

B-V ARC BULLETIN

The Monthly Publication of the
BRAZOS VALLEY AMATEUR RADIO CLUB

Serving Fort Bend and Harris Counties

Editor-in-Chief: Irv Smith, KB5EXM 437-4803
Production Manager: Roland Torres, KB5EQH 933-4143

About the Brazos Valley Amateur Radio Club . . .

Organized in 1977, the club has been growing steadily. It is a gathering place for HAM radio operators in Fort Bend and Southwest Harris Counties, and surrounding communities. It is a general-purpose type of HAM club offering a variety of activities open to all interested persons. Membership is open, not only to licensed HAM operators, but also to anyone interested in the hobby. In addition to regularly-scheduled membership meetings, the club each year conducts classes leading to amateur radio licenses, and each month sponsors a volunteer-examiner team which offers examinations in all levels of HAM licenses.

For information about the club and any of its activities, please call Stu Lamkin, WB5IGG, (713) 777-3345.

Volume: 11 Issue: 9

October 1988

ADDRESS CORRECTION REQUESTED

From: Brazos Valley Amateur Radio Club, Inc.
P.O. Box 1630
Missouri City, TX 77459
Telephone: (713) 777-3345



B-YARC Meeting Schedule

Thursday, October 13 General Meeting
7:30 pm Missouri City Fire Station
Dinner: BBQ at 6:30 @ "Vasos"

Thursday, November 3 Board Meeting
7:30 pm Missouri City Fire Station

Stu Lamkin WB5IGG
7401 Heilig
Houston, Tx 77074

Welcome, Newcomers!

Welcome to Amateur Radio! Ham lingo can baffle a newcomer at first, but it doesn't have to be a real impediment. Check the glossary of terms below to help you explore this fascinating new world.

Radio Spectrum

Radio waves, heat (infrared), visible light, ultraviolet light, and x-rays are all part of the **electromagnetic spectrum**. As the term radio wave implies, radio signals oscillate up and down much like waves in the ocean. How quickly a wave moves up and down is called **frequency**, and is measured in cycles (oscillations) per second or **Hertz (Hz)**. Kilohertz (kHz) and Megahertz (MHz) refer to thousands and millions of cycles per second, respectively, and are common units of radio wave frequencies. Another measure of a radio wave is **wavelength**, which is the distance between peaks of the wave. The higher the frequency, the shorter the wavelength. Radio waves are divided in segments or bands. Here are a few the ham community is most interested in:

MF—Medium Frequency—300 kHz–3 MHz

This includes the AM broadcast band 535–1605 kHz and the 160-meter ham band (1800–2000 kHz).

HF—High Frequency—3–30 MHz

This segment covers the 80/75-, 40-, 20-, 18-, 15-, 12-, and 10-meter bands. This is the most popular region for worldwide DX, or long-distance operation.

VHF—Very High Frequency—30–300 MHz

Our two bands on this are 2 meters (144–148 MHz), and 1.25 meters (220–225 MHz). The two meter band is just above the FM broadcast band. Repeaters, stations that receive and rebroadcast signals to allow broader area coverage, are extremely popular at these frequencies. The characteristics of VHF signals mean that communications are often limited to line of sight.

UHF—Ultra-High Frequency—300–3000 MHz

UHF communications are also limited in area coverage, and repeaters abound on the 70-cm (420–450 MHz) band. The 23-cm (1240–1300 MHz) band finds increasing use these days, but the 33-cm (902–928 MHz) band is virtually unpopulated throughout most of the country. Many hams enjoy satellite (hamsat) and amateur television (ATV) communications at these higher frequencies. Frequencies above 1000 MHz are generally called **microwave**.

Modes

Mode has many meanings, but here it is the method used to package information on a radio wave.

CW—Continuous Wave

Amateur radio's first mode of communication was continuous wave or CW, which was useful for Morse code. This wave is transmitted to produce a tone whose length can vary ("dits" and "dahs"), and shut off for spaces between tones. Morse code is still referred to by hams as CW.

AM—Amplitude Modulation

Our first voice mode.

FM—Frequency Modulation

The first hi-fidelity mode.

SSB—Single-Side Band

An AM signal has two sidebands, called **Upper-Side Band**, or **USB**, and **Lower Side Band**, or **LSB**. Both sidebands contain the same information. A clever way to save space on overcrowded frequencies is to use only one of the sidebands, but SSB equipment is more complicated than old, double sideband (DSB) AM radios. SSB development was a major advance in radio communications.

Digital Modes

Information in this mode is represented by discrete units, or ones and zeros. Read up on these in our Packet and RTTY Loop columns.

RTTY—Radio Teletype

RTTY sends characters as combinations of two tones. One tone represents ones, the other zeros. For example, the letter A is 11000, and B is 10011. RTTY is a more efficient and faster mode than CW, because tone combinations are machine-generated from keystrokes on a typewriter-like keyboard.

AMTOR—Amateur Teleprinting Over Radio

AMTOR is a special form of RTTY that checks itself for errors that arise during transmission. It was introduced about 10 years ago.

Packet Radio

Packet is latest in amateur digital communications, and one of the most fascinating modes. Discrete "packets", or bursts, of information are sent back and forth between packet stations. Each packet contains a line of information, station to and from addresses, routing data, and error correction codes. The protocol, or method of coding within each packet, is also referred to as **AX.25**, an amateur implementation of a commercial system. Packet is convenient for computer-to-computer communications. Many hams set up bulletin boards (BBS) not unlike computer BBSs accessed on telephone lines. The radio modem that interfaces the computer with a transceiver is called a **TNC**, or **Terminal Node Controller**. TNCs are the radio equivalent to telephone modems. They take data from a computer, "package" it, and send it on to the transmitter.

Image Modes

These modes convey images. What follows are the three most popular in amateur radio. Look for more information on these modes in our ATV (Amateur Television) and in our Weathersats columns.

FSTV—Fast-Scan Television

This is the mode used to carry images to your TV screen. Hams have adapted this TV technology for their own needs and to see other operators that they have contact with. Color FSTV has recently become more popular.

SSTV—Slow-Scan Television

So named because it requires almost 9 seconds to scan and display an image on the CRT.

FAX—Facsimile

Similar to SSTV, except that the scan rate is much slower (1–2 lines/second).

"Q" SIGNALS

The language of amateur radio is riddled with strange three-letter words beginning with "Q"—you may have noticed that four of our monthly departments are titled with 'em.

They first came into being in the code-only days to a way to reduce common questions and statements to a short code and make communications more efficient. "Q" was likely chosen as the first letter because it's the least common letter in the alphabet, and always always followed by "U"—if it was followed by anything else, it was a sure bet that it was a code.

"Q" signals can be either questions or statements. Here are the most common ones, followed by an example.:

QRL—"Are you busy? I am busy." Send this to see if a frequency is clear.

QRM—"Is my transmission interfered with? Your transmission is being interfered with." Often said "Q-R-Mary" to distinguish it from QRN.

QRN—"Are you troubled by static? I am being troubled by static." Often said "Q-R-Nancy".
QRP—"Shall I decrease power? Decrease power". There are some hams devoted to elegance of low-power operation. Mike Bryce WB8VGE devotes his QRP column to them.

QSB—"Are my signals fading? My signals are fading" Often said "Q-S-Baker". "There's a lot of QSB on the band"

QSL—"Do you copy me, do you acknowledge? I copy, I acknowledge". Hams exchange QSL cards to verify their contacts with each other. See "QSL of the Month" on page 6 for colorful and imaginative examples of these.

QSO—Conversation. "Thanks for the QSO, Old Man".

QSY—"Shall I change frequency? Change frequency." "Let's QSY up 5 kHz."

QTH—Location. "My QTH is Peterborough, NH."

QRX—"When will you call me again? I will call you at (hours) on (kHz)." Our QRX column is devoted to Amateur Radio news.

QRT—"Shall I stop sending? Stop sending." "The phone's ringing, I must QRT."

JUST PLAIN JARGON

What's a language without fun words and endearments? Following is a list of a few of ours. (Again, most descend from the CW-only days).

DX—Long Distance.

On HF this could mean contacts outside a ham's own country, but on VHF/UHF DX could be the next county.

OM—Old Man

Man of any age.

YL—Young Lady"

Unmarried woman of any age.

XYL—"Ex Young Lady". Wife.

Harmonics

Children of the OM and the XYL.

88s

Hugs and kisses

And lastly...

73s—

the very best to you! Enjoy our magazine!

... de KAIHY

FROM STU WB5IGG....

VOLUNTEER EXAM SESSIONS IN Oct. & NOV.

Following are Amateur Radio license exams sessions scheduled to be held in this area in October and November 1988. The listing info is as follows.

- A. Sponsored by
- B. Date and location
- C. For info, contact

- 1.A. Brazosport ARC
 - B. Nov. 5 in Angleton TX
 - C. Steve Ray KA5KRI, 409-297-7494
- 2.A. Brazos Valley ARC
 - B. Oct. 11 & Nov. 8 in Houston TX
 - Stu Lamkin WB5IGG, 713-777-3345
- 3.A. Houston Echo Society
 - B. Nov. 19 In Houston TX
 - C. Irv Block NZ5V, 713-49708750
- 4.A. Sam Houston AR Klub
 - B. Oct. 8 in Cleveland TX
 - C. Sam Neal N5AF, 713-222-3274

JOIN ARRL "ALL-risk" insurance program

A Special Enrollment Period is currently in progress until November 1st for the ARRL "All-Risk" Ham Radio Equipment Insurance Program. All members may enroll with guaranteed acceptance.

Insured equipment and accessories are covered for loss due to theft, damage caused by fire, lightning, collision, short circuiting due to fire, flood, tornado or other natural calamity.

Coverage includes equipment at home, in your car and at a Field Day or hamfest site. Furthermore, if new equipment is purchased during the policy year valued up to \$1,000, that equipment is fully covered at no additional cost until the next renewal of the policy.

The most outstanding feature of the program remains its cost. This fully comprehensive insurance program can be purchased for an entire year for only \$1.25 per \$100 of replacement cost value, plus a \$5 yearly administration fee. A \$20 minimum premium is required. Other policies on the market can cost up to \$8 per \$100 of replacement cost value.

Complete details about the coverage provided by the ARRL "All Risk" Ham Radio Equipment Insurance Program will be sent to League members. Simply complete the short application and mail it with your first annual premium check to the ARRL Insurance Administrator: Albert H. Wohlers & Co., ARRL GROUP INSURANCE PLANS, 1440 N. Northwest Highway, Park Ridge, IL 60068-1400. For more information, call toll-free: 1-800-323-2106. In Illinois: 1-312-803-3100.

RESULTS OF THE SEPT. 13TH EXAM:

by: Harold Parker, ND5F

B-VARC again sponsored the ARRL's Amateur Radio Examinations that were held on Tuesday evening, September 13, 1988 at Strake Jesuit in Houston.

The V.E. Team and Assistants:

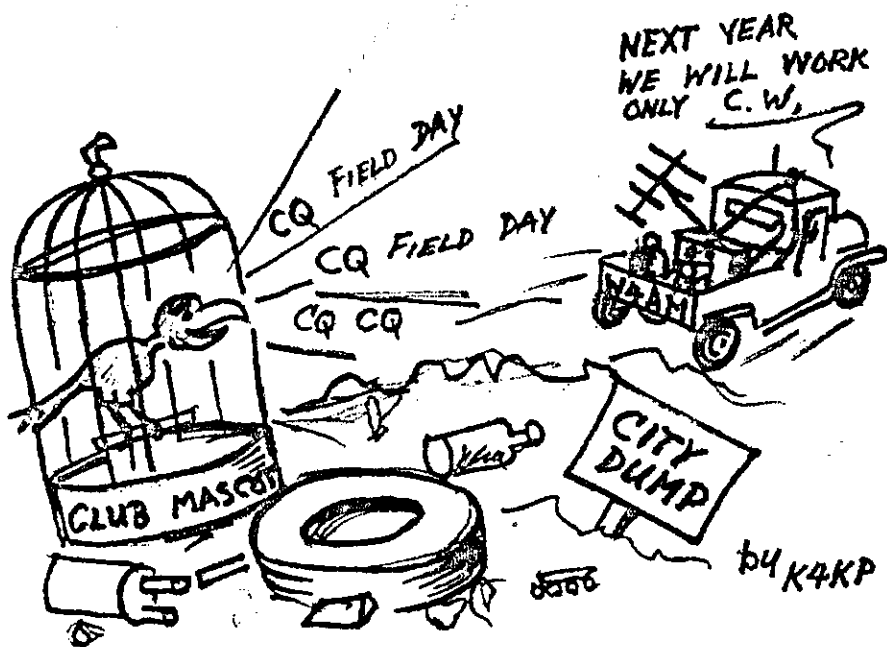
- Henry Morrison, W5RIY
- George Walker, KQ5W
- Arvin Gardner, AA5GV
- George Harris, AA5HC
- Stu Lamkin, WB5IGG
- Harold Parker, ND5F

A total of twenty (20) exams were administered during the evening to eleven (11) applicants. Of those, four (4) upgraded their license with a total of five (5) elements passed. The overall "pass rate" for the evening was **twenty-five (25) percent.**

Congratulations to all the following who upgraded and passed exams:

- Tomas Adkins, KA5AYA - Element 1B
- Karen Delafosse, KB5GQP - Technician
- Karla Dyer, N5LGS - General
- Lonnie Hardamon, KB5BRM - General
- Douglas Tees, KB5GTB - Technician

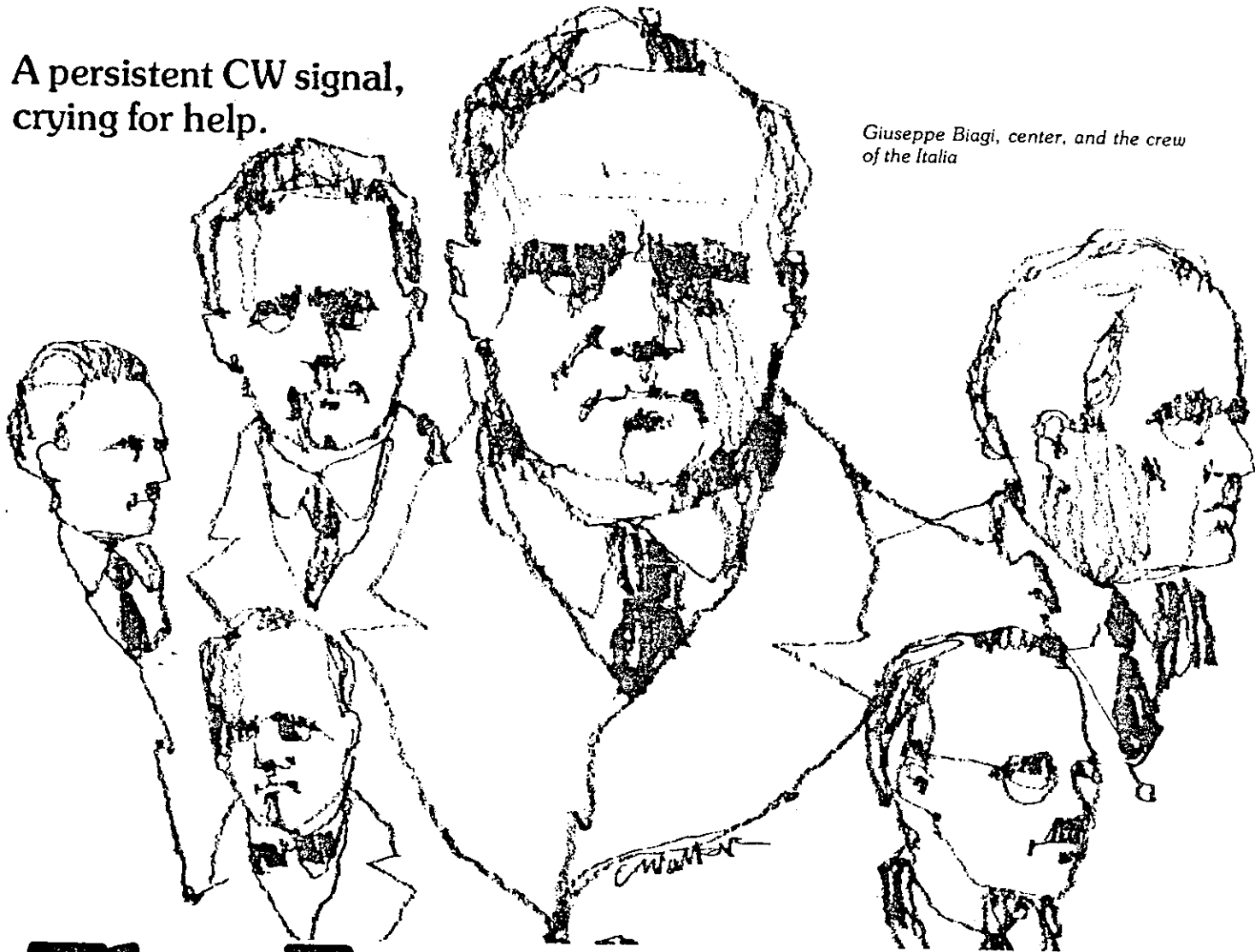
Many thanks to the Team Members and Assistants for all their time and efforts that contribute to the success of the program. We again want to thank Vincent, WA5ETS, and everyone at Strake Jesuit for providing us with the excellent classroom facilities each month for the exams.



Special thanks to Bill Walker Royalton District Manager of Warner Cable, for donating the use of their copier and supplies for printing the newsletter.

A persistent CW signal,
crying for help.

Giuseppe Biagi, center, and the crew
of the *Italia*



The Forgotten Hero

BY HENRY MORRISON, W5RIY

Every day, there are dozens of routine flights over the North Pole. Fifty years ago similar approaches over the Pole called for expeditions. The man at the radio was an all-important link. Many have been forgotten, but the men of the *Italia* will remember Giuseppe Biagi, Radio Operator, as their link with the world and rescuer from certain death.

It seems like a long time ago that an Italian dirigible built by Colonel Umberto Nobile made the first successful flight over the North Pole with a crew composed of Italians, Norwegians, and Americans. On board were such famous arctic explorers as Amundsen, Ellsworth, Riiser-Larsen, and Nobile as the pilot. That was the flight of the *Norge*. Radio was there

and electrified the world, even though, at times, the ship's aerial was so encased in thick ice that the radio was useless. All this, just a little over fifty years ago.

In May, 1927, the dramatic solo flight of Lindbergh made the world conscious of aviation and radio. Mussolini promised the Italian Royal Geographic Society a crew and airship if the city of Milan paid the expenses for another polar flight. Nobile designed the *Italia*. It was the finest of the day, with a small radio room in the rear of the main cabin. The radio antenna had been designed to be pulled into the control car when it became covered with ice. Steady electrical power for the radios came from outboard wind-driven generators.

The radio equipment was the best; from a large volunteer group of radio operators, Ettore Pedretti and Giuseppe Biagi were chosen. They checked and completed the radio installation. Emergency transmitters and heavy-duty batteries were added, as well as extra wire. They tried to plan for every communications problem. Survival items were given special attention and included two sledges, snowshoes, skis, Vickers rifles, seal-hunters' rifles, Colt revolvers, and mosquito netting. A special pemmican mixture was prepared for emergency use, and attention to clothing found no one wanting.

Captain Romagna, in command of the steamship *City of Milan*, left on March 19, 1928, with extra engines

To be continued.....

and supplies. On April 15, with twenty aboard, the *Italia* started its flight north out of Italy. The radio operators maintained a watch, but sometimes lost contact, such as when the *Italia* was caught in violent electrical storms or dropped into mountain passes.

It was not until May 3rd that the airship left Stolp, Germany, after needed repairs, brought on by a hailstorm so fierce that it had even pitted the propellers. Radio watch continued, and, over the Barents Sea, the warning came of a depression that was creating a storm of gale force. They sped toward Vadso, (now Vardo, in northern Norway).

The storm in Vadso became so dangerous that Nobile felt the ship would be safer in flight above the storm. The Bear Island meteorological station furnished weather reports, and they went off course to pass over the island. Messages were exchanged with the two isolated weathermen whose reports were so important.

By May 23rd, all was ready. The *Italia* had taken on supplies from the *City of Milan*, and radio contact and schedules had been set up with ship's operator Baccarani. Radio batteries were fully charged and equipment checked. Ettore Pedretti was to stay with the *City of Milan*, and Giuseppe Biagi would be the radio operator to fly over the pole aboard the *Italia*.

On May 23rd, at 4:28 A.M., the ground crew freed the *Italia*. Biagi transmitted the course and speed information, and then copied weather reports as the *Italia* headed north. Progress reports continued, and by 11:00 P.M. they were within fifty-five miles of the North Pole. At midnight, first officer Mariano made a sextant reading, and about twenty minutes later ordered the engines slowed and announced they were over the pole. They steered in a circle and dropped markers. Biagi keyed the transmitter with messages to the King of Italy, the Pope, and Mussolini.

Aboard the *City of Milan*, newspaper men waited outside the radio room. Captain Romagna suddenly appeared and angrily told them to leave. He did not tell them the *Italia* had crossed the pole; he felt the announcement should come from Italy. After some time, Rome proudly informed the world they had again sent an airship over the North Pole.

For twenty-four hours the *Italia* worked toward King's Bay and the safety of the *City of Milan*. Biagi received a steady flow of weather reports which indicated high winds and storm conditions. They were now flying in fog at about five hundred feet, and it was not long before ice began to form over the *Italia*. The ice was cause for worry; Biagi brought in the antenna with icicles two inches thick. Communications were difficult and the radio signals gave only approximate position figures. Hurricane winds continued, and blew the *Italia* off course. By 7 A.M. the wind was so strong no headway was made, and a course toward North-East Land was taken. Radio communications con-



Nobile in Arctic flying gear

tinued poor. At about 9:30, Nobile ran from the radio room when a cry came that the elevator wheel was jammed. The ship settled toward the ice. Only ninety yards above the ice pack, they dropped the ballast chain, which let them rise slowly out of the fog into the sunlight.

By 10:30 A.M. the airship's nose was up 8 degrees but the *Italia* was falling a half-yard per second. Engines were speeded up, but the drop was faster. A crash was coming!

The engines were stopped. Biagi was trying to reach the *City of Milan*, transmitting a position report, when the *Italia* slammed into the ice. The control car broke free and the gas en-

velope drifted away, nose up. Biagi was knocked unconscious.

There was disbelief that this could have happened; they were suddenly on the ice pack with no tent, food, radio, or sledges, and several were injured. Everyone was in a state of shock.

When Biagi came to, he found the field station for emergency use was intact. All of the hand tools had fallen into the snow. He found a box of rations and hope returned. Two waterproof bags strapped to the ceiling of the radio room contained provisions and a tent, plus a sleeping bag. They found pemmican, chocolate, a Colt revolver, a Very signal pistol, and a carton of matches.

Biagi searched for more salvage and came upon one of the wrecked gondola cars that held the stern engine. He found a pair of shoes. Biagi helped put the tent up, and then started work on setting the radio in working order. They moved to a flat surface of ice and made their camp in the growing cold. While others tried to improve the camp, Biagi had an antenna up and was operating a battery transmitter, sending an SOS to the *City of Milan*. The receiver was in the tent. He would transmit, hurry to the tent and listen, and then return to transmit SOS. No answer.

Biagi sent SOS every fifty-five minutes, and prayed that *City of Milan* radio operator, Baccarani, would answer. By nightfall, the quiet of the arctic, and their failure to be heard on the radio, brought fear. Biagi kept at his vigil all night. Nothing was heard.

The second day soon became the third. Biagi was now sending his SOS every two hours. The cold was taking a slow hold on the batteries. Although the equipment was the very best of its kind, some survivors were beginning to have doubts about the radio, about Biagi, and about the *City of Milan* — whether anyone was bothering to listen. Morale was shaky, but with something to do, like finding fresh snow for drinking water and searching for wreckage, the thought that somehow they would be rescued kept each man going. The receiver worked but the signals went unanswered.

The failure to hear the *Italia* set rescue preparations into motion in many countries. The U.S. Navy considered sending the *Los Angeles*. Swedes,

HAM RADIO LICENSE PLATES

by: Irv, KB5EXM

Reproduced below is a copy of Form 53, used to apply for Mobile Amateur Radio Operator License Plates.

Note that the fee is only \$2.00 - not the much larger sum required to get personalized plates!

Instructions are printed on the reverse side of this page, just as they are on the genuine form. They don't say anything about sending in a copy of your license, but it probably wouldn't hurt to do so.

I understand the October 1st deadline no longer applies. (This may have been a hangover from the old system when all license plates

expired on the same day each year.)

Forms may be obtained at the office where you would go to buy license plates. Jerry, N5APW, and I will have a few extra sets at the next B-VARC meeting.

You might be able to cut this copy directly out of the Newsletter; however, the original furnished by the state is a light peach color. (About the color of the ink used to print the "Bread-Wagon" stamps used on last month's mailing.)

Roland may be able to find the right color paper for this sheet in the Newsletter, or perhaps you could copy it onto some peach-color paper.

Application for
Mobile Amateur Radio Operator License Plates
(Fee \$2.00)

I, the undersigned, do hereby apply for Mobile Amateur Radio Operator License Plates for my PASSENGER CAR or TRUCK with manufacturer's rated carrying capacity not exceeding 2,000 pounds for the forthcoming registration year as provided for in V.C.S. 6701c-2. I hereby certify that I hold an unrevoked and unexpired Official Mobile Amateur Radio License and have been issued Call Letters _____ by the Federal Communication Commission for the purpose of operating Mobile Amateur Radio Equipment, and I further certify that the radio equipment is regularly operated in the vehicle described below which is owned by me and that the radio equipment is both a receiving and transmitting set.

Year _____ Make _____ Body Style _____ Motor or Vehicle Identification Number _____
Current License No. _____ Name of Owner _____
Street Address _____
City _____ County _____, Texas _____
Signature of Owner _____

Before me this day personally appeared the applicant whose signature appears above who, by me being duly sworn upon oath, declares that the above statements are true and correct.

Subscribed and sworn to before me this _____ day of _____, 19 _____.

Notary Public

County

, Texas

STATE DEPARTMENT OF HIGHWAYS
AND PUBLIC TRANSPORTATION
MOTOR VEHICLE DIVISION
40TH & JACKSON AVE.
AUSTIN, TEXAS 78779

FROM AL MATTIS N5AFV....

Check Ins for the BVARC Rag Chew Net, Wednesday evenings, 8:30 PM local, 3.960 Mhz:

August 31, 1988
N5AFV Acting NCS
KE5SR

September 7, 1988
N5AFV Acting NCS
WNSA
WN5TEN
KE5SR

September 14, 1988
WN5TEN Acting NCS
No others - the rest of us were on the 2 Meter Hurricane Gilbert Information Net

September 21, 1988
N5AFV Acting NCS
WN5TEN

All stations are welcome to check into this net, and we hope participation increases.

INSTRUCTIONS

1. Radio Operator License Plates may be obtained for either a passenger car or a truck having a manufacturer's rated carrying capacity not exceeding 2,000 pounds.
2. The registration year for Radio Operator License Plates extends from April 1 through March 31 of the succeeding year.
3. The application and \$2.00 fee must be submitted to the Department between July 1 and October 1 preceding the registration year for which requested. Make check or money order payable to the State Department of Highways and Public Transportation and forward with this application to:

State Department of Highways
and Public Transportation
Motor Vehicle Division
40th and Jackson Avenue
Austin, Texas 78779

4. If the application is approved by the Department, the license plates will be mailed to the Tax Assessor-Collector of the county in which you reside.

B-VARC BUDGET REPORT

prepared by: Brenson Abbott (KF5VZ) date: 08-31-88

MONTH	BUDGET	ACTUAL	DIFFERENCE
Apr.	102.00	28.80	73.20
newsletter			
May	102.00	71.35	30.65
newsletter			
P.O. box rent		10.00	
P.O. box rent		81.35	20.65
Jun.	102.00	25.00	77.00
newsletter			
Ham Comm seed money	200.00	0.0	
Stu Lamkin (Dec. 1987)	170.00	170.11	
Stu Lamkin (Dec. 1987)			
Stu Lamkin (Dec. 1987)	472.00	195.11	276.89
Jul.	102.00	0.0	102.00
newsletter			
club picnic	0.0	<88.14>	
club picnic	102.00	<88.14>	19.86
Aug.	102.00	50.00	52.00
newsletter			
club picnic	100.00	0.0	100.00
club picnic	202.00	50.00	152.00
Sept.	102.00		102.00
newsletter			
insurance	375.00		375.00
ham festival	100.00		100.00
ham festival	577.00		577.00
Oct.	102.00		102.00
newsletter			
Nov.	102.00		102.00
newsletter			
Dec.	102.00		102.00
newsletter			
banquet	1000.00		1000.00
banquet	1102.00		1102.00

Treasurer's Report as of August 31, 1988
Submitted by Brenson Abbott KF5VZ

Balance as of July 31, 1988 918.83

Receipts:

Greg Lefebvre K5LITW	20.00
Purchase of club paper	5.00
August Dollar Draw	5.00
Donation Russ Black KA5MCP	30.00
Total Cash Receipts	30.00

Expenses:

Irvin Smith KB5EXM	50.00
Postage July & August	50.00
Newsletters	50.00
Total Expenses	50.00

Balance as of August 31, 1988 898.83

73, KF5VZ

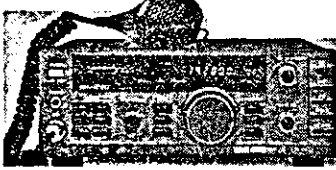
FROM ROLAND TORRES KB5EQH

This months newsletter is very light. I did not receive much in the way of printable material. As a reminder for future newsletters, if you have anything concerning BVARC or Amateur Radio in general, please send it in. If you want to ask our readers a question about your radio or the way something is done, put it in print and send it to us. We could always use it for filler as space permits (and it usually does). The "Radiotunes" that K4KP sent in were a big help in filling space this month. If you can draw, send something in, we can usually print it somewhere. Remember, the more we can print in our newsletter, the more interesting it becomes and the more we look forward to receiving it each month.

MADISON SHOPPER

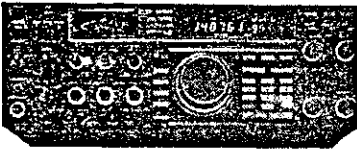
CALL FOR ORDERS
 1 (800) 231-3057
 1-713-520-7300 OR 1-713-520-0550
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 ALL ITEMS ARE GUARANTEED OR
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Kenwood TS140S — Call

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 New Kenwood TM-221A, 45W, mobile Call
 ICOM 28H/TTM Call



Icom 761 Call

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- Astalic D104C/TUP-9 72.00
- Isopole 144 MHz 44.95
- Cushcraft 124-WB (146 MHz) 33.00
- Butternut HF6V, 80-10 vertical 125.00
- Hustler G7-144 119.95
- KLM HF World Class Series Antennas Call Don
- KLM KT-34A 399.00
- NEW KLM 1,2-44LBX 129.00
- G5-FV 44.00
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- New Larsen CM 490 CO 5.00
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- Thousands of panel meters 3.95 up CALL
- 8560A 95.00
- Aerovox 1000 pF/500 V feedthrough caps 1.95
- Transformer 120 V Pri., 1050 V/1A. (Sec. #18 Wire) 50 00
- 100 mfd/450V Axial Cap 2.00
- 831SP-PL259 Silverplate 1.25
- 82-61 N Male 3.00
- GE 6146B 13.95
- 3-500Z 140.00
- GE 12BY7A 7.00
- 6MJ6 12.95
- 6KD6 12.95
- AEA PK-232 with new WX FAX 299.00
- Kantronics KPC II 149.00
- AEA Packet Terminal Call

USED EQUIPMENT

All equipment, used, clean, with 90 day warranty and 30 day trial. Six months full trade against new equipment. Sale price refunded if not satisfied.

Call for latest used gear,
 (800) 231-3057

- TS-430S, TS-830S, TS-520S, FT101E, and Collins
- Porcelain 502 Guy Insulators (1/4) 3.39

POLICIES

Minimum order \$10.00. Mastercard, VISA, or C.O.D. All prices FOB Houston, except as noted. Prices subject to change without notice. Items subject to prior sale. Call anytime to check the status of your order. Texas residents add sales tax. All items full factory warranty plus Madison warranty.

Bird and Belden products in stock. Call today.

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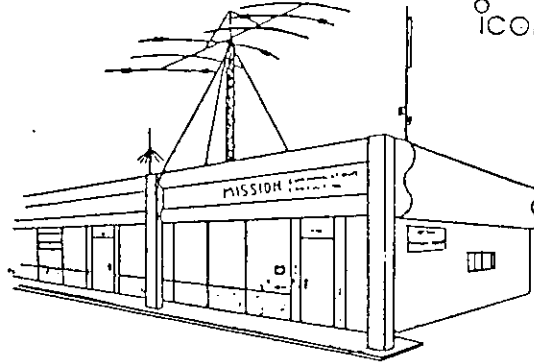
From Roland KB5EQH...

With this printing we welcome a new sponsor to our newsletter, MISSION COMMUNICATIONS. Our thanks go to Jack Vandemark WN5A for all his efforts.

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