HAM HUM

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No. 7

LAST MEETING

Our thanks to Royal M. Enders, KØLYO, and to General Motors for the use of the General Motors Training Center for our meeting in June. Our particular thanks to Royal who gave us information on ignition systems, the differences and what to expect. We read a lot of fancy claims. It's nice to hear the straight goods from a fellow like Royal who knows what he is talking about and, as he suggested at the meeting, WØYZV's mobile unit is proceeding to the nearest Delco establishment for the purpose of tuning it up properly in order to gain better performance and less motor noise.

Those of you who attended the meeting observed some of the pictures on the wall that were taken some years ago of club members, most of whom are no longer with us. We will try and publish some of them from time to time so that those of you who were not present will be able to see them and perhaps be reminded of people we used to know.

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DRIVE CAREFULLY

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JULY MEETING

As promised in our June issue of Ham Hum, the July meeting will feature Lewis G. McCoy, W1ICP, of ARRL Headquarters staff. He will talk to us on antennas and transmission lines; also, he has a very interesting talk on "How To Succeed In Amateur Radio Without Really Trying;" plus a discussion of ARRL in general and he will be available for any questions you have regarding ARRL Headquarters operations.

The meeting will be held at the 4-H Building, Ak-Sar-Ben Field, at 8:00 P.M. on July 9th.

Do bring your friends. Guests are welcome at all times but particularly at this meeting in view of our visit by an ARRL representative. We'll see you there and will have a good eyeball QSO as well as the usual refreshments.

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NEWS ITEM

A new Junior Op snuck into the world at (yawn) 6:38 A.M. June 17th by the name of Chris Alan Berounsky.

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LOCATING AND ELIMINATING TV AND RADIO INTERFERENCE
from Modulator, Colton, Calif.

One reason may be: FUNDAMENTAL OVERLOAD OR BLOCKING OF THE RECEIVER. This may appear in a TV as herringbone or slight modulation bars, or complete blanking of the set. Modulation may be heard and one or more of the channels may be affected. THIS IS STRICTLY A RECEIVER PROBLEM AND NOTHING CAN BE DONE AT THE TRANSMITTER TO CURE IT. If the interference is not too severe, an inexpensive cure can be had by connecting a ¼ wavelength open-end stub made of 300 ohm TV line across the antenna terminals of the TV set. The formula for the length of this stub in feet is 246 divided by the frequency (in megacycles) of the unwanted signal. Cut the piece of transmission line a few inches longer than the formula shows and attach it to the receiver antenna terminals. Cut it off at the open end, a small piece at a time, until the unwanted signal is reduced. If the interference is severe and the stub does not completely eliminate the interference a "Drake 300 hp 52" should be installed directly at the tuner with the ground strap connected to the set chassis.

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Will give away to any interested party couple of old Thordarson audio transformers; small Bud steel cabinet; misc. other items - need room.

John, WØWRT
556-1538

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OFFICIAL BULLETIN NR 3 FROM ARRL HEADQUARTERS NEWINGTON CONN APRIL 29, 1965 TO ALL RADIO AMATEURS BT

Attention DXers. Announcement is hereby made of the addition to the ARRL Countries List of San Felix Island. Located some 550 miles off the central west coast of Chile, San Felix is territory belonging to Chile. Acceptance of this island is in accordance with point 2A of the criteria, see July 1963 QST DXCC Note. Confirmations for contacts with San Felix Island may be submitted for DXCC credit starting August 1, 1965. Confirmations received for this listing before August 1, 1965 will be returned without credit AR

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FIELD DAY '65

The unofficial results show the following:

80-75	328
20	325
40	313
VHF	79

with a total of 1,045.

Of the above figures, approximately 200 contacts were CW and the balance Side band, or in the case of VHF all AM contacts.

Saturday morning started out cool and rainy; however, by noon the rain stopped and we were able to complete the setting up of the various antennas. Most of the tents and antennas had already been set up prior to Saturday morning, however, so the rain did not hamper the operation too much.

Field Day this year started with some confusion as we had a little trouble setting up the VHF antenna, so we got off to a later start at 4:00 P.M. instead of our regular starting time of 3:00 P.M. However, all stations seemed to perform well with only slight problems, and the interference between transmissions was cut to a minimum this year and band conditions were very favorable.

Your chairman would like to thank all those who participated in Field Day, as well as the Wives and Mothers who contributed or sent food to Field Day. Everybody was very well fed and really enjoyed the food.

We would also like to thank the Red Cross for the use of their emergency generator and World Radio Laboratories for the use of their equipment, and a special thank you to everybody who helped along the way to get Field Day moving.

Field Day ended at 4 P.M. on Sunday afternoon and was completely torn down by 4:30 P.M. We feel this was very fortunate inasmuch as we had a terrific rain and hail storm at 4:45 P.M. which would have drenched us all.

We will be looking forward to a bigger and better Field Day next year, so start planning now, and see what you can do to get this under way. Your Club would appreciate any suggestions. (See photos on pages 4-8)

Frank WØBTE

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The FCC gave Pan American Airways a 90 day permit to have two of their Jets communicate with ground stations via a satellite relay. The aviation industry is interested in this kind of communication for long over water flights. On Jan. 28th, a Jet flying from Hong Kong to Tokyo sent a message via satellite to a ground station 7000 miles away.

The message was transmitted over the Formosa Strait and passed thru Syncom 3, which is in stationery orbit over the Gilbert Islands. It traveled 20,000 miles from plane to the satellite, then another 20,000 miles to Camp Roberts, California. The plane used 148.260 Mc.

Pack Rat Cheese Bits/Amateur Radio News Service

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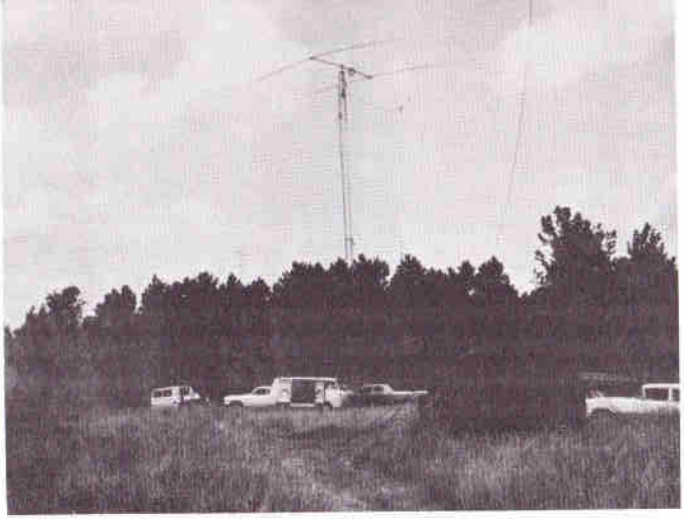
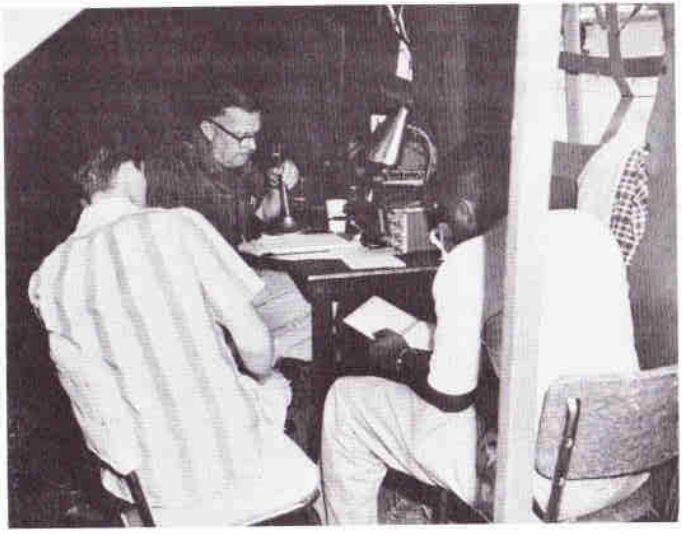
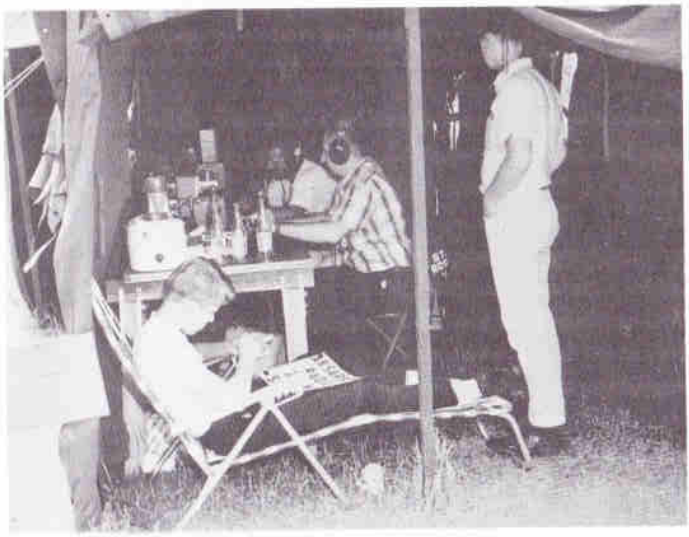


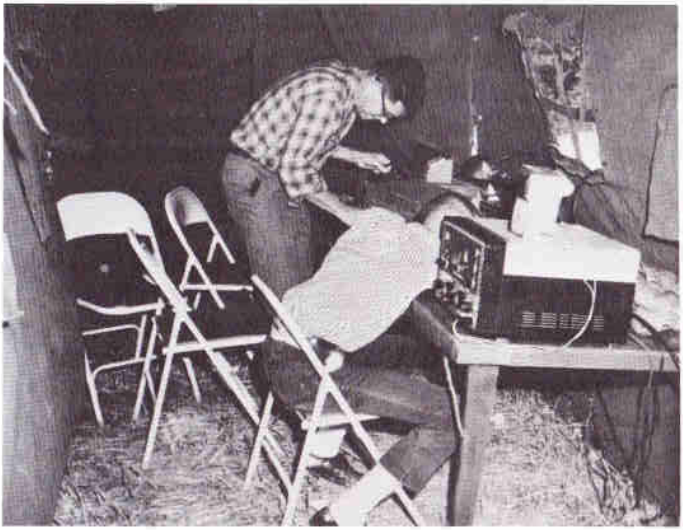
FIELD DAY PHOTOS

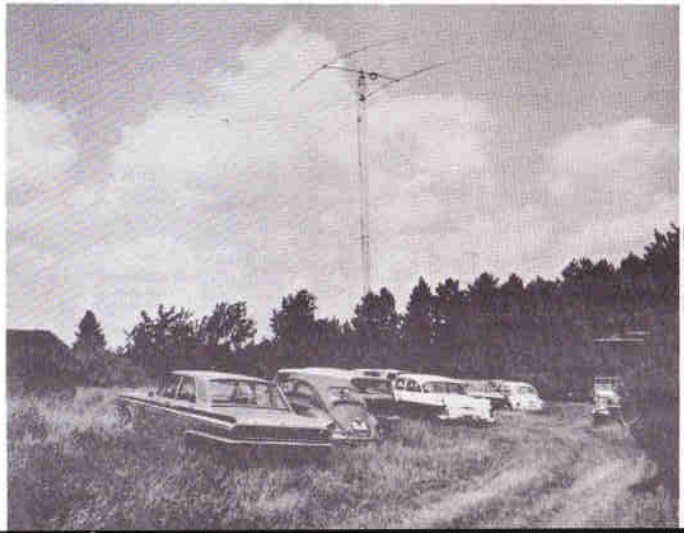


by Bob Miller
KØZLY

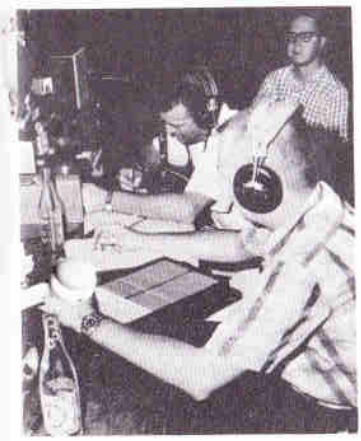


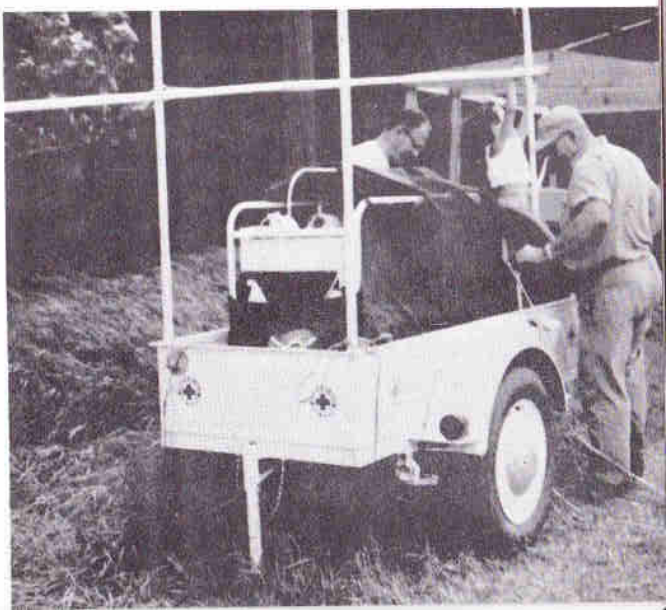

2
WAY
RADIO

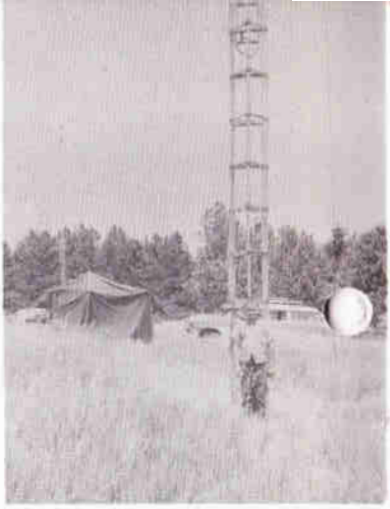




FIELD DAY PHOTOS - by Bob Miller, KØZLY







FIELD DAY PHOTOS
by
WØVLI

Left to right -
Royal, KØLYO; Bud, WAØICK; Ed, WØYEV; Steve, WAØJES

"CANOE RACE"

The South District Explorer Canoe Race was held on June 5, 1965. This was a 58½ mile canoe race on the Platte River from Camp Eagle, near Fremont, to the U.S. Highway 73-75 bridge. Thirteen canoes participated in the race. Each canoe changed crews at Twin Rivers, Linoma Beach and Highway 50 bridge. The river was high from recent rains and except for a shower in the late afternoon, the weather was perfect; these conditions made for a fast race.

The winning canoe, St. Mary's Troop #95 of Bellevue, Nebraska, completed the race in nine hours and 41 minutes, which was about 4 hours faster than last year.

Lt. Col. Gore Roberts, in charge of this year's race, wishes to express his thanks and the gratitude of the South District Explorer Scouts to the Ak-Sar-Ben Radio Club and to the persons who provided their equipment and time to help make this event safe and successful.

Thanks to:

Dick Eilers	WØYZV	Bill Eilers
Hugh Tinley	KØGHK	Fran Neufville
Royal Enders	KØLYO	Steve Lustgarten - WAØJES
Ed Donze	WØYEV	Lou Cutler - WØVLI
Harold McClenahan	WAØDGA	(Net Control Station)
George Cherney	KØMGX	(Air Boat Patrol)
Bud Smith	WAØICK	Kurt Fischer
Dave Duskin	WAØJCI	Bob Decker - KØCZX
Bob Margritz	WAØBIE	Vi Margritz - WAØBID
Frank Fernald	WØBTE	Paul Cassidy - WAØIMN

Fred Fischer - WØEGP
CANOE RACE CHAIRMAN

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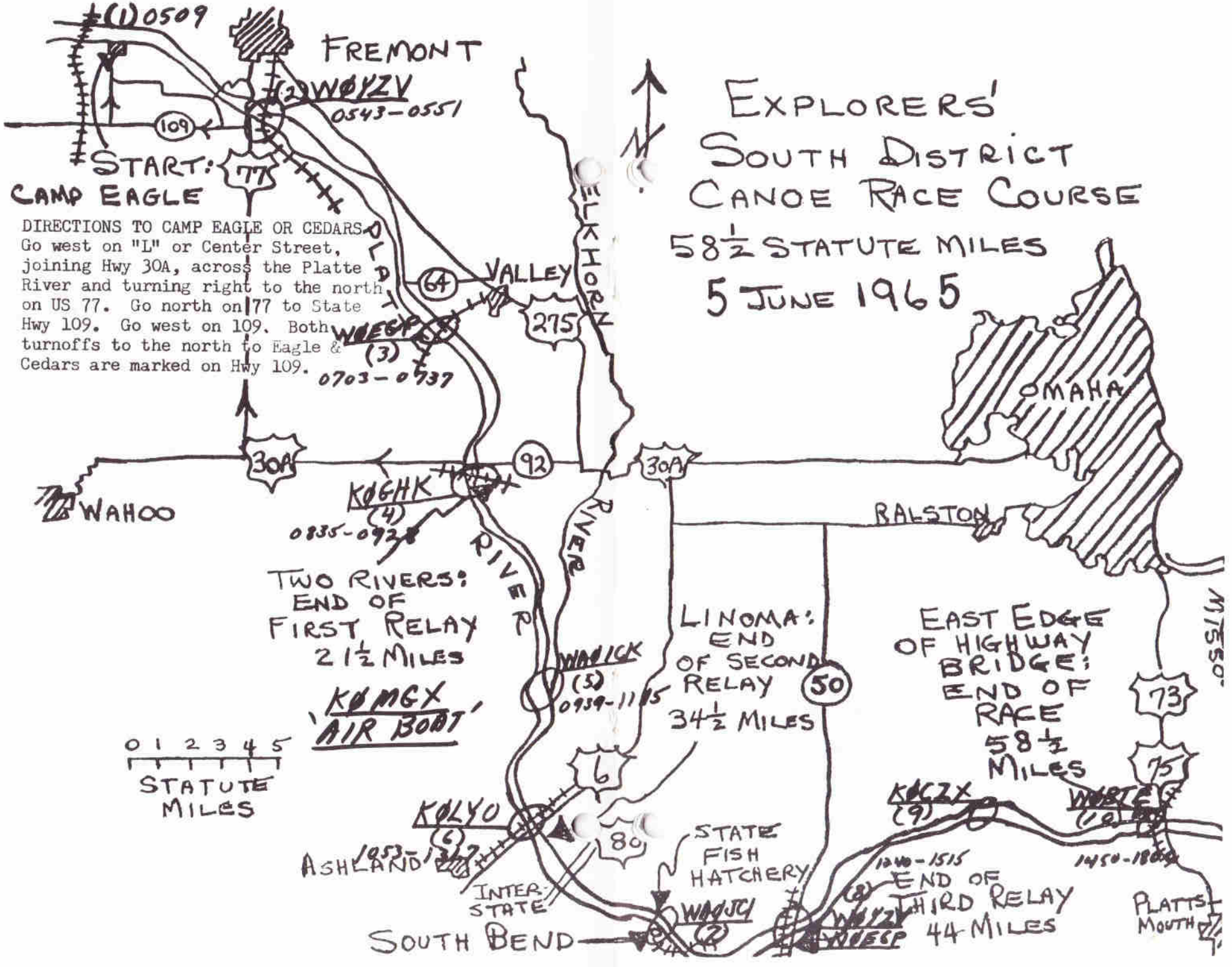
EXPLORERS'
SOUTH DISTRICT
CANOE RACE COURSE
58½ STATUTE MILES
5 JUNE 1965
(1) 0509
FREMONT
(2) WØYZV
0543-0551
109
START:
77
CAMP EAGLE
DIRECTIONS TO CAMP EAGLE OR CEDARS
Go west on "L" or Center Street, joining Hwy 30A, across the Platte River and turning right to the north on US 77. Go north on 77 to State Hwy 109. Go west on 109. Both turnoffs to the north to Eagle & Cedars are marked on Hwy 109.
OLD
64
VALLEY
ELKHORN
275
WØEGP
(3)
0703-0737
30A
92
WAHOO
KØGHK
(4)
0835-0928
TWO RIVERS:
END OF
FIRST RELAY
21½ MILES
KØMGX
'AIR BOOT'
RIVER
RIVER
WØJCK
(5)
0939-1105
LINOMA:
END
OF SECOND
RELAY
34½ MILES
50
30A
OMAHA
RALSTON
MISSOURI
EAST EDGE
OF HIGHWAY
BRIDGE:
END OF
RACE
58½
MILES
73
75
0 1 2 3 4 5
STATUTE
MILES
KØLYO
(6)
ASHLAND
1953-1317
6
80
STATE
FISH
HATCHERY
KØCZX
(9)
WØRTE
(10)
1240-1515
1450-1800
INTER-
STATE
SOUTH BEND
WØJCJ
(7)
(8)
WØEGP
END OF
THIRD RELAY
44 MILES
PLATTS-
MOUTH

FOR SALE

Galaxy III Transceiver, 12VDC Power Supply, Hustler Antenna including coils for 20-40-80, Foldover Mast, Base Mount and Spring. Also have a Shure Mobile Mike. All above less than one year old and in excellent condition. A $455.00 value. Will let go for $300.00. Call or come over and see:

Joe Berounsky, KØQDB
3227 Seward Street
Omaha, Nebr.
551-9714

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OFFICIAL BULLETIN NR 12 FROM ARRL HEADQUARTERS NEWINGTON CONN JUNE 24 1965 TO ALL RADIO AMATEURS BT

At a Commerce Committee hearing this week on Senate Bill 1015, the League's General Counsel Booth spoke in favor of the bill, which would increase FCC control over incidental and restricted radiation devices such as wireless intercoms, diathermy, TV receivers, etc. While the FCC can take action in some cases now, the legislation proposes FCC regulation of the manufacture of devices which can cause radio interference. ARRL suggested that the bill should be broadened to cover power lines, motors and similar devices capable of wide band noise, and also suggested that the bill should adequately cover noise and unwanted signal rejection of radio and TV receivers offered to the public. Further information will appear in August QST AR

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Hi: I finally got my station set up and got my license. I am using an Eico 720 transmitter and a HQ-129-X receiver with a homebrew T-R switch and a long wire (130') with a W.R.L. tuner. My dad and I cut out all the parts and assembled a new desk to put all my junk on. I had trouble at first though with my station. The T-R switch was wired wrong, so the only way the few hundreths of a microvolt signal had to go was through a resistor to get to the receiver.

Steve E. Heil
WNØMKA

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MEASUREMENTS ON THE 2 METER TEN ELEMENT "SKYBEAM" MADE BY "J" BEAM AERIALS, LTD. -- by Loren Parks, K7AAD

In one of my previous VHFER articles I intimated that the claims of some antenna manufacturers were less than honest, by several d.b. Bill Roberts of Gain, Inc. took it upon himself to prove I was mistaken as far as his line was concerned. He challenged me to measure it, and I accepted. Later, after I had made a report on it to him, he sent me a very well written booklet put out by J Beam Aerials which showed my measurements were very much in agreement with theirs and that their claims were indeed well founded. Rather than make this article simply a strong sales pitch for this beam (which I later bought) I would like to go through the measurement method

with you and discuss some of the design characteristics of the Skybeam and of Yagi antennas in general. I want to do this because I know full well that the pathway to better DX is more likely to be through the antenna than through improvements on any other part of your equipment, once you have a reasonably good converter, receiver, transmission line and a few hundred watts output.

Antenna gains are stated as being so many d.b. over dipole or over an isotropic radiator. An isotropic radiator is a theoretical antenna which puts out radiation equally intense in all directions. Of course a dipole doesn't do that nor does any antenna. But to make an actual measurement a reference antenna is used and the dipole is convenient. When you look at antenna specifications be sure you know if gain is specified as being over an isotropic source or a reference dipole. An antenna 10 d.b. over a dipole has more gain than one 10 d.b. over an isotropic radiator. I still say that when you read specifications on amateur antennas, be very skeptical of gain claims. Sometimes gains are (mis) calculated and not actually measured. Not all manufacturers of antennas are competent. Not all are truthful.

I measure antenna gain by comparing the relative ability of two antennas, the dipole and the antenna under test, to deliver power to a known load (a 50 ohm 1/2 watt carbon resistor.) Fig. 1 shows the set up I used to test the Skybeam.

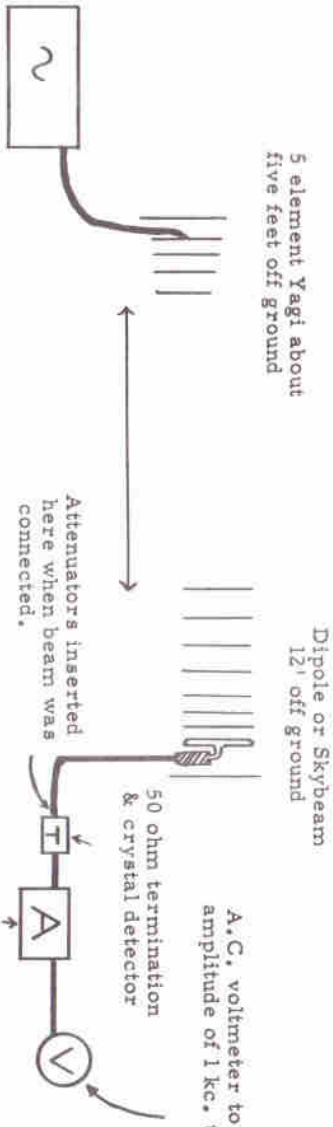

Fig. 1

First I raised the dipole to about 12 feet and read the meter on the output of the narrow-band audio amplifier (peaked at 1 kc.) This reading is a reference. Then I disconnected the dipole and attached the coax line directly to the balun on the beam so that coaxial line length would be the same in both measurements. I put up the Skybeam to the same height and of course the meter read off scale. So I inserted coaxial attenuators (shown in Fig. 2) just ahead of my 50 ohm resistive termination and rectifier box until the meter reading was the same as it was with the dipole. To make the meter reading the same as before I had to use 12 d.b. of attenuation. Therefore the Skybeam was extracting 12 d.b. more power from the passing wave than the dipole. Only two calibrations are involved in this method--the dipole and the attenuators. The dipole was checked for match and for a symmetrical pattern on an antenna range. I have a good selection of attenuators and have compared them against each other and believe they are accurate. No matter what may happen to the amplifier with respect to its gain from day to day or week to week, as long as the gain stays constant between comparisons of the dipole and the antenna under test, it does not enter into the measurement at all.

You probably question the accuracy of gain measurements made so close to the ground. There are always problems in making gain measurements unless you're out in free space. The usual problem is ground reflections or reflections from surrounding objects. I was in a large open field. I had the transmitting antenna fairly close to the ground so that the path to the antennas used to receive would be about the same length whether the wave went directly from the source or was reflected off the ground. This minimizes cancellation or enhancement of the received signal due to interaction of the direct and ground-reflected waves. Also I used a small beam as a source to more or less focus the signal toward the receiving antennas and minimize signal radiated toward the ground.

To test for ground reflections, I moved both the dipole and the beam up and down and several feet sideways in the test area to note the difference in the received signal. The difference was not appreciable as long as the antenna height remained constant.

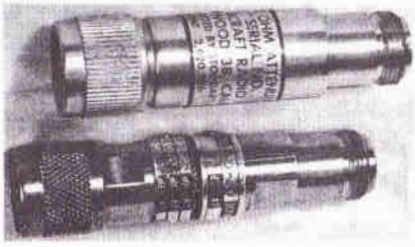

Fig. 2 Fixed attenuators

Then I moved the entire receiving test set-up another 75 feet away and re-measured, getting the same results for gain. I did not test

for side lobe or front-to-back ratio a second time. Of course I measured 2 or 3 times in each location, never depending on a single reading.

When I measured the first side lobe level, I measured with reference to the forward gain. I got about 16 d.b. below the main lobe. The back lobe was about 17 d.b. down from the forward lobe.

From the side lobe level, down 16 d.b., I guessed that the beam probably had more gain at a higher frequency. The reason is that for maximum gain on a Yagi the first side lobes should be about 10 d.b. down. At lower frequencies side lobes will be lower, at higher frequencies they will be higher and higher until the main lobe splits and the whole pattern breaks up.

Now refer to Fig. 3 from the booklet describing the characteristics of this beam. It shows maximum gain to be in the region of 146 to 147.5 Mc., and that gain is down from the peak value by about 3/4 d.b. at 145 Mc., or about 12.5 d.b. where I measured 12. I don't consider my measurements accurate to within 1/2 d.b. and theirs might not be either, but they agree quite closely. I consider their honesty in advertising this amateur beam to be almost beyond belief. Not only is it the best manufactured 2 meter beam I've measured, but it is the best constructed in my opinion. I had been using a 14 ft. boom antenna (same as the Skybeam) which is highly advertised as having 15.5 d.b. gain and on which I measure 9 at the most under the same conditions. The Skybeam I have up now is 3 d.b. better, doubling signal strength in a given direction and doubling received signal power.

Now there are some things I should clear up so you don't get the wrong impression.

1. There is no collusion between the distributor or manufacturer of the antenna and myself. I bought the beam and balun after testing it because it was considerably better than what I had been using and was very ruggedly built. I bought the 2B52 balun to go with it and suggest if you buy the beam you do the same.

That combination works, I'm sure. If you use some other combination you may not get the performance I did. For the record, I'd like to say that I do not go along with much of what is written about open wire lines in this and other amateur magazines. Moon bounce was done with coax. DXers I know use RG 8/U, RG 17/U or 200 ohm Federal line. I don't know any VHF DXers on the west coast using open wire line and I am acquainted with most of them from Canada to Mexico. Open wire line properly used in some situations is no doubt superior to coax. But at two meters, coax will do a better job in the hands of a fool. That's why I use it.

2. If you have an antenna with 9 d.b. gain and you put up this one as recommended, signals which were marginal with the other beam aren't going to jump out of the speaker at you when you hook up this beam. 3 d.b. doesn't make that

much difference. It's twice power and worth having, but it takes 6 to 10 d.b. to make a pronounced difference. To get 6 to 10 d.b. you have to pick up d.b.s wherever you can get them. You can't get them any cheaper than in the antenna. Remember, it helps both transmitted and received signal strength.

3. Don't get the idea that because this beam is peaked at about 146 Mc. it won't do an excellent job at 144 or 145. That d.b. difference is not discernible to your ear or mine.

4. Don't be concerned about the VSWR curve. When I use the balun and my Bird wattmeter at 144.05, reflected "power" indication is practically nothing. Of course, the place to measure is at the antenna, but few do that. Also, reflected "power" is not all lost, and SWR meter readings are not to be trusted without additional tests (changing line length.) At a 1.6:1 VSWR, reflected power is only a little over 5%.

Now I would like to discuss this antenna's design with you and why it works---and why many others don't. First, a Yagi is divided into into two basic sections--a launcher and a slow-wave structure. The launcher is the dipole and reflector as a rule, but can be a corner reflector antenna, a V antenna or numerous other types used to excite a slow-wave structure which is the string of directors.

Looking at the antenna as a receiver of the passing wave front, the wave is slowed as it enters the front part of the Yagi and travels

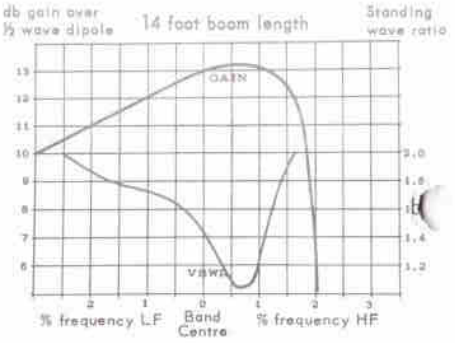

Fig. 3
Ten Element 2 Meter Skybeam

down to the dipole. The velocity of the wave as it travels along the Yagi is extremely important. The wave arriving from the string of directors must have a certain phase relationship to the wave which arrives directly from free space for maximum gain. In other words, there is a phase shift occurring in the Yagi which is caused primarily by the length of the directors and their spacing. When there is not enough phase shift (phase velocity two fast) the antenna has gain but not the maximum possible. The gain drops very rapidly when there is too much phase shift. Longer directors and closer spacing causes more phase shift or slowing of the traveling wave. Now look again at the chart of Fig. 3 and note how steep the curve is on the high frequency side. This response curve is characteristic of a Yagi type structure. Variations may be caused by different tuning or feeds. A signal at 151 Mc. would be slowed much too much by the Skybeam and therefore

the antenna would show little gain. At 140 Mc. it would still show good gain. This curve and the preceeding discussion are intended to show you why you can't just add more elements to a properly designed Yagi and make it work better. You can only make it worse. If you want to increase the gain of a properly designed Yagi you have to add more to the boom length and re-adjust everything for optimum phase velocity by changing element lengths, spacing between elements or both.

While phase velocity is extremely important in a Yagi there are other things too. On a Yagi several wavelengths long a high-performance antenna often has 3 parts to its slow-wave structure. The main body, the terminal or end taper and the feed taper, as shown in Fig. 4.

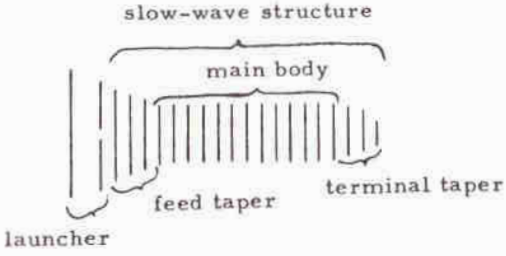

Fig. 4 Parts of a long Yagi with equal element spacing.

A wave traveling at the speed of light does not couple well into a dipole or dipole reflector combination. If it is slowed down it couples much better. The purpose of the feed taper is to slow the wave considerably for better coupling. You can think of it as a matching network. To slow the wave or "match" it from the main body to the dipole you must put the elements closer together, make them longer or do both. But you still have to keep the total phase shift along the array the same or nearly so. That means increasing the wave velocity somewhere else. The Skybeam has all directors of equal length, so they are spaced more closely near the dipole to slow the wave.

At the far end of the Yagi, in the transmitting case, the wave must suddenly change from the velocity along the directors to free space velocity. It couples to space better when the wave is speeded up, so elements are often shortened near the end or spread farther apart. If the transition is too abrupt, a portion of the transmitted wave is reflected from the end and causes a higher back lobe level.

The Skybeam does not have an end taper. It does quite well without it and I suggest you do not try to put one on it for fear you'll foul up the phase velocity. When you're building your own beams you could try the tapers, especially the feed taper.

There are some serious pitfalls in tuning up Yagis. Some of these will be covered in subsequent issues of VHFER.

de VHFER, W8HHS

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OFFICIAL BULLETIN NR 6 FROM ARRL HEADQUARTERS NEWINGTON CONN TO ALL RADIO AMATEURS

The ARRL Board of Directors, meeting in Quebec May 21 and 22, voted to support the principles of FCC Docket 15928 on incentive licensing, but asked that Advanced Class licensees be granted First Class licenses without further examination. It decided the prefix for Extra Class call signs should be W, WA, WB or K and the numeral and suffix of all call signs should not change throughout an amateur career so long as the amateur remains within a call area.

The Board felt that the proposed restricted voice band at 21 Mc should be only for Extra Class. FCC is urged to postpone any new suballocations for six and two meters pending further studies concerning incentives for those bands. The Board also asks that FCC require two volunteer examiners be present for each conditional and technician class examination.

The 1965 ARRL Merit Award will be presented to Project Oscar in recognition of Oscar III.

National Conventions were approved for Boston in 1966 and San Antonio in 1968.

Studies were ordered on the articles of association, on the area and population of the various league divisions, on radio frequency interference from non radio sources and on several communications matters.

A proposal to change the composition of the Executive Committee was rejected, and Roanoke Director Anderson W4MWH was newly elected to that committee.

The Board tendered its congratulations and best wishes to the ITU celebrating its hundredth anniversary. Full text of the minutes will appear in the July issue of QST AR

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ARRL REQUESTS REDUCED FEES

ARRL has filed a request that the FCC amend their rules to provide a $2.00 application fee instead of the present $4 and a $4 fee for special call sign requests instead of the present $20.

In support of this proposal, the League points out that an individual's total fees might be many times the basic one over a five year period either because of failure or progressing to a higher class plus possible changes of address. Commercial licenses, which produce income for the holders, are renewed for only $2 and this is an inequity which penalizes the amateur service.

The imposition of the $20 fee for special call letters tends to discourage the establishment of special events stations (K3BSA and K2US for example) and to defeat the Commissions basic purpose in authorizing such stations. Further, it is to be expected that Docket 15982 may result in amateurs being given wider latitude in selecting or retaining specific call signs and continuation of the present $20 fee would impose an unreasonable burden upon many amateurs so that the basic objectives of the revision of the license structure would be jeopardized.

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OFFICIAL BULLETIN NR 8 FROM ARRL HEADQUARTERS NEWINGTON CONN JUNE 2, 1965 TO ALL RADIO AMATEURS BT

Project Oscar requests all data reports covering Oscar III up to Orbit 1000 be submitted to the project as soon as possible in order that the preliminary report for this experiment be completed. The Oscar III telemetry beacon on 145.85 Mc. is now operating on solar cells. On some occasions the beacon goes off the air when the satellite passes into the shadow of the earth. At other times it remains operating in the darkness, depending upon the temperature of the package. A thermal switch connects an auxiliary battery to the equipment when package temperature is low. For orbits above 1000, Project Oscar requests continued surveillance of the 145.85 Mc. telemetry beacon aboard Oscar III. When the orbit number exceeds three digits, the last three digits should be used on the reporting form or for RTTY tape. For example, orbit 1132 should be logged as orbit 132 AR

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SWR

No, that doesn't mean Short Wave Radio. Standing Wave Ratio can be expressed in voltage, current, or power interchangeably. Most of us use an SWR bridge without knowing what makes it tick. Some could care less. You may think of the SWR meter as a "coax directional coupler." It samples instantaneous differences of voltage by means of rectification. It is as simple as this: We compare the forward voltage with the reverse voltage and we have the STANDING WAVE RATIO.

Just how high an SWR can we tolerate? Would it be easier if we compared it to the percentage of power lost due to high SWR? For all practical purposes, "An SWR of 3 equals a loss of 25% of the forward power." SWR 2:1 equals approximately 11% loss of power. An SWR of 1.5:1 equals 4% loss or difference. 1.22:1 is next to perfect with only 1% loss. Copy these figures down on the back of that spare card in your billfold for future reference. It may come in quite valuable sometime.

The Old Timer. (de Florida Skip)

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OFFICIAL BULLETIN NR 9 FROM ARRL HEADQUARTERS NEWINGTON CONN JUNE 2, 1965 TO ALL RADIO AMATEURS BT

On June 1, Brazil and the United States signed an agreement to permit the exchange of messages, on behalf of third parties, by amateurs of the two countries. The amateurs must have no pecuniary interest in such messages, and it must be traffic not considered important enough to be handled by regular commercial channels. The U.S. has previously signed similar agreements with Bolivia, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Haiti, Honduras, Liberia, Mexico, Nicaragua, Panama, Paraguay, Peru, and Venezuela AR

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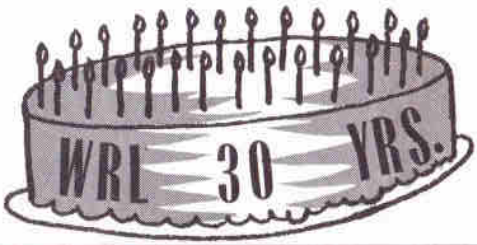

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