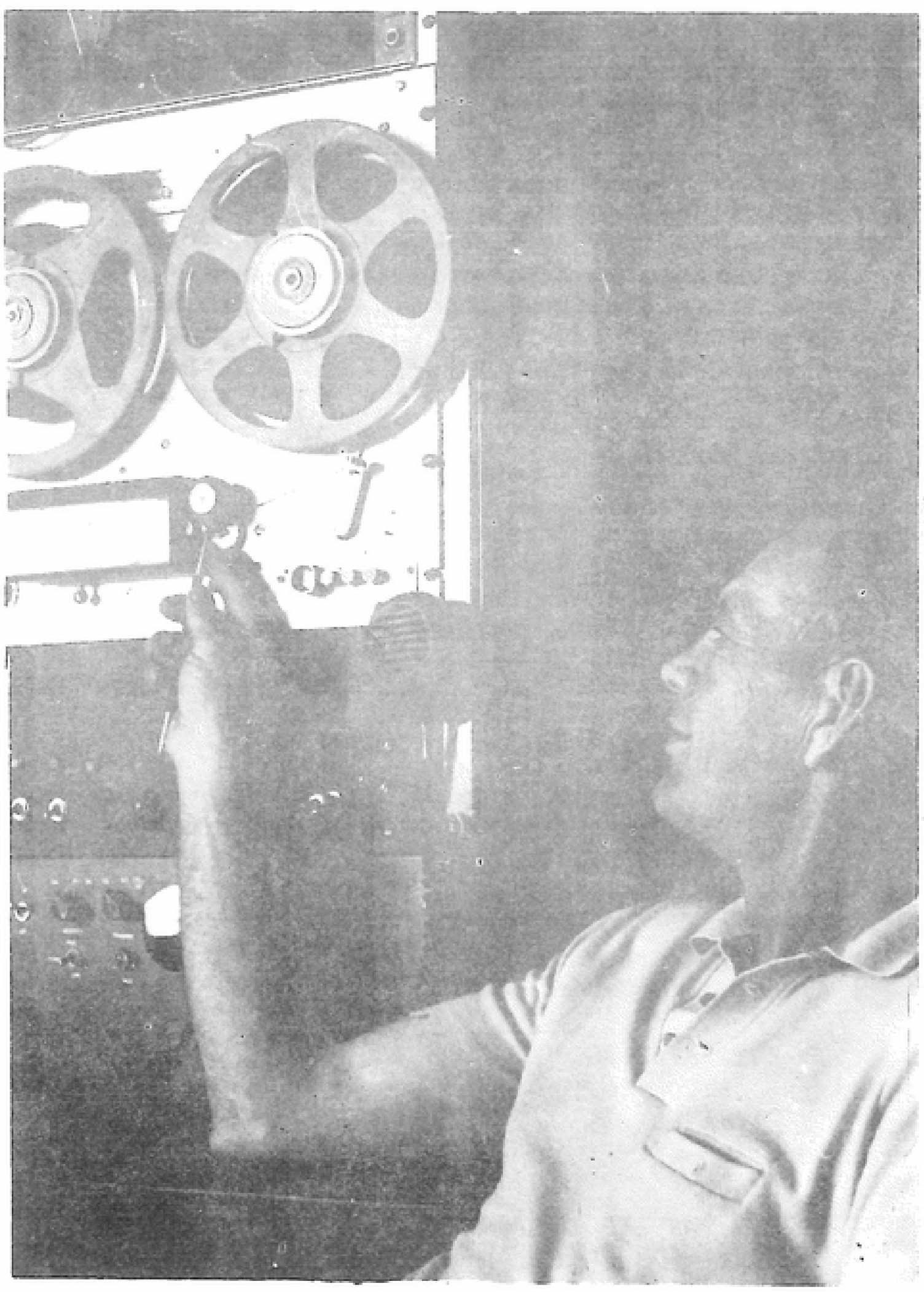
Central Oklahoma Radio Amateurs

COLLECTOR AND EMITTER

Vol.1 AUGUST 1975 Number 7



Wayne Hogan, WA5AOB, shown monkeying (fine tuning) the first 34/94 repeater in Okla. City. See page 3.

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Central Oklahoma Radio Amateurs (CORA) Inc. was organized to enhance the cooperation of Oklahoma Amateur Radio Clubs in sponsoring activities of mutual interest to the Clubs and Radio Amateurs. Participation in specific CORA activities is optional with the individual Clubs. CORA officers are:

President	Ken Kendrick	WB5ECJ	751-4917
Vice President	Gary McCormick	WA5ETY	946-2898
Secretary	Ellard Foster	W5KE	789-6702
Treasurer	Bob Williams	WB5LHR	789-0987

Participating clubs for CORA Collector and Emitter:

AERONAUTICAL CENTER AMATEUR RADIO CLUB, INC.
Postal Station 18, Oklahoma City, OK 73169
Meetings: 8:00 p.m. on first Friday each month, Flight Standards Building, FAA Aeronautical Center. Club Station W5PAA.

President	Bob Ashby	W5HXL	942-5375
Vice President	Al Prince	WB5KCU	789-1160
Secretary/Treasurer	Bill Oliver	K5KDR	329-6333
Asst to President	Ken Ford	WB5KHU	528-8770

OKLAHOMA CENTRAL VHF AMATEUR RADIO CLUB, INC.
323 N. W. 10, Oklahoma City, OK 73103
Meetings: 8:00 p.m. on third Friday each month, American Red Cross, 323 N. W. 10. Club Station W5LOW.

President	Carl Drumeller	W5JJ	789-3788
Vice President	Tom Stinson	W5OZE	942-3714
Secretary	Jef Casey	WB5GWB	528-0252
Treasurer	Ellard Foster	W5KE	789-6702

MID-OKLAHOMA REPEATOR, INC.
Meetings: 8:00 p.m. Tuesday of first full week each month, Oklahoma City EOC, 4600 N. Eastern. WR5ADE 34/94 WR5ADF 07/67

President	Bill Noland	WA5FWD	354-5018
Vice President	Jim Kearns	WA5LFN	751-6035
Secretary/Treasurer	Don Graham	WA5TAW	733-3044

Mail dues to Sid Gerber, 829 E. Bouse, MWC, 73110

OKLAHOMA CITY AUTOPATCH ASSOCIATION, INC.
Meetings: 8:00 p.m. on third Monday each month. WR5ACB 22/82 147.81/21

President	Frank McCollom	WB5JBL	751-3577
Vice President	Larry Dillard	WB5CWB	685-4065
Secretary/Treasurer	Jim Denman	WB5EOL	681-6048

7705 S. Charlotte Drive, Oklahoma City, OK 73159

Subscription Price: $3.50 per year to non-affiliated club members

MID-OKLAHOMA REPEATOR INC.

SALUTE! WAYNE HOGAN, WA5AOB, FIRST TRUSTEE OF 34/94

Probably the most Instrumental in keeping the 34/94 machine going since it's inception. Also designing and building much of the control circuitry and putting it together and making it work for 34/94 and 07/67 and the 450 repeater. Wayne had very little knowledge of solid state, let alone digital circuitry, when he started, but he cracked the books and with encouragement and prodding from fellow amateurs he has come a long way with this new "didgital double talk". You've heard of the saying "let George do it"? Seems as the name was changed to Wayne. Thanks Wayne for all the untold hours bent over the work bench and books. It's good to know there are still people around willing to put forth the effort that you do.

WHAT YOUR SCRIBBLES MEAN.

Elois Spence - Certified Graphoanalysis will speak to the ladies of Oklahoma HAM HOLIDAY. Date-August 2nd, 1:30 P.M.
Elois lectures and teaches eight basic step courses. She has done work in counciling parents with problem children. She has done compatibility analysis for prospective marriages and single visit marriage counciling. She will speak to us on the science of graphoanalysis and thus explain what your scribbles mean.

Next MORI Meeting Sept.9

The next MORI meeting will be held at the EOC 8:00P.M. Sept. 9. Due to Oklahoma Ham Holiday and other events durin Aug. there will be no meeting this month.

34/94 Repeator
Hopefuly by the time you read this the 34/94 repeator will be on the Liberity Nat'l Bldg. As most of you have noticed by now it has been on,on a test basis for about the last week. The Tech. Committie is doing all possable to have it on before the first of Aug.

TWO HUNDRED AND THREE MEMBERS OF THE MID-OKLAHOMA REPEATOR INC. Sincerly hope that you and yours, are going tohave, are having, or have had an enjoyable time at OKLAHOMA HAM HOLIDAY & State A.R.R.L. Convention

Bill WA 5 FWD

Club
NEWS

W5LOW
The Elmer Geddes Memorial Station

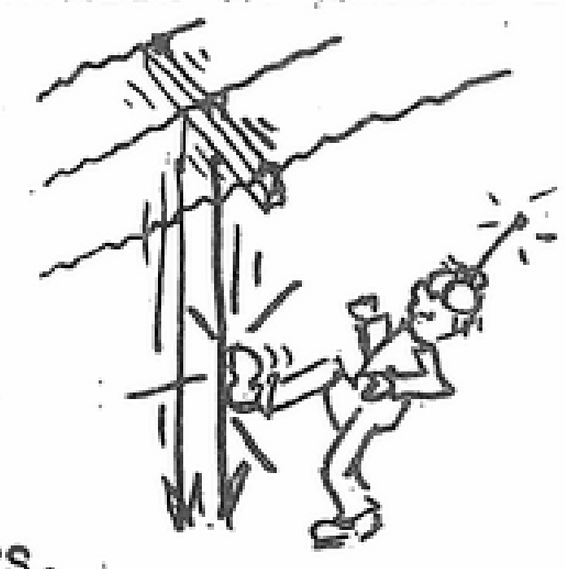
FROM THE PRESIDENT

THIS MONTH HAS ZIPPED BY ALL TOO QUICKLY! HERE IT'S TIME FOR C-E COPY AND I HAVEN'T THOUGHT OF A THING WORTHY OF BEING TURNED OVER TO WA5TRS FOR EDITING AND EVENTUAL PUBLICATION. PERHAPS IT'S ALL DUE TO THE SHOCK OF FIELD DAY. NOT THAT I DID ANY OPERATION FROM THE FD SITE, BUT I DID SPEND MANY HOURS COMBING THE BANDS FOR W5LOW/5 WITH THE HOPES OF HELPING THAT STATION RUN UP A FEW MORE POINTS. I LOOKED ON 8Ø M, 4Ø M, AND 2Ø M, BOTH IN THE FONE AND THE CW SECTIONS, NOT A PEEP OUT OF W5LOW/5. SUNDAY MORNING I HEARD THAT STATION ON 39ØØ KHZ, GIVING A MSG TO WA5FSN, AND SNAPPED A QUICK REQUEST FOR A CONTACT ON A BIT LOWER FREQUENCY. THE WHOLE TIME WAS A TOTAL LOSS FROM THE STAND-POINT OF ASSISTING W5LOW/5, BUT IT DID GIVE A NUMBER OF CONTACTS TO OTHER FD STATIONS ABOUT THE COUNTRY.

AND THAT BROUGHT UP A POINT FOR COMMENT. WHY, OH, WHY MUST EACH FD OPERATOR SPEAK AS THOUGH HE WERE IN A SPEED-TALKING CONTEST WITH LOWELL THOMAS? THE REPETITIONS HE'S REQUIRED TO MAKE CONSUME MUCH MORE TIME THAN WOULD BE NEEDED FOR THE CALL AND CONFIRMATION AT NORMAL CONVERSATIONAL SPEED. ON RADIOTELEGRAPHY, THE TENDENCY WAS EVEN MORE PRONOUNCED. NOVICES STUMBLED THROUGH CQS AT 25 WPM, MESSED THEIR OWN CALLS UP AT 2Ø WPM. IN THE OTHER SECTIONS OF THE BANDS THE AVERAGE SPEED OF CALLS WAS EVEN HIGHER. ONE WONDERS JUST HOW MANY POTENTIAL ANSWERERS WERE DISCOURAGED? ON OTHER DAYS, I HEAR VERY FEW CONVERSATIONS BEING CARRIED ON AT SUCH SPEEDS. OH, THERE ARE SOME OPERATORS WHO CAN LOAF ALONG AT 45 OR MORE WPM, BUT THE AVERAGE BRASS-POUNDER FEELS ONE HECK OF A LOT MORE COMFORTABLE AT AROUND 15 WPM.

CARL, W5JJ

CHASING EMI



EMI, THE ABBREVIATION FOR ELECTROMAGNETIC INTERFERENCE, IS THE TERM GIVEN TO UNDESIRABLE ELECTROMAGNETIC ENERGY. EMI IS GENERATED BY RADIO TRANSMITTERS, INCLUDING THE UNDESIRABLE ONES LOCATED THROUGHOUT OUR NEIGHBORHOODS AND GENER-ATING SIGNALS WITHIN RANGE OF OUR RECEIVERS.

THE PURPOSE OF THIS ARTICLE IS TO RELATE MY EXPERIENCE IN TRACK-ING DOWN AND ELIMINATING EMI FROM POWER LINES AND OTHER SOURCES AROUND MY NEIGHBORHOOD.

SOME INTERFERENCE IS NOT CORRECTABLE. THE HISSING SOUND THAT SOMETIMES PRECEEDS OR ACCOMPANIES A THUNDERSTORM, SOUNDS A BIT LIKE SPARK GENERATED EMI BUT IS NOT WITHIN THE CAPABILITY OF MAN TO CORRECT! LIKEWISE LIGHTNING STATIC CRASHES! THESE, AND MOST OTHER FORMS OF EMI, SUCH AS ELECTRIC DRILLS, SEWING MACHINES, MIXERS, ETC., ARE USUALLY OF SHORT DURATION AND THUS NOT WORTHY OF TOO MUCH CONCERN. KEEP TELLING YOURSELF THAT WHEN YOU ARE TRYING TO KEEP A NET SCHEDULE OR HOOK A RARE DX CONTACT THROUGH THAT PERFECTLY TIMED BUZZ OR WHIRR!

HOWEVER, THE ENVIRONMENT CAN BE IMPROVED SOMEWHAT, IF CHRONIC RECURRING OR CONTINUOUS BUZZING, FRYING AND HISSING CAN BE ELIMINATED. NECESSARY TO THE ELIMINATION IS A HIGH RATE OF RECURRENCE OR CONTINUANCE OF THE EMI. BEFORE THE NOISE CAN BE STOPPED, IT MUST BE FOUND. IF THE RECURRENCE RATE IS HIGH ENOUGH AND ON A DAILY BASIS, YOUR CHANCE FOR FINDING THE SOURCE IS VERY GOOD. IF YOU ARE FORTUNATE LIVE IN A RELATIVELY NOISE FREE NEIGHBORHOOD YOU ARE LUCKY BECAUSE WHEN TWO OR MORE SOURCES OF NOISE ARE HEARD AT ONCE, IT BECOMES QUITE DIFFICULT TO SEPARATE THEM.

THE BEST PIECE OF TEST EQUIPMENT TO HAVE IS A SHIRT POCKET TRANSISTOR RADIO BECAUSE THE BUILT-IN ANTENNA IS QUITE DIRECTIONAL.. THE RECEIVER I USE IS A DUAL BAND MODEL WITH AM BROADCAST BAND AND, 3Ø-5Ø MHZ PUBLIC SERVICE BAND. THE LATTER IS OF DUBIOUS VALUE BUT I TRY TO USE IT WHEN I AM CLOSE TO THE SOURCE. THE AM ANTENNA NEEDS TO BE CALIBRATED FOR DIRECTION. THE BEST PROCEDURE IS TO GET OUT IN A FIELD, AWAY FROM ANY POWER LINES AND SELECT A BC STATION IN A KNOWN DIRECTION, PREFERABLY ONE WHICH HAS THE ANTENNA VISIBLE. TURN ON THE RADIO AND ROTATE IT UNTIL THE DIRECTION OF BEST NULL IS FOUND. ON MY RECEIVER, THE DIRECTION DOES NOT EXACTLY CORRESPOND TO ANY OF THE AXES OF THE RADIO CASE SO I MADE AN ARROW OUT OF TAPE AND STUCK IT ON THE CASE. GENERALLY NULL IS FOUND WHEN THE FERRITE BAR IS MORE OR LESS POINTING AT THE BC STATION. MAXIMUM SIGNAL OCCURS WHEN THE BAR IS BROADSIDE OF THE STATION BUT THE LOBE IS BROAD AND NOT GOOD FOR DIRECTION FINDING.

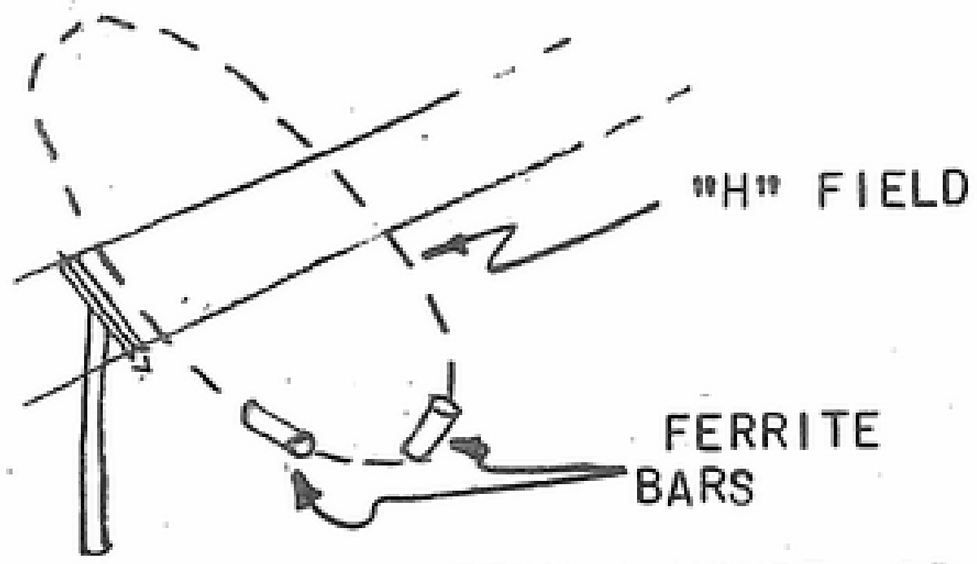
THE TECHNIQUE FOR LOCATING SOURCE OF NOISE IS WHERE YOUR BEST IMAGINATION AND SKILL WILL BE NEEDED. THE NOISE WE ARE LOOKING FOR USUALLY IS GENERATED BY A SPARK CREATED BY CURRENT LEAKING ACROSS A HIGH RESISTANCE PATH, SUCH AS LOOSE POWER POLE HARDWARE, FAULTY INSULATORS OR SOMETHING IN CONTACT WITH A POWER LINE, SUCH AS A TREE LIMB, PIECE OF BAILING WIRE, OR BRICK TIE, FOR EXAMPLE. OTHER, AND PERHAPS MORE COMMON, SOURCES ARE THERMOSTATS FOUND IN AQUARIUM HEATERS, ELECTRIC BLANKETS OR REFRIGERATORS, AND DEVICES SUCH AS DOOR BELL TRANSFORMERS AND WATER PIPE HEATERS.

IF YOU HAVE A ROTATABLE BEAM ANTENNA, YOU MAY BE ABLE TO GET A BEARING ON THE NOISE BEFORE YOU LEAVE THE HOUSE. ONE WORD OF CAUTION THOUGH, THE NOISE YOU HEAR ON 75 M AND THE NOISE ON 1Ø M MAY NOT BE COMING FROM THE SAME SOURCE. YOU NEED TWO RECEIVERS TO FIND OUT FOR SURE. IF THE ANTENNA IS POINTING AT THE POWER LINE BEHIND YOUR HOUSE, OR AT THE POLE UP THE STREET WHEN MAXIMUM SIGNAL IS INDICATED, DON'T JUMP TO CONCLUSIONS YET. NOISE GENERATED AT ONE POINT EXCITES THE TUNED CIRCUITS CONNECTED TO IT AND THEY, IN TURN, RADIATE THE EMI. A FAULTY INSULATOR, WITH LEAKAGE, MAY BE GENERATING EMI FOR MILES AROUND. THE FREQUENCIES INVOLVED ARE DETERMINED BY THE RESONANCES OF THE LINES INVOLVED, INCLUDING THE GROUND WIRES ON THE POLES. ALSO, ALONG A LENGTH OF WIRE, NOISE MAXIMUMS SEEM TO CORRESPOND WITH HALF WAVELENGTHS ALONG THE WIRE. TO DEMONSTRATE THIS IN THE OKLAHOMA CITY AREA, DRIVE ALONG A NOISY STREET WITH <u>ANY</u> AM RADIO, BC, HF OR VHF, AND LISTEN TO THE NOISE INCREASE AND DECREASE AS YOU MOVE ALONG.

THE BEST HORRIBLE EXAMPLE OF THE POWER COMPANY'S ABJECT NEGLECT AND NEGATIVE PUBLIC RELATIONS IN THESE TIMES OF POLLUTION AWARENESS, IS SOUTH SUNNYLANE FROM EAST RENO TO SE 89TH OR SO. ABSOLUTE DISASTER AREA THERE! IF YOU LIVE AROUND THERE, OR IN A SIMILAR AREA, READ NO FURTHER, SEE YOUR REAL ESTATE AGENT.

THE MAXIMUMS AND MINIMUMS YOU WILL EXPERIENCE ALONG A LINE TEND TO BE CONFUSING SINCE THEY MASK THE SIGNAL STRENGTH CHANGE AS YOU APPROACH, OR RECEDE FROM THE SOURCE. ALSO, THERE IS A PROXIMITY EFFECT FROM POLES THEMSELVES. THEY OFTEN HAVE GROUND WIRES THAT RADIATE, THEREFORE, PASSING CLOSE TO A POLE WILL GIVE A STRONG SIGNAL INDICATION. SINCE YOU MUST RELY ON YOUR MEMORY FROM ONE PEAK TO THE NEXT, I FIND IT IS ADVANTAGEOUS TO DRIVE THE CAR, OR BETTER YET, RIDE A BICYCLE UP AND DOWN THE STREET LISTENING TO THE NOISE. MY BICYCLE HAS NOISE SUPPRESSION ON THE IGNITION. AS YOU MAY SURMISE IT IS BEST TO DO THESE THINGS AFTER DARK, PREFERABLY AFTER MOST PEOPLE HAVE GONE TO BED.

AS YOU KNOW, AN ELECTROMAGNETIC WAVE HAS TWO COMPONENTS, ELECTRIC AND MAGNETIC. WE ARE USED TO THINKING OF ANTENNAS AND WAVE PROPAGATION IN THE PLANE OF THE ELECTRIC WAVE. THE FERRITE ANTENNA IN YOUR BC RADIO IS A MAGNETIC ANTENNA AND THEREFORE RESPONDS DIFFERENTLY THAN A WHIP. THE BEST RECEPTION OF THE MAGNETIC WAVE FROM THE NOISE GENERATING WIRE OCCURS WHEN THE AXIS OF THE FERRITE BAR IS ORIENTED ALONG A CIRCLE HAVING THE WIRE AT ITS CENTER AND LYING IN A PLANE PERPENDICULAR TO THE WIRE. SEE FIGURE. THIS KNOWLEDGE IS OF LIMITED USEFULNESS EXCEPT UNDER SOME CIRCUMSTANCES WHEN TRYING TO FIGURE OUT WHICH OF TWO SETS OF WIRES IS MAKING THE MOST NOISE.



ORIENTATION FOR
BEST RECEPTION OF
MAGNETIC WAVE

IF THE NOISE SEEMS TO COME FROM A HOUSE, OR GETS LOUDER AS YOU PASS BY THAT LOCATION, TAKE TWO DIRECTION READINGS FROM POINTS UP AND DOWN THE STREET AND SEE IF YOU CAN TRIANGULATE THE SOURCE. IF POSSIBLE, VERIFY THE SOURCE FROM A NEIGHBOR'S BACK YARD AND RULE OUT THE POSSIBILITY THAT A POWER LINE IN THE BACK YARD IS RADIATING THE EMI.

IF THE NOISE IS SUSPECTED TO BE COMING FROM INSIDE THE HOUSE, YOU HAVE A DIPLOMATIC PROBLEM. CHANCES ARE, THOUGH, IF YOU ARE HEARING IT FROM VERY FAR AWAY, THE OCCUPANT IS HEARING IT ON RADIOS, AND POSSIBLY TV AND WILL WELCOME YOUR VISIT. ISOLATION OF THE EMI GENERATOR IS BEST DONE BY OPENING CIRCUIT BREAKERS, ONE AT A TIME, AND LISTENING FOR DISRUPTION OF THE NOISE. DOOR BELL TRANSFORMERS MAY NOT BE ON A CIRCUIT BREAKER SO TRY RINGING

THE DOOR BELL WHILE LISTENING ON THE RADIO. SOMETIMES, THE DOORBELL IS INOPERATIVE WHILE THE NOISE IS BEING GENERATED. WAIT FOR THE NOISE TO START BEFORE TESTING THE DOOR BELL CIRCUIT. THE NOISE MAY STOP THE INSTANT THE BUTTON IS PUSHED.

IF THE SOURCE OF NOISE IS SUSPECTED TO BE ON A POWER LINE POLE AND THE GENERAL LOCATION IS DETERMINED, LOOK FOR A GUY CABLE COMING FROM ONE OF THE POLES WHERE THE LINE MAKES A TURN. SHAKING THE GUY CABLE WILL AGITATE THE HELL OUT OF ALL THE POLES ON THE LINE AND IF LOOSE HARDWARE OR INSULATOR PROBLEMS ARE PRESENT, THE NOISE WILL LIKELY SPUTTER AND BREAK UP IN CADENCE WITH THE MOVEMENT OF THE WIRES. SOME TIMES A SHOCK ON THE GUILTY POLE SUCH AS INFLICTED BY A HAMMER OR SIZE TWELVE BROGAN WILL STIR UP THE NOISE.

THE NEXT STEP IS TO CALL THE POWER COMPANY, PROBABLY ASKING FOR THE RADIO SHOP. EXPLAIN WHO YOU ARE, WHAT YOU HAVE DONE AND DESCRIBE WHERE THE SOURCE OF NOISE SEEMS TO BE. THE POWER COMPANY CANNOT FIND A NOISE THAT IS NONEXISTANT WHEN IT ARRIVES SO TRY TO ADVISE IT IF THE NOISE IS ABSENT EXCEPT DURING CERTAIN CONDITIONS.

NOW, ARMED WITH ALL THIS KNOWLEDGE, ALL YOU NEED IS A LITTLE KICK IN THE PANTS TO GET YOU OUTSIDE WHEN YOUR RIG IS SPEWING FORTH RASPBERRIES INSTEAD OF RARE DX! IT DOESN'T DO ANY GOOD WHATSOEVER TO SIT BACK AND CUSS IT! JOE WA5TRS

MINUTES OF CLUB MEETINGS

THERE ARE NO MINUTES OF THE INFORMAL MEETING HELD FIELD DAY WEEKEND SINCE THERE WAS NO BUSINESS CONDUCTED. THE MEETING HELD IN JULY WAS A JOINT ONE WITH AERONAUTICAL CENTER ARC. THE CLUB SECRETARY WAS ABSENT AND W5KE TOOK MINUTES. THEY SHOULD BE FOUND IN THE AERO. CENTER SECTION OF THIS ISSUE. JOE, WA5TRS

VACATION IS NOW HISTORY

I ENJOYED THE SECOND HALF OF MY VACATION THIS SUMMER BY TAKING A MOTORCYCLE TRIP THROUGH NEW MEXICO AND COLORADO. DROVE 23ØØ MILES IN NINE DAYS WITHOUT A PROBLEM ONE. DIDN'T REALLY GET A CHANCE TO LOAF, WITH LOOKING FOR A CAMP SITE, SETTING UP SAME, COOKING, EATING, SLEEPING, BREAKING UP CAMP, AND OFF TO TAKE IN ANOTHER DAY OF THAT WONDERFUL SCENERY. MAYBE NEXT YEAR I'LL TAKE TWO WEEKS AND HAVE TIME TO DO SOME RADIOING. JOE, WA5TRS

CONTRIBUTORS TO C&E

AS YOU MAY REMEMBER, LAST MONTH I SAID THAT I WAS GOING TO PICK THREE CLUB MEMBERS AT RANDOM TO WRITE SOMETHING FOR THIS PAPER. WELL, I PICKED THREE NAMES BUT FORGOT TO INFORM THEM UNTIL IT WAS TOO LATE. THEREFORE I AM NOT GOING TO COMPLAIN ABOUT ABJECT APATHY, LAZINESS, INDIFFERENCE, ETC., THIS MONTH. RELIEVED EH? JOE, WA5TRS

A GUIDE TO AMATEUR RADIO

There's a new book, written by Pat Hawker, G3VA, and published by the Radio Society of Great Britain, that's of interest and worth to all English-reading persons having a budding involvement in amateur radio.

It gives a background picture of amateur radio, its language, its customs, what it is, what is needed to become an amateur of radio communication and technology.

With the background established, Pat Hawker moves on with specific information on equipment, mild theory of how the equipment functions, and procedures for amateur operation. Although the theory portion is presented as easy reading, it is not superficial. Even experienced amateurs may find it enlightening! It covers antennas, wave propagation, shielding, safety.

A whole chapter is devoted to communications receivers. In it Hawker discusses sensitivity, tuning rates, stability, images and other spurious signals, concluding with details of several types of receiver circuits. In common with most British publications, this one runs heavily to quite detailed instructions on building equipment. These instructions relate to a number of types of receivers, ranging from ultra-simple to moderately-complex.

The same approach is applied in the chapter on transmitters. Circuits are explored and developed, first for block-components, then for whole transmitters. Although it may seem to some that more space is given to 6A3 (two sidebands and carrier) modulation than present practice justifies, this is not true. To understand 3A3J (one sideband and no carrier), one must first have a thorough comprehension of 6A3; they're both examples of Amplitude Modulation and most SSB transmitters start a signal as 6A3. Frequency modulation is given fewer words. For good cause, as there's no way to explain FM thoroughly without excruciating complexities!

The portion devoted to antennas is well-used, wasting few words on little-used types but telling what is needed in order to put up practicable antennas, ones that a newcomer might want. Happily, Pat Hawker is not a devotee of the cult of unity VSWR worshipers; so that mythology, which so often clutters up poorly-edited publications, is not present to insult the intelligence of readers!

Another section covers frequency measurements quite well. And, for some unknown reason, this segues into instructions for building a simple 1.8 MHz AM and CW transmitter!

An American reader will not profit fully from the chapter on passing license examinations, as it's pointed to the British examination. Yet there's much of worth for any reader.

The same is true of the instructions for operating an amateur transmitter. In this instance, however, most of the text is wholly applicable to American as well as British amateurs.

There's no question about the chapter on workshop practice! The advice given is good. You'll find many ideas that were missing from other publications. This is because the UK amateurs do a great deal more home construction than we Americans! Here, again, there's a segue into building instructions, this time for a 3.5 MHz direct-conversation receiver. The detail is excellent.

Perhaps the high point of the book lies in the chapter on Amateur Radio Equipment. Even to the old timer this chapter alone is worth the price of the entire book! It tells general information and even a degree of detail

AERONAUTICAL CENTER AMATEUR RADIO CLUB, INC.

W5PAA

THE PRESIDENT'S CORNER

Field Day '75 was a complete success, in my opinion. While the score, when finally computed, may not be highly competitive, everything else was near perfection. Six stations were set up and operated successfully without failure for the duration of the contest. These included two firsts for Oklahoma City operation, a satellite station working through OSCAR 7, and a two meter FM station. The highlight of the operation was the delicious food turned out by the chef of the cook tent, Bill, WA5FWD. Everyone had the opportunity to do his "thing" to the extent he wanted to participate, be it operating, setting up antennas and equipment, or just visiting in the shade of the many trees at the Lake Overholser location. My thanks to all who helped make this another successful Field Day.

Although appropriate and satisfactory for Field Day, the set-up of antennas and equipment was overly complex and involved too much time and effort to be considered practical in an actual emergency. A transceiver that only requires an antenna and power connections is certainly preferable to separate transmitters and receivers with the added complexity of their interconnection. The inverted "vee" either single or multiband, with a simple TV mast is an effective antenna that is easily erected. Several members have an inverted "V" that they can throw up on vacation or on a weekend campout to increase the communications effectiveness over the mobile whip. This would also come in handy in case a storm took out the normal home station antenna. Shouldn't you fix up one and keep it available for weekend use or in the event it was needed in an emergency?

Don't forget our August meeting will be on the third Friday, August 15, when we will host a joint meeting with the VHF Club. This change was made to move our meeting time away from the Ham Holiday weekend. Program will be Harold Gilbertson, W5RB, on Traffic Handling and CW nets. See you all at the Southgate Inn, August 2 and 3 for Oklahoma Ham Holiday and State ARRL Convention.

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GUIDE TO AMATEUR RADIO (Contd)

on just about every amateur receiver manufactured in America, Europe, or Asia since the mid-thirties to the present time! You'll be enchanted with this treasure-box!

Of course, being edited by human beings, it's not free of error. An anateur building the circuit on Figure 17, page 24 may wonder why he blows his power supply every time he turns on his transmitter. A plate blocking capacitor would save him that worry! Then, too, the use of kc/s and Mc/s in place of kHz and MHz appears to be unnecessarily archaic. And I don't see why the misuse of Q signals should be encouraged by the table shown on page 80.

But it's a really good publication, one well worth the cost of 70 pence. RSGB publications are handled in the USA by the publishers of Ham Radio Magazine. Just what will be their charge for this book is unknown. Regardless of the exact figure, you can be sure you'll get your money's worth!

W5JJ

AERONAUTICAL CENTER AMATEUR RADIO CLUB, INC.

W5PAA

MINUTES OF JOINT OKLAHOMA CENTRAL VHF AMATEUR RADIO CLUB
AND AERONAUTICAL CENTER AMATEUR RADIO CLUB MEETING
18 July 1975

The meeting was held in the Oklahoma City Red Cross Headquarters Building. It was called to order by Carl Drumeller, W5JJ, president of the OK Central VHF Club. There were about 30 members of the two clubs and guests present.

A motion was made by Jim Williams, K5VRL, and seconded by Charles Greene, WA5JGU, that minutes of the two clubs be accepted as printed in the Collector & Emitter. The motion passed without opposition.

Ken Ford, WB5KHU, advised the VHF Club that they are now owners of an ICOM 22A, that will have capabilities on .34, .94, .07, .67, .28, .88, .22, .82, .16, .76, .94, .94, and .52, .52.

K5VRL read a letter of appreciation from the Cancer Crusade, thanking amateurs for assistance rendered.

Introductions and comments were solicited from those present. Joe Harding, WA5ZNF, has been working on Ham Holiday preparations. He also reported that only one Collector and Emitter copy was returned last issue because of incorrect address. Tom Stinson, W5OZE, has been exchanging musical tapes of "Big" bands with Herman Davis, WA5KQB. WA5JGU reported that Clyde Johnson, K5VIL, has recovered nicely from his operation. Del Feret, W6KOZ, is again attending the FAA Academy. WB5KHU advised Field Day scores included 244 General Class contracts, 41 Novice contracts, 33 contracts on 6 meters and a total score of 1454 points. Harold Gilbertson, W5RB, said he had driven a pair of push-pull 813's to 660 watts without TVI complaints. Harold Todd, WA5VAQ, reported hearing W5RB (a confirmed CW man) on a SSB mike. He has also learned of a SWL with a "Scanner unlimited" project. Richard Ogg, WA5ZCB, has been busy at school. Cecil Cash, W5PML, reported his vacation now just history. Don Templeman, WN5NIY, spent 3 weeks at the FAA school at Lawton. K5VRL is getting more serious in the restoration of his Model A Ford. Marvin White, K5HQP, has likewise completed his vacation. Bill Noland, WA5FWD, was hamburger cook during field day activities. Ken Eason, K5VVZ, finds the .07, .67 trustee job keeps him busy. Jerry Broudy, W5MCJ, announced that H.O. W5MLT passed his General Class test today. He also said that the call W5UZX will be used at the Norman EOC as a memorial station for Bill Todd. WA5MLT said three groups of 10 each took the FCC amateur exams. He could not name participants, but estimated 50% of them made it. Joe Buswell, WA5TRS, reported good and bad experiences with his motorcycles. He plans to organize amateur instruction classes at the OK Military Academy starting in September. Clint Griffin, W5ZZG, tried traveling with 2M FM with poor results. Jim Jones, K5PER, uses h.f. and meets the Early Bird Net about 4AM. Bill Hulse, W5UGZ, brought his son Billy to the meeting. They have had some boat troubles. Bob Ashby, W5HXL, reported "hibernating". W5JJ has been busy reading radio magazines for the Amateur Radio News Service to supply ratings they award.

W5JJ offered a comment on general Field Day operating. He noted that too many "frantic" calls were made, in which call letters were not articulated or "pounded-out" clearly. This causes much loss of time and contacts. W5PML added that chasing up and down the band after CQ's was also ineffective.

AERONAUTICAL CENTER AMATEUR RADIO CLUB, INC.

W5PAA

Minutes of Joint OK Central VHF & ACARC Meeting continued -

W5HXL took over the gavel for ACARC business. He advised Ham Holiday registration and Call Letter License application forms were on hand.

Information was added that Bill Peterson, WN5NXO, passed FCC General Class tests here, and Charles Vogel, W5LHO, passed exams in Tulsa.

Bob Ashby invited everyone to attend the next joint meeting at the Aeronautical Center on the third Friday of August.

WA5FSN advised regretfully that the Enid Club has found itself undermanned for the Wouf Hong initiation at Ham Holiday and must give up the idea. Discussion of possible Oklahoma City Club takeover resulted in a conclusion that only an inadequate ceremony could be prepared and that would be worse than none.

Cecil Cash, W5PML, distributed some ARRL material. He did not make the usual SEC visits to Field Day sites because ARRL travel funds were short. His vacation included a stop in Houston. He was impressed by the service furnished there by Bel-Air Electronics. They have a counter in the window that will check the frequency of a mobile at the curb.

W5HXL called for old business. W5KE advised that an undercoat was applied to the ACARC power plant trailer by Melvin Hood, K5VWQ, even though Melvin was ill at the time.

W5JJ & W5HXL asked for new business without response.

W5JJ took the floor to supply the technical program. He discussed information learned from articles in magazines and newsletters he has been reviewing, that described early detecting devices. He reviewed the Hertz "almost closed loop" detector, the coherer, the first thermonic valve, the Fleming valve, the crystal detector, one using a platinum wire into a liquid acid cup and the mysteriously little known Marconi moving wire detector. Those present found his discussion most interesting and informative.

The meeting adjourned for coffee, doughnuts, and fellowship at 9:30 PM.

For Jef Casey, Secretary
OK Central VHF ARC

and

Billy J. Oliver, Secretar
Aeronautical Center ARC

by Ellard Foster, W5KE

HOW TO ASSEMBLE YOUR STATION -- BUILD, BUY, OR PLUG TOGETHER
(From DARA Bulletin, June 1975)

I remember some of my past hamshacks. The first one was <u>really</u> a shack which was built out in the back yard because mom couldn't stand the noise, stomach the smells, or clean my bedroom. Since then I have had shacks in basements, garages, trailers, and even in the working part of a 1933 Cadillac hearse. (Get me to tell you about that one sometime!) My present shack is in an upstairs bedroom vacated by my daughter when she established her own residence. Makes for nice short antenna leads.

In over four decades of amateur radio I have sat in and wandered through many ham shacks. In all of these amateur radio stations, one fact seems to stand out. Each owner is proud of his own station, in spite of his protests that it is never quite ready for company and there are always great plans for updating and adding more equipment.

As I looked over these many shacks, it occurred to me that the setting up of an individual station falls into categories which resemble some of the commercial titles of people who work in the electronic and allied industries. Now, don't take it too seriously, but see where you fit into these descriptions of some of the radio amateurs I have known:

First, we have the manufacturer. He constructs equipment from scratch using his own or someone else's basic plans. He must know components, construction techniques, and test procedures. So, we also have the manufacturing radio amateur, the "home brewer" who builds his own equipment. He must be a design engineer, a construction technician, a test and calibration specialist, and a trouble shooter. Sometimes he is a rebuild and overhaul specialist. Do you fit into this category?

Meet the equipment assembler. He puts together completed equipment from prepared plans and pre-packaged components. He is not overly concerned with the fine details of the circuitry or parts placement, since this has been worked out by the design and components engineers. But he is a very careful and neat worker. In this category, our radio amateur is known as the "kit builder." He prefers to build kits for many reasons. One of the reasons is economy; the end product is a pretty good replica of more expensive equipment. Another reason is efficiency; the kit manufacturer has done the heavy design work, debugged many prototypes, and rounded up all the hard-to-come-by parts for you. Then, again, there is the feeling of achievement of having persevered through the maze of parts and hundreds of instructions to assemble a piece of equipment. Does this shoe fit you?

Then we have the installation and adjustment specialist. He doesn't know the exact details of what is inside the cabinets, but he does know how to mount it neatly, how to interconnect it and tune it up to make it work. This radio amateur, the "horse trader" has acquired a shack full of equipment by shrewd trading, surplus, swap and shops, and maybe some new stuff. He has the expertise to connect these together and decipher the terminal strips and connectors. He designs and constructs control panels, matching networks, and builds auxiliary equipment where needed. How do you plug in to this slot?

Introducing the systems engineer. He knows the performance figures of all the newest equipment on the market. He specifies the line of equipment he wants, the performance standards, and then leaves it to the team of installers to assemble it and get it working properly. The systems engineer type of radio amateur, the "buyer" knows the capabilities of all the manufactured amateur gear, like Drake, Kenwood, Swan, Alpha, Collins, and some you haven't heard about. He studies the specifications, browses equipment stores and

shows, calls manufacturers, and then orders the stuff for his station. If he is also an installation technician type, he sets up his own station. If not, he gets some of his amateur friends to assist him; a case of 807's provides the proper catalyst. Are you in this picture?

Finally, here is the project engineer. He wants, and gets, top drawer results. He has the financial backing to make it come true. A project engineer type amateur also wants the ultimate. He commissions Collins to design his equipment. His towers are designed and installed under the supervision of a civil engineer. The shack is designed and executed by a major TV studio architect. Of course, this doesn't quite fit you. But--there are even a few amateur radio stations of this type in existence. Ask me some time.

Maybe you don't fit any of these. Or, maybe you fit several of them. It's quite possible that some radio amateurs have worn all these shoes either at different times, or simultaneously. After all, isn't that what makes amateur radio a hobby for everybody?

W8FBH

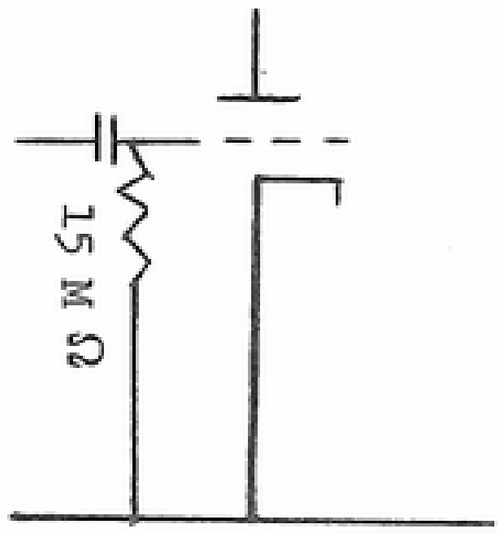
THE RESONANT CIRCUIT
W5JJ Answers Questions from WA5PPA

WA5PPA: A class "A" amplifier requires plate current flow for 360 degrees of the input cycle. Also, such an amplifier should not draw grid current.

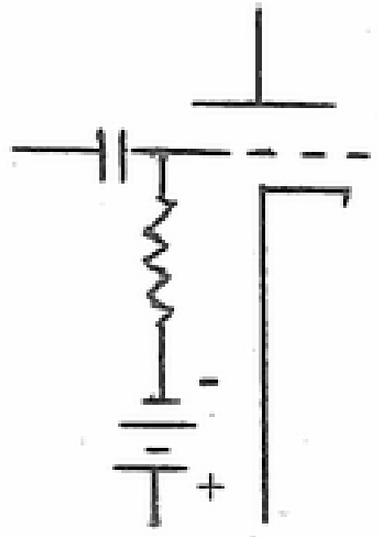
Since grid leak bias requires grid current, how can grid leak bias be used in a class "A" amplifier?

Answer by W5JJ: Only in exceptional cases is "grid leak" bias used with vacuum tubes in Class A service. At one time, it was popular among certain designers of very low level amplifiers, generally in audio service, to use what was termed "contact bias." This took the form of a stage having the tube's cathode grounded and its grid returned through a very high (often many megohms) resistance. It was assumed that electrons intercepted by the grid structure, even though not positive in relation to the cathode, would be sufficient to provide a slight degree of negative bias. The gain of a tube so biased is at its maximum.

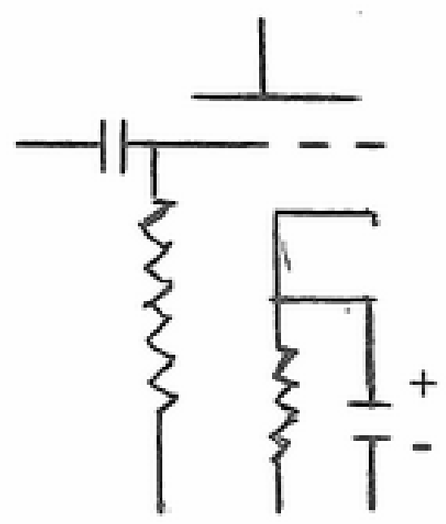
In normal circuit applications a tube in Class A service is biased to the designed operating point by an external voltage source, termed "C battery" in classical nomenclature, or from the IR drop across a resistor in its cathode circuit.



"Contact" bias



"C" battery bias



Cathode bias

CHATTER

Remember Dick Coan, who worked at the Aeronautical Center many years ago? The chap who'd been a design engineer for National Radio. The one who shipped out to the Washington Office. Well, Richard Coan, W3CPU, appears on the list of AMSAT brass. He is (or was) Membership Chairman.

During the evaluation of dozens of publications produced by amateur radio clubs in this country, Canada, and England, W5JJ, in his capacity as Vice-President for Publications, Amateur Radio News Service, had the opportunity of observing how the Collector and Emitter stacks up in comparison with other club papers. It comes out fairly well, but not in the top rank. How can it be made better? Well, for one thing, have the copy all made on one typewriter so that there are no abrupt transitions in appearance from page to page. Have a central editing point so that nomenclature is consistent (not to mention correct). Use more photographs, more drawing (if we have an artist amongst our contributors). Have more news, new of members (their shacks, their activities, etc), news from members, technical articles by members. You'd be amazed to see how well some papers get along in these fields. Few combine all such attributes in one paper, but among the many papers you'd find how well some editors manage to elicit news, views, and technical essays.

Did you ever hear some chap whining about how he was too old to get a license or up-grade an entry-level license? Well, Doug, WN5LHO, is 72 years old (young?) and has passed his General Class examination and is awaiting the new ticket from the FCC.

A letter from G2BVN sez the cost of an amateur license in East Africe (5Z4, 5X5, and 5H3) now is approximately $85 in US funds! The period of the license is not stated, but probably is one year.

Australia has decided to license Novices, charging half the normal license fee, requiring crystal control, and limiting operators to certain segments of the 3.5, 21, and 28 MHz bands. The code speed, as in the US, is 5 wpm. One concludes that operation is not confined to radiotelegraphy, for the regulations limit Novices to 10 watts for double sideband and 50 watts for single sideband. It's not stated as to whether this is input or output power.

FOR SALE:

Ameco TX-62 CW and AM transmitter (can be FMed easily), Ameco tube-type converters for two and six meters, power supply for the converters, two switch boxes for selecting converters (one unused), antenna filter for eliminating TV over-ride on converters. Contact W5JJ, 5824 N.W. 58 St., Warr Acres, phone 789-3788.

RF coax relays, 115 V ac, Type N connectors, $2.00. Many types of coax fittings, mostly BNC, but some UHF. Contact W5JJ.

TECHNICAL REVIEWS

W5JJ

HAM RADIO, Jul, adjures, in its editorial, amateurs to advocate passage of HR 7052, which would compel manufacturers to make RF and AF equipment that wouldn't respond to every stray RF field. W1HXU tells of a mechanical advance in the construction of quad antennas. VE2BEN attempts to sort out the many misconceptions of Phase and Frequency Modulation (even some textbooks are screwed up on the precise distinction.) W5NPD tells details of multiplexed seven-segment readouts. WA2GCF passes on ideas about low-noise preamplifiers and converters.

AMATEUR RADIO, May, describes building a field strength meter and gives a slick trick for two-wire reversing of series-wound AC/DC motors.

SHORT-WAVE MAGAZINE, Jun, contains pointers on satisfying HF mobile operation and shows several quite simple circuits for low-power transistor transmitters. These circuits present a marked contrast to the highly complex ones shown in QST! The "Communication and DX News" section of this magazine consistently gives an extraordinarily good picture of what's happening on the HF bands, the best of any magazine this writer reviews.

QST, Jul, tells how the dynamic range of a receiver may be ascertained. K2YAH expounds the virtues of a VHF crystal filter for protecting the receiver of a repeater. RF power transistors get a thorough explaining in the continuing series on semiconductors. The concluding half of the article on a CW transceiver shows how it goes together.

POPULAR ELECTRONICS, Aug, reviews an active antenna; although it's for the MF Advertising Band, the idea has applications to amateur work. W9EGV discusses a simple device for use with an oscilloscope for checking transistors. The remainder of the magazine is totally worthless!

RADIO-ELECTRONICS, Aug, has an additional installment of its series on oscilloscopes and naught else.

RADIO COMMUNICATION, Jun, has most of its worth in the Technical Topics Section, which, as usual, is fascinating. How does a VHF loop antenna, designed for clipping on your shoulder, sound? It has a bandwidth of 1.4 MHz for 146 MHz use. And the idea of generating a DSBSC sig at 15 kHz, converting it to 10.7 MHz (where filters are cheap!) for filtering to SSB, then another conversion to operating frequency? Sound intriguing? There's a list of VLF and LF high-power transmitting stations.

THE BIG SIGNAL
OKLAHOMA CITY AUTOPATCH ASSOCIATION, INC.
THE NEWS

THE AUTOPATCH STORY

The Oklahoma City Auto Patch Association, Inc. was formed in August 1970 for the purpose of making available to central Oklahoma, a repeator with auto patch to advance Amateur Radio on the VHF frequencies. In the spring of 1971 the repeator was placed on KWTV s tower and after testing the coverage, it was determined that the repeator would support a weather net extremely well. KWTV was approached and they graciously accepted the idea of a weather net by Amateurs for public service. The word"Amateur" is defined as one who engages in a pursuit for pleasure and not as a business". In conjunction with the KWTV weather department, the Oklahoma Amateur Severe Storm Net began its coordination of on-the-spot weather information in April of 1971. The storm net began with two clubs participating and has increased to eleven participating clubs in 1975. Cities such as Ardmore, Chickasha, Cushing, Drumright, Enid, Lawton, Pauls Valley, Seminole, Shawnee and many others report severe storm information directly into this net. The information derived from this net is integrated with information from all other sources and re-broadcast over KWTV and the Amateur storm net. Amateurs in the outlying cities can request and receive weather information for use by local authorities. The participating Amateurs attend training sessions conducted by Professional Meteorologists. These sessions began in 1971 and have been repeated each spring for all interested persons. The 1975 session was attended by 128 Amateurs representing 11 clubs from 20 cities. These Amateurs are the remote eyes and ears to be used at the discretion of professional meteorologists to enhance their sophisticated radar systems.

The Amateurs comprise an above average cross section of the population as they are Doctors, Professors, Engineers, Policemen, Firemen, Technicians, Military personnel and many other occupations too numerous to list here.

For many years the American Red Cross has relied heavily on Amateurs for emergency communications. After severe weather has deistated an area Amateurs set up their radio equipment in the affected area to convey health and welfare information from the affected people to their concerned relatives. This service reduces the load on other means of communications,keeping them open for other emergency use.

Many noteworthy contributions by Amateurs to public service are a direct result of the Oklahoma Amateur Severe Storm Net.

The first person to arrive in Union City on May 24,1973 and establish com-

munications was Oren Feltenberger, WB5EDD, a member of the Oklahoma Severe Storm Net. Oren stayed in Union City for Approximately 18 hours handling communications between there and Oklahoma City as the Civil Defense and Oklahoma City Police were beyond their radio range. Other Amateurs went to Union City to relieve Oren and Keep the communications link open.

During the tornado that cut a path across Oklahoma City on June 8,1974 causing damage at the weather bureau, Amateurs followed it and relayed the direction of travel along with damage reports to KWTV for rebroadcast to the public. This action on the part of Amateur Radio Service,provided advance warning to Drumright and Tulsa, helping to keep the death toll to a minimum. As the tornado passed from the Oklahoma City range, Amateurs in Tulsa and the surrounding area began their observation and reporting. At one time the Amateur network was the only means of communications in Tulsa. The Tulsa Amateurs were recognized for their assistance and participation by an award from the Civil Defense.

Amateurs of the Great State of OklahOma have become more closely knit together as a result of the severe storm net. This is supported by the fact that participants are almost doubling each year. Information from Amateur participants is becoming more accurate as experience is gained but we do not presume to be infallible. Working together, Amateurs can provide a public service to the people of Oklahoma which will be second to none. FM repeaters has made possible a highly reliable communications system which has been a significant factor in being able to operate a severe weather net of this type.

WB5EOL

NOMINATING COMMITTEE REPORT

Election of officers will be held at the next regular meeting, the third monday of August. The nominating committee has met,and it is our recommendation that the names of Frank McCollum,pres., Larry Dillard, vice pres., and Jim Denman,sec.and treas,,be submitted for re-election. Nominations may be made from the floor, however.

K5PJU

Dont forget the election of officers,BE THERE, and vote.... If you iont come and vote, then dont gripe about how things are run. Your officers need your help. WANTED,someone to write the paper next month for our club.

WB5CWB

THE BIG SIGNAL NEWS
OKLAHOMA CITY AUTOPATCH ASSOCIATION, INC.

FROM THE PRESIDENT'S CORNER

On June 31st, at midnight, the Autopatch Assn. closed it's membership. The magic number is 156 total members and this is the maximum number of members that can be admitted. When members drop out due to moving to another part of the country or non-payment of dues for 30 days or more beyond due date, a vacancy will exist. At that time, any amateur wishing to join will be admitted. The total membership will be limited, however, to 156. The secretary will notify members by mail when their memberships are due to expire. Our goal of having the finest two repeaters in the Southwest has still not been realized but we are making progress in that direction, as you will find in the report of the technical committee elsewhere in this issue. Let me repeat that the only spokesman for the technical condition of our equipment for 2 meters is Bob Williams, K5PJU. In our next issue, you will be given the names of Chairmen of technical committees for 450 and 50 mHz repeaters.
The terms of office for the present president, vice president, and secretary treasurer, will come to a close at the election to be held at our August meeting and it's been a fast paced year. It's hard to believe it's been a year. I am sure I speak for the other club officers when I say it's been an honor, even though sometimes frustrating, to try to steer the club to reach the goals we have accomplished this past year.
Thanks again.

WB5JBL

HAM SCHOOL TO BE HELD IN SEPT.

Joe Buswell, WA5TRS, the school coordinator, has set Sept. 4th at 7:30 pm, as the kickoff time for the ham school to be held at the Oklahoma Military Academy, N.E. 36th and Grand Blvd. This is a Thursday evening and those interested should set aside Thursday night for 15 weeks, excluding Thanksgiving. This will take us up to the Thursday before Christmas. Those completing the course could take the test during the January visit by the FCC. Two sections will be taught, including code practice; one for beginners and one for those who wish to upgrade through advanced class. Any non-Amateurs whom you know should be encouraged to come and participate.

WB5JBL

2-M TECHNICAL COMMITTEE CHAIRMAN SEZ:

The 81/21 repeater will be in operation as soon as we receive the power supply for the GE receiver. The auto-patch will be switched to this repeater after it is fully checked out.
We have been advised that we can not put the 6 meter repeater on the channel nine tower. We need volunteers to help find a new location and to maintain the six meter equipment.
22/82 will be back up to full power as soon as we receive the replacement bridge rectifier.
Deviation on Touch Tone pads should be set at 3kHz. Give me a call on the air or landline and I can check your levels.

Bob Williams, K5PJU

FOR SALE: Drake TR-4 transceiver, MS-4 AC power supply and speaker, HY-GAIN multiband trapped vertical antenna, and 100 ft. RG8/U coax, $531.00.
WA5WHO, Sam Gover, 634 2510

AERONAUTICAL CENTER AMATEUR RADIO CLUB, INC.

W5PAA

W5AQP
W5ATO
W4AUP - W4AP
W5AVK
VE6AEB/W5
K5AYL
WB5BTT
K5BUX
WB5CDW
K5CPI
WB5CWB
WB5DJQ
WB5ECJ
WA5ETV
WB5FBC
WA5FLT
K5FWA
W5FRZ
WA5FSN
WA5FVJ
W5FW
WA5FWD
WB5GCX
K5GBW
WA5RLP
WB5GHB
K2GKK/5
W5GU
WB5GZN
W5JCB
K5JLS
W5HAZ
K5HFN
W5HGH
K5HQP
W5HXL
W5HXR
W5HZD
W5ICL
WB5IAF
W5INV
W5IQ
WB5ISN
W5IYH
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WA5JHB
WA5LZD
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W5KE
WB5KHU
WA5KHW
WB5JYK
WA5KQB
WB5KVQ
K5LAD
WB5LHR
WB5LTI
WN5MWP
WB5MWO
W5NEN
W5MCJ
WN5MSI
WN5NIY
WA5NRJ
W5OHH
WA5OPP
WA5OPV
W5OZE
K5PER
K5PJR
W5PML/WBOAYU
WBOPNE
WA5QPW
WA5QXV/UIO
WA5RAQ
W5RB
W5RG
WA5RSC
W5RZX
W5SE
WA5SKG
W5SNM
W5SNL
W5SQJ
WA5TAW
WA5TRS
W5TY
K5TZS
W5UCJ
W5UGZ
W5UHV
WA5UJG
WA5UNL
WA5VAQ
W5VCJ
WA5VHN
K5VRL
K5VVZ
K5VWQ
K3WGF
KOWNL/5
K5WUF
K5YFX
K5YBP
WA4YCO/5
K5YFX
W5ZKJ
W5ZKK
WA5ZNF

WA5ZMO

This is a list of the earliest registerants for Ham Holiday. If your call doesn't appear here, your application came after this list was compiled. In any case, the tickets of those pre-registered will be available at the door.
HAVE A GOOD TIME!

AUGUST HAM HAPPENINGS

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
					1	HAM HOLIDAY ARRL CONVENTION
LAST DAY HAM HOLIDAY	4	MORI MEETING — AUTOPATCH JOINS THEM	6	7	8	9
10	11	12	13	14	ACARC VHF JOINT MEETING AT ACARC	16
17	OKCAP MEETING — ELECTIONS	19	20	21	22	23
24 / 31	25	26	27	28	29	30

SEE PAGE 2 FOR TIMES AND PLACES

HAM SCHOOL STARTS THURSDAY SEP 4TH

TEXOMA HAMARAMA OCT 24/26

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