. E. Beck, W7EDO via Bill, WA5RAQ

VOLTAGE TO CURRENT TRANSACTOR. According to the October, 1977 Popular Science Magazine, p 88, Texas Instruments has a new Micro-circuit called a VCT or voltage-to-current transactor. Two will fit on a standard 16-pin IC package. The VCT is faster, more reliable and cheaper than op amps which it is destined to replace. The hi Z output of VCT's facilitates the adding of currents. A VCT may make a capacitor look like an inductor in a "gyrator" network for low-frequency filtering. The VCT has a very wide range of other applications. - - - Bill, WA5RAQ

COMPUTER BASICS. Read "MICROELECTRONICS", page 52 of January, 1978, Popular Science.

FOR SALE - Heath Mobile Power Supply, Model HP-13B. \$30.00
Call Jack, W5SVN - 677-8537

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LOOK OVER the COLLECTOR & EMITTER INDEX. MAKE USE of all this good information in the 1977 issues.

= = = = = Bill, WA5RAQ = = = = =

CAPACITANCE METERS
Or
"An Incapacitating Experience of CxV"

In the early days of my youth, I studied electricity or should I say, I attempted to chip away at all the things in electricity that I didn't understand. Being isolated in a small midwestern town and too poor to afford even the most basic test equipment, such as a VOM, I marvelled at the miracles performed by others whose knowledge of electricity extended well past the simple equations for parallel and series resistances that characterized my sixth grade interest. I had to wait until high school physics before many of the concepts reached a point in my understanding that allowed me to actually do things. More of the scales of ignorance fell from my eyes when I finally understood the physical meaning of capacitance and inductance could be expressed mathematically (Credit a few calculus courses and Engineering core studies for this). I too learned the fact that knowledge concerning capacitors and inductors represented truth, knowledge and power. It was difficult to read books and articles in electronics journals that described troubleshooting consisting of the ingenious placement of several .01 ufd capacitors in a circuit. Thus were heaps of electronic garbage converted into modern day miracles. Most of my projects remained in the disposal. How I longed to know where to put those capacitors.

However, many times I had a problem more basic than that. My early parts scrounging days produced many old radio chassis' and boxes of scraps donated by my cousin who worked as a serviceman for HP. Many of the parts were unmarked or had lost their identification. A VOM was barely within my price range, much less the exotica needed to I.D. the numerous capacitors and inductors that fell my way from my cousin's electronic care packages.

We now jump to the present. Recently, while tuning up a couple of HT's, I needed to identify a couple of very tiny red capacitors to be used for padding the driver so I could squeeze a few more milliwatts out of the final. The capacitors were unmarked and of the Radio Shack (100 to a package) variety. I tried a few theories, but quickly found that you could not predict the value by the size. I finally had to retreat to known values from Motorola, but did manage to luck out with one particular value that worked (lucky guess). Buttoning up the radio, I thought about finding a simple way to I.D. capacitors by value. The fact that I had several boxes of the Radio Shack assortments, most of which were unidentified did not dissuade me from my search for a simple capacitance meter.

I researched the literature and found several nifty circuits in back issues of "ham radio" and "73 Magazine." I resolved to begin construction after finishing a paper and some other projects. I also checked out several commercial units but dismissed them quickly after seeing the prices start over \$250. One particular commercial unit, the ECD Model 100 Digital Autoranging Capacitance Meter did catch my eye, but its \$289 price tag made me stop short. A couple of weeks ago, while puttering around a friend's lab, I spied a Model 100. He let me borrow it for this article (ahem) and also to run through a few hundred capacitors for I.D. purposes.

The Model 100 is quite impressive. It is a quality piece of lab equipment that automatically measures capacitance from .1 pf to 200,000 mfd in 10 automatically selected ranges. Operation couldn't be simpler. Plug the capacitor into the tiny terminals or run test leads. Make sure all stray capacitances are nulled out, push a single button and read your capacitor with accuracy to .1% on the 3 and 1/2 digit display. The device is CMOS operated and four pen light cells supply all the action. ECD estimates that you can measure 20,000 capacitors on a single set of cells. The accuracy is maintained on all ranges from 59 to 95° F.

The Model 100 operates by measuring the RC time constant of the unknown capacitor and a standard precision resistor. Range changing is accomplished by switching between one of the 3 standard charging resistors. The circuit autoranges by counting the number of charge and discharge cycles and stepping down automatically to the next range when the number of cycles exceeds a preset value. This is done in less than a second for very small values and can take up to 4 or 5 seconds for large values (greater than 10,000 mfd). The time needed is insignificant compared to the time it takes to use a bridge. Most bridges involve measuring a capacitor's impedance at a specific frequency, nulling out the resistive component and calculating the capacitance by plugging into the following standard formula:

$$C = \frac{1}{2 \pi X_c F} \quad \text{Eq. 1}$$

The Model 100 measures the capacitor's charge storage capabilities via the RC time constant at a particular voltage. Since capacitance is the ratio of the charge to voltage ($Q = CV$) and the capacitance in farads is equal to the time constant in seconds divided by the resistance (of the charging resistor) in ohms

$$C = T/R \text{ since } T = RC \quad \text{Eq. 2}$$

the capacitance drops out if you know the time and the charging resistor.

When I first got the Model 100 home, I glanced through the manual and a nifty book supplied by ECD about capacitors. The extra manual describes a model for capacitors that explains some of their imperfect characteristics. I then sat down and began going through my stockpile. It took about an hour and a half to measure 100 capacitors, scotch tape them to a sheet of paper and then scribble their value next to them. Some of the capacitors seemed to take an awful long time to stabilize to a single value. These were carefully marked as utility only. That's probably the reason they were in the Radio Shack bag.

I worked my way through the balance of the unknowns (which I had dug up from every Radio Shack I could find). Having nothing better to do in particular and armed with a device that would allow measurements down to .1%, I recklessly drug out a bunch of marked values to compare the actual values. The results were somewhat astonishing. The worst offenders were the electrolytics. One capacitor marked at 10,000 ufd pegged in at 13,670 ufd. Another "electro" marked at 100 ufd showed an actual 176 ufd. Others weren't so bad. A couple of tubulars that were part of a mass purchase at Dayton in a giant capacitor transaction turned in very impressive accuracy (less than 3% in most cases and in some instances less than .5%). They were marked at 5% and were made by Tex Cap.

My polystyrene capacitance decade box showed accuracy down to about .05% on all values and most of the silver micas that I measured were within 2%.

I had recently built a set of touch tone decoders using phase locked loops (NE567) and considered all types of capacitors for the loop oscillator. I finally settled on some cheap mylars, plugged them in with metal film resistors and had no trouble. I took an extra Mylar and inserted it in the "C" Meter. It was right on. I bent the leads so I could blow hot air across the capacitor without heating the meter. I used an old hair dryer and got that capacitor so hot that I could not touch it for more than a second at a time. It only moved 2.7%! A previous attempt at building a decoder using these same capacitors and carbon composition resistors had failed for lack of stability. Apparently, most of the problem came from the resistors.

I dug out one of the Tex Caps from Dayton. I heated it and it performed most impressively registering only a .4% change while still quite warm to the touch. There appeared to be an aging process in the heating cycle. The capacitor never returned to the initial value after cooling off. It was off just a very little bit. These capacitors would make excellent filters and oscillators.

I tested a few electrolytics. They were very heat sensitive. One moved from 49 mfd to 57 mfd. Several disc ceramics were quite surprizing, registering a change as little as 4%. One large disc, however, moved from .105 down to .038 ufd when heated. I always thought ceramics had terrible characteristics. It just depends on the capacitor.

Table 1. Characteristics of various types of capacitors. All values shown are representative figures.

TYPE		CAPACITANCE RANGE	VOLTAGE RANGE	TEMPCO ppm/°C	DF% 1 kHz	D.A. %	Leakage ¹ ohm·uF
Ceramic -	COG	1pF-.1uF	50-600	0 ± 30	< .2%		5 × 10 ⁸
	COH	1pF-.01uF	50-600	0 ± 60	< .2%		5 × 10 ⁸
	COJ	1pF-.01uF	50-600	0 ± 120	< .2%		5 × 10 ⁸
	COK	1pF-.01uF	50-600	0 ± 250	< .2%		5 × 10 ⁸
	U2J	1pF-.01uF	50-600	-750 ± 120	< .2%		5 × 10 ⁸
	P3K	100pF-.01uF	50-600	-1500 ± 250	< .2%		5 × 10 ⁸
	X7R	10pF-2.7uF	50-100	+1000 ± 3000	< 2.5%		10 ⁸ -10 ⁹
	Y5F	.01-2.2uF	3-50	± 2500	2-10%		10 ⁵ -10 ⁸
	Y5R	.01-2.2uF	3-50	± 3000	2-10%		10 ⁵ -10 ⁸
	Y5T	.01-2.2uF	3-50	+1000 ± 4000	2-10%		10 ⁵ -10 ⁸
	Y5V	470pF-4.7uF	50-100	± 20,000	< 2.5%		10 ⁹
	S2L	3-200pF	1kV-6kV	-330 ± 500	< .6%		8 × 10 ⁷
	S3N	3-200pF	1kV-6kV	-3300 ± 2500	< .6%		8 × 10 ⁷
	X5F	100pF-.01uF	50-600	-500 ± 2500	< 2%		5 × 10 ⁴ -10 ¹⁰
	X5U	100pF-.01uF	50-600	± 7500	< 2%		5 × 10 ⁴ -10 ¹⁰
	Z5F	100pF-.01uF	50-6kV	± 2000	< 2%		5 × 10 ⁴ -10 ¹⁰
	Z5P	.001-.01uF	50-6kV	+2500 ± 2500	< 2%		5 × 10 ⁴ -10 ¹⁰
	Z5R	.005-.1uF	50-6kV	+2500 ± 2500	< 2%		5 × 10 ⁴ -10 ¹⁰
Ceramic	Z5U	.001-4.7uF	50-6kV	± 10,000	< 2%		5 × 10 ⁴ -10 ¹⁰
	Z5V	.001-.1uF	50-600	± 10,000	< 2%		5 × 10 ⁴ -10 ¹⁰
Silver Mica		1pF-.1uF	100-2kV	± 500 to ± 10	.05-.2% ²	1%	10 ⁹ -10 ¹¹
Polyester (mylar)		.001-10uF	50-1600	+400 ± 200	.5-1%	.5%	5 × 10 ⁹ -10 ¹¹
Polystyrene		20pF-30uF	30-600	-120 ± 30	.01-.1%	.02%	10 ¹¹ -10 ¹²
Polycarbonate		.001-25uF	50-400	0 ± 100	.1-.5%	.2%	10 ¹⁰ -10 ¹¹
Polypropylene		100pF-.15uF	200-1600	-450 ± 300	.01-.1%		
Parylene		.001-1uF	30-100	0 ± 50, -200	.1-.3%	.1 - 1%	10 ¹⁰ -10 ¹²
Teflon		.001-1uF	50-600	-200	0.1-.2%	0.2%	10 ¹¹ -10 ¹²
Paper Impregnated		.0005-100uF	200-15kV	0 ± 500	.2-1%	2%	10 ⁹ -5 × 10 ¹⁰
Glass		.5pF-.01uF	300-1kV	+140 ± 25	.03-.1%		10 ⁹
High K Glass		10pF-.01uF	50-100V	± 4500	1-3%		10 ⁹
Aluminum Foil		.5uF-1F	3-500V	+10,000	3-50% ³	10%	.01-10uA/uFV
Solid Tantalum		.001-1000uF	3-125	+1000	1-12% ⁴	2%	.01-1uA/uFV
Tantalum Foil		.1-10,000uF	3-500V	+2500	10-20% ⁵		.01-1uA/uFV

¹minimum; from manufacturers literature, package limited for small values

²at 1 MHz

³at 120 Hz

⁴at 120 Hz, 2-30% at 1 KHz.

The little pamphlet that accompanies the Model 100 features a table of various types of capacitors as shown in Table 1. I thought this was an extremely useful collection of information, so we are going to reproduce it in its entirety. The voltage coefficient of the capacitor refers to the change in capacitance with respect to a change of the applied voltage. It is frequently expressed as that percentage of zero-bias capacitance that is found when the capacitor is used at its full rated working voltage. In some high density ceramics, the capacitance falls by as much as 60%. Some electrolytics show higher capacitances at full voltage, while some show lower. Thus, with some capacitors, a measured value only applies at a specific voltage. The capacitance is a function of the voltage applied.

Sometimes, capacitors don't discharge as readily as theory predicts they should. A voltage can be noted across the capacitor even after it has been fully discharged. This effect is known as soakage, recovery, or dielectric absorption (DA).

I finally had to deliver the Model 100 back to its owner when the snow thawed. However, having the opportunity to play with this goodies for about a week started me on a mission to construct a device similar to it. There were a couple of analog devices shown in current issues of 73 magazine. January 1978 at page 164 features a simple CMOS circuit, but its lowest scale goes only to 100 pf. ham radio for April 1970 features a simple four transistor circuit that measures on its lowest scale to 0 - 10 pf. The highest scale is 0-1 ufd.

One of the first digital capacitance meters that I found appeared in the February 1974 issue of ham radio. This device places the unknown capacitor in an oscillator which is then used to gate a 1 mhz oscillator. The larger the capacitor, the greater the gate time and consequently the larger the reading. The resolution was not very impressive, being only about 1000 pf.

The most sophisticated home construction circuit is featured in the February 1978 issue of Popular Electronics. It functions very similarly to the Model 100. It features autoranging and measures values from 1 pf to 4,000 ufd. The circuit measures the discharge time and uses the comparators of a NE555 to determine the cycle time. The comparators feed a flip flop that gates a reference oscillator. The oscillator feeds a set of counters and decoders. The autoranging circuitry works by counting the overrange pulses from the last BCD decade counter and stepping to the appropriate scale. A complete kit of parts is available for just about \$70.00. A partial kit is also available for about \$20.00. This meter uses TTL instead of CMOS and is line operated. In any case, it appears to be a relatively simple way to add a very sophisticated piece of equipment to your test bench for just a few pennies (well, maybe dollars, but still definitely useful). The Model 100 is still the Cadillac.

Micheal Salem N5MS

CAPACITORS ANONYMOUS

Maybe this should be titled "Confessions of a Capacitor Junkie." Since seeing the little assortment of capacitors (Part No. 272-804), I have had these almost uncontrollable urge to buy every assortment I could get my hands on. Somebody at Radio Shack really had their head on straight. This assortment that led to the previous article is a real delight for miniature capacitor users.

The Radio Shack assortment (Pack of 100) features the miniature and subminiature Erie capacitors in various values. I have priced this capacitor individually at more than 50¢ apiece. This is the price from Motorola. The capacitors are excellent for miniature projects or for tuning up Handie Talkies. The only problem is identifying the various values. An ECD Model 100 Capacitance Meter

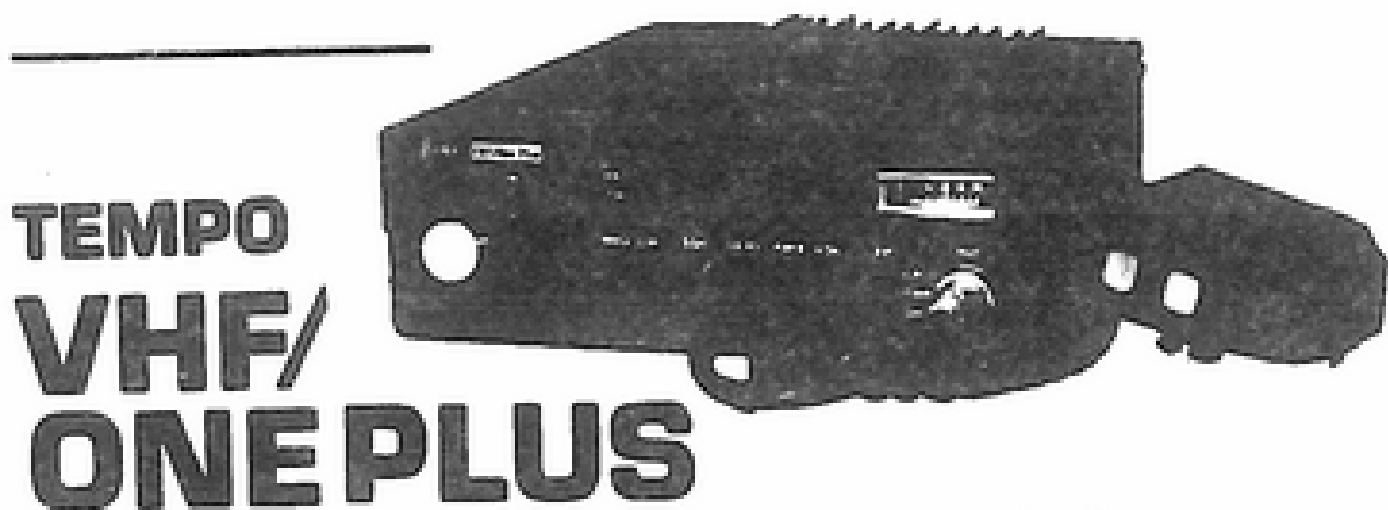
solves this problem conveniently.

The assortments provided by Radio Shack are not always the most even. I kept record on 5 assortments that I tested with the Model 100 and found the numbers varied from 82 pieces to 110. The yield of good to bad capacitors was about 85-90%. This left me with a number of high quality miniature capacitors for various projects. The distribution of values varies considerably. In one assortment, I found about 16 capacitors valued at 3.2 pf (ideal for tacking onto the VHF finals in an HT) and 10 valued at 29 pf. The rest varied in onesies and twosies from 12.5 pf to 4700 pf. Another assortment produced over 20 at 27 pf and 9 at 90 pf. The assortment was very skewed.

The modus operandi of Radio Shack seems to be to put a lot of about two different values and then throw in a couple of whatever else is left. One bag had almost 50 capacitors marked at 3 pf. The rest were a wide range.

This can be overcome, however, by buying several assortments. The problem with this is that most Radio Shack stores never have more than two or three of Catalog part No. 272-804 at a time. I generally buy an assortment whenever I see it, because I don't know when I will see another one. These capacitors are a real value if you can find a way to identify them. Some are already marked, others are marked incorrectly. There are a few cosmetic rejections, but on the whole, you should get at least 70 - 80 good capacitors out of each batch. And at the price they normally cost, that's quite a bargain.

Micheal Salem N5MS



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* Not furnished.
FCC Type accepted models available.



Club
NEWS

W5LOW
The Elmer Goshier Memorial
Station

MINUTES OF CLUB MEETING

MEETING WAS CALLED TO ORDER JANUARY 20, 1978, AT 8:05 PM BY PRESIDENT WOODY, W5FMX, WITH 14 MEMBERS AND GUESTS PRESENT.

CARL, W5JJ, CHAIRMAN OF NOMINATING COMMITTEE PRESENTED A PROPOSED SLATE OF OFFICERS. THOSE ELECTED WERE:

KEN FORD, WB5KHU, PRESIDENT

AL PRINCE, WB5KCU, VICE PRESIDENT

JOE BUSWELL, K5JB, SECRETARY

ELLARD FOSTER, W5KE, TREASURER

RANDY WILLIAMS, WB5CNM, DIRECTOR

JACK MUSE, WB5ZKZ, DIRECTOR

THE TWO DIRECTORS REPLACED CARL, W5JJ, AND JIM, K5VRL. CARRY OVER DIRECTORS ARE BILL, WA5FWD, C.Y., WB5TKG, AND CHARLEY, WA5JGU. (AFTER MEETING, THE BOARD MET AND ELECTED CHARLEY, WA5JGU, AS PRESIDENT OF THE BOARD.)

KEN, WB5KHU, TOOK OVER HELM AND RETIRING OFFICERS WERE GIVEN HEARTY THANKS FOR LEADERSHIP LAST YEAR

IT WAS MOVED AND PASSED THAT THE CLUB BUY A NEW CALLBOOK, WITH SUPPLEMENTS, AND SELL THE OLD (1976) CALLBOOK TO THE HIGHEST BIDDING CLUB MEMBER AT THE NEXT CLUB MEETING.

JACK, WB5ZKZ, ASKED THAT THE CLUB PARTICIPATE ACTIVELY IN SIMULATED EMERGENCY TEST WHICH WILL COME AS A SURPRISE SOON.

BOB, W5HXL, HAD SOME DISCUSSION ON CORA HAM HOLIDAY. HE ASKED FOR A SHOW OF HANDS OF THOSE INTERESTED IN QSL CARDS TO BE PROVIDED BY THE CHAMBER OF COMMERCE. THERE WAS SOME DISCUSSION ABOUT PROGRAMS FOR THE HAMFEST. ELLEN WHITE WAS MENTIONED AS A POPULAR ARRL SPEAKER. THE PROGRAM COMMITTEE CHAIRMAN (I) EXPRESSED HOPE THAT A VOLUNTEER WOULD STEP FORWARD TO ORGANIZE A DANCE, OR SIMILAR SOCIAL EVENT FOR SATURDAY NIGHT OF THAT WEEKEND. DANCES HAVE PROVEN QUITE POPULAR AT OTHER HAMFESTS. LACKING SUCH A VOLUNTEER, OTHER ENTERTAINMENT OPTIONS SUCH AS BLUEGRASS, BARBERSHOP, COMEDIAN, ETC., WERE DISCUSSED. (IF INTERESTED, CONTACT K5JB.) THE CLUB WAS, BY CONSENSUS, OPPOSED TO SELLING EXTRA TICKETS FOR PRIZES OR ALLOWING CLUBS TO INDEPENDENTLY HOLD PRIZE DRAWINGS DURING HAM HOLIDAY.

IT WAS ANNOUNCED THAT THE OKLAHOMA CITY AUTOPATCH CLUB HAS RESCHEDULED THEIR FLEA MARKET AT OKLAHOMA MILITARY ACADEMY. THE NEW DATE IS FEBRUARY 6. IN ADDITION, ANOTHER FLEA MARKET WILL BE HELD MARCH 21. DON'T FORGET THE WEATHER MEETING FEBRUARY 21 AT KWTU.

PAUL, WA5HTL, WILL ROUND UP SOME PRIZES TO BE DRAWN NEXT MEETING. TICKETS WILL BE SOLD AT THE MEETING.

FIRST AMATEUR RADIO CLASS, SCHEDULED JANUARY 18, WAS CANCELLED BECAUSE OF WEATHER. JANUARY 25 WILL THEREFORE START THE FIRST ROUND OF NEW CLASSES.

DISCUSSION FOLLOWED ON PROGRAMS. NEXT MONTH CHARLEY, WA5JGU, WILL TALK ON SETTING UP THE NEW AMATEUR RADIO STATION. IT WAS SUGGESTED THAT PANEL DISCUSSION ON ANTENNAS, TRANSMISSION LINES OR OTHER COMPLEX SUBJECTS WOULD PROVIDE COMPREHENSIVE VIEWPOINT WHICH SHOULD PROVE EDUCATING. WOODY, W5FMX, CONSENTED TO PUT ON A PROGRAM ON 6 METER OPERATION. MICROPROCESSOR SESSION AND HIGH SPEED CW COPYING CONTEST WERE PROPOSED. OF COURSE THE SOCIAL EVENTS, WATERMELON FEED, PICNICS, ETC., WILL BE SCHEDULED AS USUAL.

THE MEETING WAS AJORNED 9:35 PM AND THE GROUP HEADED FOR COFFEE AND DOUGHNUTS.
JOE, K5JB

GET WELL

THE MEMBERS OF THE VHF CLUB WISH WAYNE, WA5A0B, A SPEEDY RECOVERY FROM SURGERY HE HAD JANUARY 13.

OKLAHOMA REPEATER SOCIETY - TECHNICAL COMMITTEE

JANUARY 14, THE ORS HAD A MEETING IN NORMAN AND PRESIDENT, LEONARD, WA5FSN, APPOINTED MEMBERS TO THE THREE COMMITTEES PROVIDED FOR UNDER THE BY LAWS OF THE GROUP. I WAS APPOINTED CHAIRMAN OF THE TECHNICAL COMMITTEE CONSISTING OF DAN BATES, N5TM, CHARLES DIBRELL, W5BLW, JOE GARLAND, WA5FLT, KEN ISBELL, W5QMJ, AND LOREN SIMS, WA5CBF.

I AM LOOKING FORWARD TO WORKING WITH THIS VERY EXPERIENCED GROUP. I EXPECT THAT THE PRIMARY PRODUCT OF OUR COMMITTEE WILL BE INFORMATION TO REPEATER OPERATORS ON TECHNICAL MATTERS SUCH AS INTERMODULATION PRODUCT, REPEATER LINKING AND THE LIKE. THE MEMBERS OF THE COMMITTEE MAY NOT HAVE ALL THE ANSWERS BUT THEY WILL HAVE A BETTER PROBABILITY OF FINDING AN ANSWER THAN ANY ONE INDIVIDUAL MIGHT.

OKLAHOMA REPEATER SOCIETY ALSO SERVES THE USERS OF REPEATERS. THE COLLECTOR AND EMITTER WILL SERVE AS FORUM AND VEHICLE FOR INFORMING THOSE INTERESTED IN TECHNICAL PROBLEMS. TO THAT END, ANYONE WHO HAS A PARTICULAR PROBLEM HE WOULD LIKE TO SEE DISCUSSED SHOULD CONTACT ONE OF THE MEMBERS OF THE TECHNICAL COMMITTEE. EVENTUALLY WE WILL GET IT IN LANGUAGE FIT TO PRINT AND GET IT IN THE COLLECTOR AND EMITTER.

OUR COMMITTEE DOES NOT GET INVOLVED IN FREQUENCY COORDINATION EXCEPT WHERE SELECTION OF A FREQUENCY HAS BEEN MADE AND IT TURNS OUT TO BE UNDESIRABLE BECAUSE OF IN OR OUT-OF-BAND INTERFERENCE. SOME POTENTIAL PROBLEMS ARE EASY TO PREDICT BUT OTHERS MAY COME AS A SURPRISE AFTER RECEIVER OR TRANSMITTER GO ON THE AIR AT THE PROPOSED SITE. IT IS A GOOD PRACTICE TO PUT A RECEIVER ON THE PROPOSED FREQUENCY AND MONITOR THE RESULTS FOR A TIME BEFORE SEVERAL PEOPLE MAKE INVESTMENTS IN CRYSTALS AND REPEATER DIRECTORIES ARE MADE UP. THIS MONITORING HAS OFTEN BEEN DONE WITH A UHF LINK FROM THE SITE TO SEVERAL CONTROL OPERATOR'S HOMES. IF A REPEATER EVOLVES FROM SOMEONE'S HOME, IT IS DIFFICULT TO CHANGE FREQUENCIES WHEN MOVING IT TO AN EXTRAORDINARY SITE BUT THE CHOICES ARE THREE IN NUMBER: CHANGE FREQUENCY, DON'T USE THE SITE, OR IMPROVE THE PERFORMANCE OF THE SYSTEM.

THE LATTER CHOICE IS THE MOST CHALLENGING. NOTHING CAN BE DONE ABOUT SPURIOUS SIGNALS ON THE RECEIVING FREQUENCY EXCEPT ADDING TONE BURST OR CONTINUOUS TONE SUBAUDIBLE SQUELCH (CTSS). THIS ACTION WILL NOT PREVENT INTERFERENCE FROM SPURIOUS SIGNALS WHICH ARE SIMILAR IN STRENGTH TO DESIRED SIGNALS BUT WILL PREVENT UNNECESSARY KEYING OF THE REPEATER BY THE SPURIOUS SIGNALS. THIS ACTION ALSO HAS THE EFFECT OF CLOSING THE USE OF THE REPEATER TO OUTSIDERS WHICH MAY OR MAY NOT BE DESIRABLE DEPENDING ON THE WISHES OF THE GROUP SUPPORTING THE MACHINE.

IMD, OR INTERMODULATION DISTORTION PRODUCTS ARE GENERATED IN RECEIVER OR TRANSMITTER NEAR THE REPEATER AND CAN SOMETIMES BE ELIMINATED BY UPGRADING THE SYSTEM. IF THE PRODUCTS ARE CAUSED IN ANOTHER USER'S EQUIPMENT AT THE SITE IT MAY BE EASIER TO ABANDON THE SITE OR CHANGE FREQUENCY THAN GET THE USER TO CORRECT THE PROBLEM. THIS IS ALSO TRUE IF THE IMD IS CAUSED BY LOOSE HARDWARE SOMEWHERE IN THE VICINITY AND CAN'T BE LOCATED. IF THE IMD IS IN THE REPEATER RECEIVER OR TRANSMITTER IT CAN BE REMOVED SOMETIMES BY INSTALLING A RECEIVER WITH BETTER IMD FIGURE OR FILTERING ONE OF THE SIGNALS CAUSING THE IMD. CIRCULATORS AND ISOLATORS ARE USED ON OUTPUTS OF TRANSMITTERS TO KEEP SIGNALS FROM FEEDING INTO THE PA STAGE TO BE MIXED. ONE WAY TO TELL IF THE PRODUCT IS BEING GENERATED IN THE RECEIVER IS TO INSTALL AN ADJUSTABLE ATTENUATOR ON THE FRONT END AND SEE IF LIMITER CURRENT VARIES THE SAME WITH THE IMD AS IT DOES WITH THE DESIRED SIGNAL. IF A GIVEN AMOUNT OF ATTENUATION HAS GREATER EFFECT ON THE IMD THAN IT DOES ON THE DESIRED SIGNAL, MIXING IS OCCURRING IN THE RECEIVER. IF IT DOESN'T, IT IS OCCURRING ELSEWHERE AND BEING CARRIED BY THE FEEDLINE TO THE RECEIVER.

REPEATER LINKING WAS ANOTHER SUBJECT BROUGHT UP AT THE MEETING. MANY PEOPLE HAVE HEARD PROPOSALS BY BOB PACE, WA5CJG, WHO IS FAMILIAR WITH THE METHODS USED IN TEXAS. TULSA REPEATER ORGANIZATION HAS AN EMERGENCY HOOK-UP RIGGED WITH AN OUT OF TOWN REPEATER TO BE USED DURING SEVERE WEATHER. THEIR SYSTEM USES VHF LINKING. THERE WERE PROPOSALS IN THE AUTOPATCH CLUB TO INSTALL AUXILIARY RECEIVERS AT THE 22/82 SITE TO LINK OUT OF TOWN REPEATERS WITH THAT SYSTEM DURING SEVERE WEATHER.

THE ONLY DIFFICULTY WITH GETTING REPEATERS LINKED UP IS FINDING SUFFICIENT ENTHUSIASM ON THE PART OF REPEATER TECHNICAL COMMITTEES TO BUILD, INSTALL AND MAINTAIN THE NECESSARY HARDWARE AND CONTROL CIRCUITS. MOST GROUPS ARE HARD PRESSED TO

FIND TIME TO KEEP EXISTING EQUIPMENT WORKING AND TUNED TO KEEN EDGE WE HAVE COME TO EXPECT.

IN DUE TIME, THE ORS TECHNICAL COMMITTEE WILL TRY TO COVER THE "HOW TO" ASPECTS OF THESE AND OTHER SUBJECTS SO COMMENTS ARE WELCOME. JOE, K5JB

BUTTING IN AND OTHER BAD PRACTICES

The following are suggestions on how to screw up emergency communications based on observations I have made over the last few years. I am guilty of pulling some of these myself and only on reflection afterwards, realized how it probably sounded to an observer. The first group of suggestions is based on the principle of "butting in." The latter suggestions are just ordinary bad operating practice.

1. Offer to help someone who has situation under control. If he has started dialing a phone number, he would appreciate receiving a superfluous call on the radio. Call him on the phone if he is keeping the radio frequency too busy for you to edge in.
2. Pass along some spurious information. The people working on a tornado problem in Shawnee would love to hear about flooding in Omaha. In the midst of hail reports a simple report that it is (is not) raining makes a refreshing change of pace.
3. Offer to relay what you heard on the same repeater to which everyone else is listening. If appropriate, explain that you couldn't make out the guy either because he was too noisy into the repeater.
4. Call one of the participants to pass time of day or ask how his uncle's gout is doing.
5. Lacking any of the above imaginative ploys, just call in and ask what is going on.
6. If net control, or other active participant asks you a question, ignore it and answer a question that has not been asked. If you are asked if you see the tornado, it is hardly worth keying up to say "no." Explain where you have been all afternoon, where you are going and what radios you have turned on. If NCS asks for check-ins to take outgoing traffic, check-in with incoming traffic or, better yet, no traffic.
7. While expanding a short comment into a long winded soliloquy, keep the mike keyed during the long pauses necessary to collect your thoughts. If you don't, you are liable to be thanked and asked to stand by.
8. In order to stretch your transmitters duty cycle, repeat everything at least once and make liberal use of phoenetics.
9. Make your initial check in as lengthy as possible. It gives Net control and the others a chance to grab a cup of coffee during the din that results if two guys do it at once.
10. If none of the above are suitable, either call someone unrelated to the situation to see if they are on frequency or on HF, just run through a lengthy tune-up on a live antenna.

The suggestions I have for better operating during emergency communications are fewer in number. Maybe it is because I don't know very many, or maybe it is because it isn't really hard to be a smooth operator during an emergency.

1. Let someone assume control, or assume control yourself. Only one person need be in control but control is essential to establish and maintain orderly flow of communications. The controller may or may not have the answers. He can get those with answers hooked up with those who have questions. He should ask all others to stand by.
2. Keep all transmissions short. Stick to the question (or answer). Don't repeat unless asked. Check in with just your call.
3. Above all, listen. Only check in if you have a problem related to the situation or a solution related to the problem. Save the social check in (for the count) until business is less pressing or net control asks for a census.
4. Once checked in, stay on frequency. Don't wander off to other frequencies or bands. If you join the group, be a helper not a kibitzer.

A very, very small amount of our available operating time is used for actual emergency type situations. It shouldn't be very difficult to muster the discipline to make emergency communication very effective. The buffoonery can be reserved for the extensive periods between emergencies.

Joe, K5JB

HOW TO BE A DX LID

With the bands opening for fine DX this winter, you may want to observe the following rules to assure yourself a widespread reputation among stations in any DX pileup.

1. Tune up on the DX station's frequency. This is a great tactic because you will QMR whatever QSO may be in progress, and possibly make a few guys so angry they will QSY. Wonderful for warning the competition that a big gun is entering the fray.

2. Always run maximum power. So what if you can work that GK3 with a couple of hundred watts? By all means, flick on the linear! Your splatter alone will announce your presence on all sides of your primary signal, and that guy in DX-land, who may be legally limited to low power, is sure to feel warmly toward you for showing off.

3. Whenever the DX station goes back to the station he is working, be sure to jump in there and yell your call a dozen times. Most of the other guys on frequency will be more polite, and you're sure to be heard this way (even if the station your prey wants to hear is covered up).

4. Any time you don't hear anything, talk. The station over there may be QRZ. Of course he may also be in QSO with someone you can't hear, but don't let technicalities bother you.

5. Once you get through, be sure to ragchew...endlessly. There may be 20 stations waiting, and your DX pal may be weary. No matter. You will be remembered vividly if you keep it at your end 15 minutes every time, telling interesting stuff like how you glued the plastic knob back on the framus, and how many catfish you caught on that great trip when you were 13.

6. Avoid the standard phonetic alphabet. Be an individual! You will make a great hit if you can identify your call, as say, Winnebago Boondoggle Fihuve Tamale Zombie Zilch, rather than the dull and predictable Whiskey Bravo 5 Tango Zulu Zulu. The guy at the other end will pay closer attention, trying to figure out what you're saying.

7. If you hear anyone else trying to break, chew him out on the air with the repeated assertion that the frequency is in use. This asserts your authority and macho, and has the added advantage of dragging out the amount of time you keep everyone else from working this rare one you've hooked.

8. Don't waste any time. If you discover that the guy on the other end is in a country you've already worked, by all means be rude and sign immediately. Then, if he needs your card, ignore his call-backs. And if he sends you a card, don't send him one back.

9. Never say thanks, or try briefly to establish a meaningful human contact. Be brisk, brusque, and brazen.

10. Never send IRCs with your QSL card.

If you follow these 10 easy rules, I am sure you will soon be known far and wide as a member of a small but growing fraternity of DX hounds with their own code of behavior. In addition, you will never have to worry about finding a place for all your DX reply cards, or have the hassle of applying for DXCC. After a while, you may not even have any reason to turn your station on at all!

Jack, WB5TZZ

TUNING A RANDOM WIRE

Jack, WB5TZZ

Most long-timers in the hobby know how to work little tricks with a tuner to end-feed a random wire antenna, but newcomers may have some difficulty. When I first tried a tuner on 40 and 75, and experienced trouble, I felt embarrassed. That feeling faded as word got around that I was using a random wire -- and hams with considerably more experience started calling to ask how I got such and such a tuner to work.

I'm still learning, but here are a few tips that may be of help.

HAVE A GOOD GROUND!

A tuner feeding a random, end-fed wire MUST have a good ground connection. Driving a pipe 8 feet in the ground may not be good enough. You may have to get to a cold water pipe. This may be a nuisance, but not as much nuisance as fiddling for hours at the rig and never getting the SWR below 20-1.

FIGURE YOUR WIRE LENGTH!

This came as a nasty surprise to me, but that "random length" end-fed wire probably won't be all that accidental in length at all by the time you get done messing with it--unless you're lucky. The antenna will present a maximum impedance to the tuner--perhaps more than it can handle--when the wire is close to a half-wavelength for the frequency desired. Therefore, unless you like high SWR and RF in the shack, you have to select a "random" length as far as possible from a half wavelength.

Naturally, there's also some practical limit to how short a wire you can tune. Add to the the fact that you probably want to use the antenna for more than one band, and things get complicated. You can either do a little math and try to find a good compromise length as far as possible between desired frequency band half-wavelengths, or you can throw up a bunch of wire and snip and trim until you get it right.

After snipping and trimming once for days, I recommend some figuring. It's tough enough to find the proper loading positions sometimes without being plagued by the sneaking suspicion that NO tuner combination can possible resonate the particular length of wire you happen to have chosen.

Also, the tuner is cross-eyed. It can't tell the difference between wire running from the antenna terminal and wire running out to ground. If you put up 60 feet of "antenna" and then have 20 feet of wire to ground, the box thinks it's looking at the total, or something like 80 feet.

USE AN SWR BRIDGE!

Once your wire is up, using the center conductor of some coax to get the rf outside the shack, it comes time to play with the tuner for the first time. Different boxes have different instructions, but generally they tell you to twiddle the knobs until you get maximum signal in the receive mode, then start trying to load the transmitter. Good advice. I've found that the best transmit settings on the tuner are usually quite close to the maximum "noise level" in receive.

You'll need a SWR bridge in the line to go further, however, and it will save a lot of switching and guessing if you have the type that reads forward and reflected power simultaneously. The best forward power reading is not at all necessarily the lowest SWR -- and vice versa. It helps to be able to watch both needles at once.

There's more on page

LOAD VERY LIGHTLY!

Using a dummy load or whatever prayerful method you devise, tune the transmitter. Then feed just enough power into the tuner so you can get some forward power and SWR reading. DON'T pile on the power; you don't really enjoy buying new finals, do you?

TUNE FOR INDUCTANCE FIRST!

This may not be an iron-clad rule, but it's one I've suggested to some guys, and it helped them. Usually the inductance control has click settings to engage various positions in the coil, and you'll see gross changes in the power and SWR as you change inductance. Chances are very good that whatever position you choose for maximum reception will be right for transmitting, too, so finding this position should not be too hard.

If all the positions seem alike, twiddle the capacitance knob(s) a little bit -- a LITTLE BIT -- and try again. Remember that you're looking most for low SWR; if the forward power moves up at that point, you're lucky. Just find the best compromise between maximum incoming signal and evident low SWR as you work on the inductance, and be satisfied for the moment.

RECHECK THE TRANSMITTER OFTEN!

Every time you change the tuner settings, you may change the transmitter loading. Once you think you may be satisfied with the inductance setting, go back and make sure the loading hasn't changed. If it has, tweak it up again.

GET THE SWR DOWN FIRST!

Now the fun begins. Many tuners have two capacitance controls. My Dentron Super Tuner, for example, has one labeled "Transmitter Matching" and another labeled "Antenna Matching". I have found that the first is the more critical by far. Twiddle this one FOR LOW SWR. It does not matter if the forward power also appears to go out of sight! If you try to work two knobs and read two dials, often going in strange gyrations, all at the same time, you can go nuts. Look for the minimum SWR even if the forward power indication seems to plunge proportionally.

Do the same with your other capacitance setting, if you have two.

At this point you'd better check the transmitter again.

COMPROMISE FOR FINAL SETTING!

You should be close by now if the SWR is low, even if forward power also is zilch. You should try to feed just a bit more power into the tuner. If all has gone well, you may be pleasantly surprised to find the forward power moving up, while the SWR stays down. If you don't have much luck, you may need to twiddle your capacitors again a little. USE SMALL MOVEMENTS!

Remember this vital point: the maximum forward power setting as first indicated while you tune up may also carry a very high SWR. If you can find the low SWR point, the chances are good that you can then add a little power from the transmitter and find excellent loading. At risk of being repetitious: GET THE SWR DOWN FIRST!

One gentleman to whom I showed this technique complained that it just didn't make any sense to tune for low SWR when he could see the forward power plunging simultaneously. It helped him to accept the reality when I told him, "Sure, your forward power is high in another position -- but it's obviously all coming right back at you, too."

CAN YOU FOLLOW DIRECTIONS ?

Read everything carefully before doing anything.

Put your name in the upper right hand corner of this paper.

Circle the word "NAME" in sentence two.

Draw five small squares in the upper left hand corner.

Put an "X" in each square.

After the title, write "YES, YES, YES."

Put a circle completely around the sentence under seven.

Put an "X" in the lower left corner of this paper.

Draw a triangle around the "X" you have just put down.

On the back of this paper, multiply 703 by 66.

Draw a rectangle around the word "CORNER" in sentence four.

Loudly call out your first name when you get this far along.

If you think you have followed directions carefully to this point, call out "I HAVE".

On the reverse side of this paper, add 8950 and 9805.

Put a circle around your answer, and put a square around the circle.

In a loud speaking voice, count from ten to one, backwards.

Punch three small holes in the top of this paper, with your pencil.

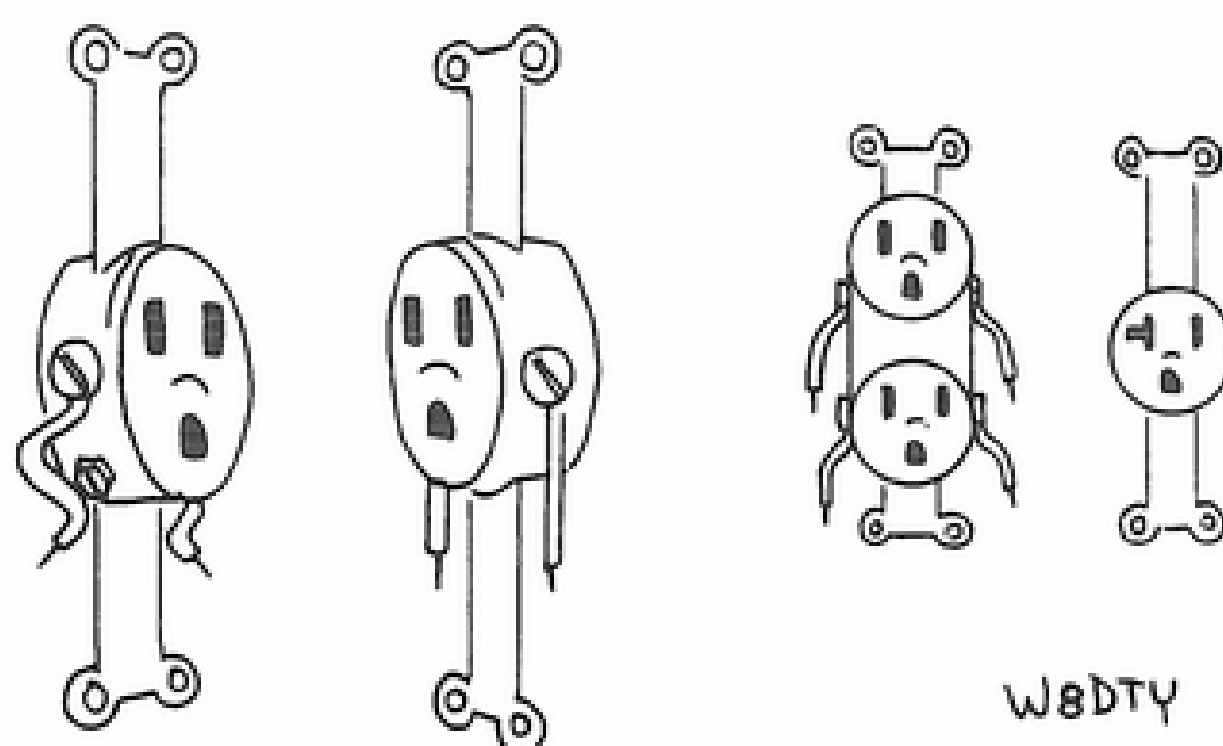
If you are the first person to reach this point, loudly call out,

"I AM THE FIRST PERSON TO THIS POINT, AND I AM THE LEADER IN FOLLOWING DIRECTIONS."

Underline all even numbers on the left side of this paper.

Loudly call out "I AM NEARLY FINISHED, I HAVE FOLLOWED DIRECTIONS."

Now that you have successfully followed sentence number one, do only as directed in sentence number two.



"Talk about a couple of wierdos...."

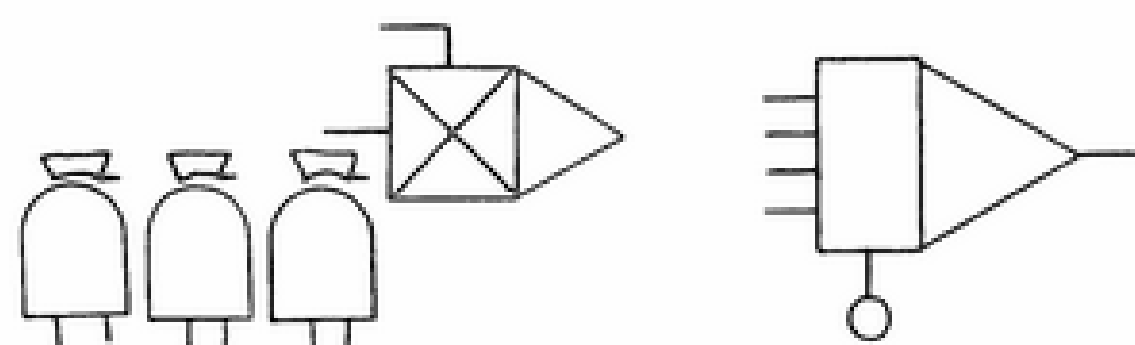
from ACTION Mini mag

Commonest Metric Conversions

	When you know:	You can find:	If you multiply by:
LENGTH	inches	millimeters	25
	feet	centimeters	30
	yards	meters	0.9
	miles	kilometers	1.6
	millimeters	inches	0.04
	centimeters	inches	0.4
	meters	yards	1.1
	kilometers	miles	0.6
AREA	square inches	square centimeters	6.5
	square feet	square meters	0.09
	square yards	square meters	0.8
	square miles	square kilometers	2.6
	acres	square hectometers (hectares)	0.4
	square centimeters	square inches	0.16
	square meters	square yards	1.2
	square kilometers	square miles	0.4
	square hectometers (hectares)	acres	2.5
MASS	ounces	grams	28
	pounds	kilograms	0.45
	short tons	megagrams (metric tons)	0.9
	grams	ounces	0.035
	kilograms	pounds	2.2
	megagrams (metric tons)	short tons	1.1
LIQUID VOLUME	ounces	milliliters	30
	pints	liters	0.47
	quarts	liters	0.95
	gallons	liters	3.8
	milliliters	ounces	0.034
	liters	pints	2.1
	liters	quarts	1.06
	liters	gallons	0.26
TEM- PERA- TURE	degrees Fahrenheit	degrees Celsius	5/9 (after subtract- ing 32)
	degrees Celsius	degrees Fahrenheit	9/5 (then add 32)

THESE PREFIXES MAY BE APPLIED TO ALL SI UNITS

Multiples	Prefixes	Symbols
1 000 000 = 10 ⁶	mega	M
1000 = 10 ³	kilo	k
0.01 = 10 ⁻²	centi	c
0.001 = 10 ⁻³	milli	m
0.000 001 = 10 ⁻⁶	micro	u



"See one new weapons parade, 'n' you've seen 'em all!"

from ACTION Mini Mag

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			Q ARC 1	GROUND HOG DAY 2	AERO. CNTR. ARC 3	4
5	6	MORI 7	ASH WED. 8	ALTUS HAM CLUB 9	10	11
HAPPY BIRTHDAY ABE 12	13	14	Q ARC 15	16	OK CENT. ARC. 17	18
19	HAPPY BIRTHDAY GEORGE 20	OK CITY AUTOPATCH - WY MEETING (incl. 76'er) 21	CORA 22	23	24	25
26	27	28				

See page 2 and/or individual club sections for details

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