

**THE ARRL BOARD OF DIRECTORS – HISTORICAL COMMITTEE**

***THE ARRL HERITAGE MUSEUM***

Presents

**THE HISTORIAN'S VIEW-PRESENTATION**

**Chapter nine  
Revised 5/1/2017**

***A Chronicle of W1AW-Emblem of Excellence***

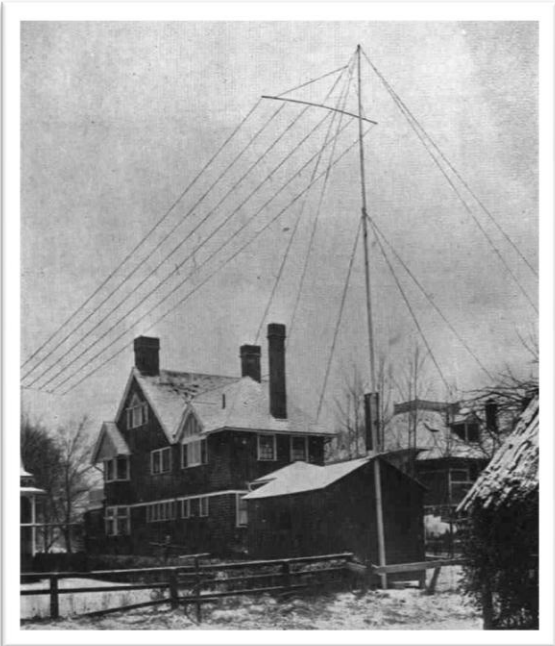
**In three parts-(A) Narrative; (B) Power Point Presentation and (C) Script**

**--.- ... - Calling All Radio Amateurs**

**This is not only a rendition of the history of a bricks and mortar building, its contents, and its activities which has become the icon of Amateur Radio. This is a tribute to the American Radio Relay League (ARRL) staffers, station managers, operators and technicians whose ingenuity and dedication created and maintained this institution for almost a century.**

**From its inception the founders of the ARRL recognized the need to communicate with their members and fellow Amateurs. *QST* magazine introduced in late 1915, a year after the founding, was a means of accomplishing this objective. The monthly journal solidified the organization and advanced all aspects of Amateur Radio and related technology. After more than one hundred years of publication the periodical still serves as the principal source of Amateur Radio information worldwide.**

However, the nature of the initial organization structure required a more immediate method of regular communication. The nationwide message relay system, which the organization conceived and created, utilized specifically addressed, relayed messages to attend to matters of system structure, scheduling and maintenance. In addition to participating in the traffic network there were general matters to be addressed which merited broad distribution to the network. Consequently, the League staff generated Official Bulletins and Announcements addressed to the overall amateur population which were relayed and rebroadcast by specific network stations. Initially both the traffic system participation and the origination of broadcasts were conducted from the home station of League founder Hiram Percy Maxim. The early logbooks of the station 1ZM and later 1AW, record the broadcast of such communications keyed by Maxim and staff members. These broadcasts were commonly prefaced "QST" (calling all Radio Amateurs).



American Radio Relay League Station 1AW  
Hiram Percy Maxim, Owner 276 No. Whitney Street, Hartford, Conn.

Radio \_\_\_\_\_  
Your \_\_\_\_\_ signals were worked here on \_\_\_\_\_ at about  
heard \_\_\_\_\_

A.M. \_\_\_\_\_ E.S.T. \_\_\_\_\_  
P.M. \_\_\_\_\_  
on Tuska three-circuit tuner and two stages audio amplification, Baldwin phones. Audibility \_\_\_\_\_

Remarks: *my far as Mr. Sig heard here then usually 854*

Wave-length \_\_\_\_\_  
QRN \_\_\_\_\_  
QRM \_\_\_\_\_  
QSS \_\_\_\_\_  
Weather \_\_\_\_\_  
Tone \_\_\_\_\_  
Wave \_\_\_\_\_

Would like report on 1AW's signals if you hear them. Best 73's.  
*Hiram Percy Maxim* Operator

HARTFORD HOME OF HIRAM PERCY MAXIM AND 1AW QSL CARD

This practice of conveying information of general interest was continued, on a modest scale, from 1922 onward from the two successive office buildings that the League occupied in Hartford, Connecticut. These stations, designated as 1MK, improved with the leap in technology that marked the period. However, due to the serious site limitations this on the air voice of the League was at best feeble and extensively relied on relays. The second office building station was equipped for 80 and 40 meter operation with roof top antennas and a 50 Watt transmitter.



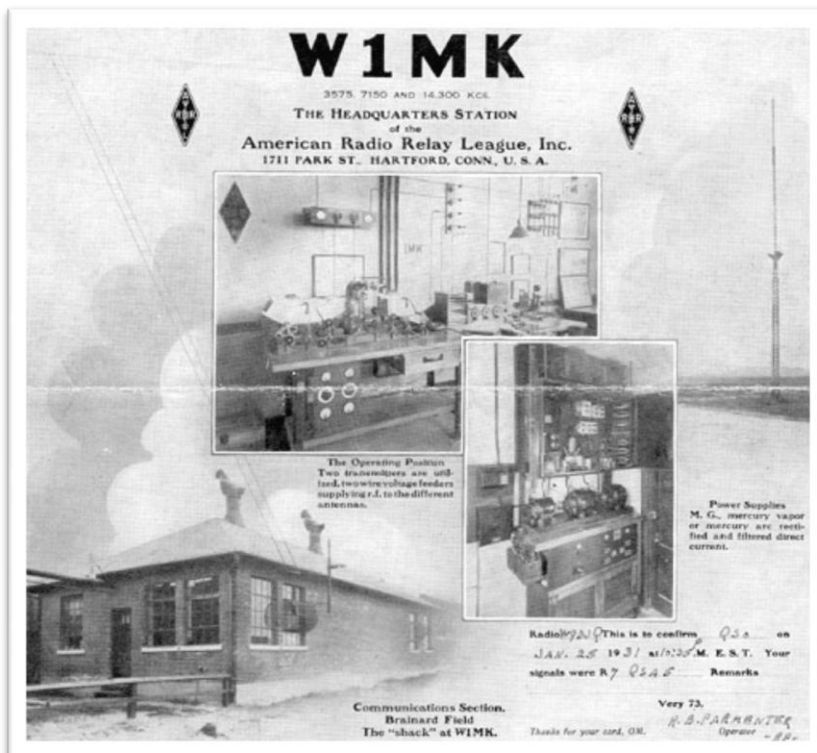
ARRL OFFICES HARTFORD AND 1MK

With a membership of almost 20,000 by 1925 the League continued to expand its influence and advocacy for Amateur Radio in domestic and international forums. As the amateur position in the worldwide spectrum solidified the League leaders sought to underscore their presence with formidable signals. The leaders undertook to create a leading edge, world class League station. Headquarters station 1MK was relocated.

The move was completed in April of 1928. The new facility was situated at Brainard Field, the recently developed Hartford suburban airport. The building eventually housed two transmitters, a multi band 500 watt unit for 80, 40 and 20 meter operation; and a 250 watt 40 meter unit. The transmitters were powered by mercury arc and motor generator arrangements. The receivers were of the latest design selected for optimum performance. Individual antennas for each band were elevated on poles and switchable from within the building.



LATE W1MK STATION LAYOUT



THE W1MK STATION BUILDING

The station was manned by a full time operator augmented by staff members. The equipment was assembled to facilitate simultaneous broadcasts of official and Special Bulletins on 40 and 80 meters. Operating schedules were published monthly in *QST*

magazine, along with the station accomplishments and traffic count. Transmissions were timed to provide convenient reception in each US time zones including emanations at mid night Eastern Time intended for West coast listeners. Other on the air activities included schedules with specific key station participants in the National Traffic System; presence during contests and operating events; and making general contacts during free time. Performance was impressive and the post functioned well for eight years until March of 1936.

During these eight years the station was not only renowned for the technical expertise that it exemplified but also the high level of operating quality that it exhibited. The operators set the standard for operating excellence which permeated the amateur bands and influenced and distinguished the Amateurs as the “gentlemen” of the airwaves



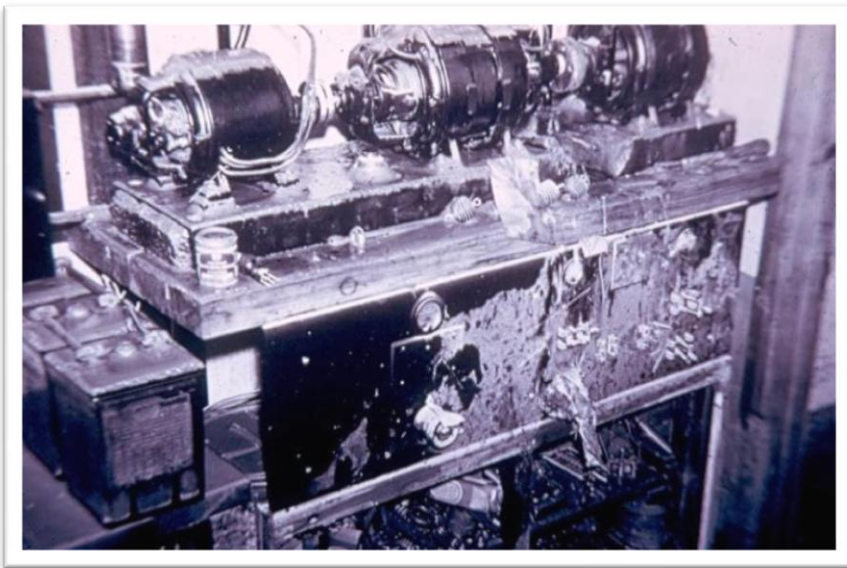
Nature temporarily silenced the signals from the league when disaster drowned the station building. The building was located in a low lying area close to the banks of the Connecticut River. As spring storms lashed the Northeast the station area was inundated. The ice chocked and rain swollen waters of the river rose considerably above flood stage topping



**the protective levees. To complicate matters adjacent oil storage tanks erupted creating a devastating mixture-water, silt and oil. The water rose in the building to a level which caused virtually complete devastation of the operating equipment. The submerged equipment was rendered junk. Intrepid hip booted League staffers, arriving by boat, were able to rescue the receivers and some other table top items.**

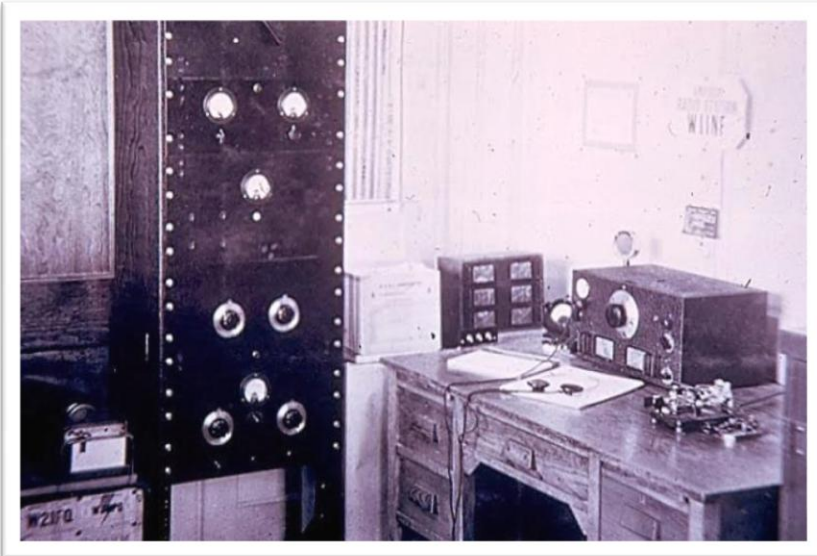


**FLOOD DESTRUCTION**



**The showpiece voice of the League was stifled. Its link in the relay system was filled by local stations but no official bulletins were aired. A modest station was hastily assembled in a corner of the Communications Department in the West Hartford, headquarters office**

**building from existing and salvaged components and a roof top antenna. The League was back on the air, although feebly, utilizing the call of the staffers club W1INF.**



W1INF STATION

**February 17, 1937 was the first anniversary of the death of Hiram Percy Maxim. On that day the office building station began to broadcast identifying with Maxim's personal call letters W1AW. This is the first time W1AW was heard on the airwaves as the League headquarters.**



W1AW STATION

**While the modest medium power station struggled to be heard plans were underway to erect a specially purposed super station. A critical specification was that the site of the station be capable of accommodating a full rhombic antenna directed to the West.**



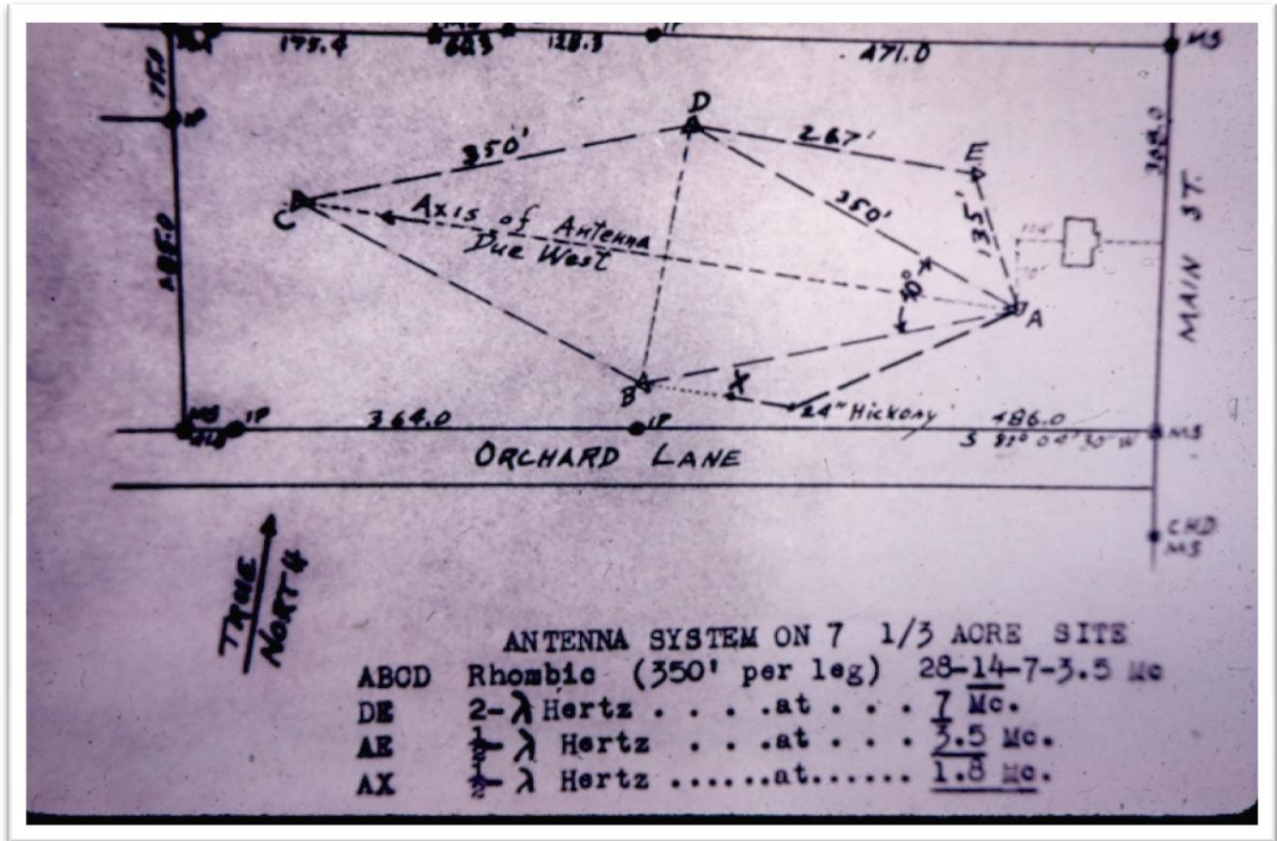


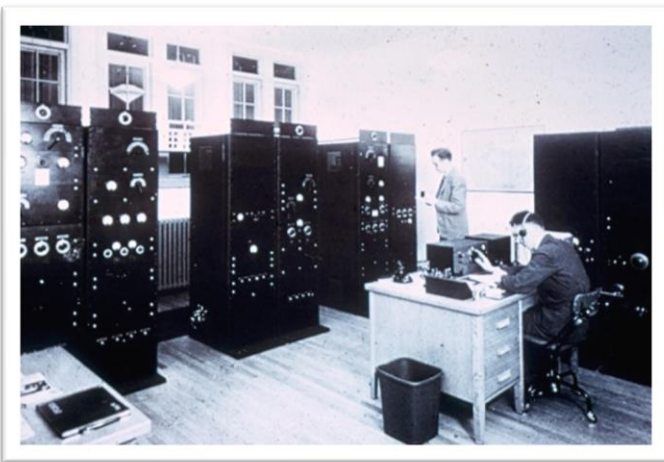
DIAGRAM OF THE RHOMBIC

Shortly, a suitable seven acre site was purchased in the nearby, rural community of Newington. A building was designed to be situated at the front of the property and sized to accommodate no less than five transmitter racks, and the ancillary controls and auxiliaries to operate them. The plan adopted was a 26 foot by 42 foot brick structure with an attic and basement which although modified regally stands today.

By July of the next year, 1938 all was ready- the building had been completed, the equipment installed, and the antennas strung. The inaugural contacts were made on July 9, on 80 meters CW. The station was the embodiment of leading edge technology and operating ability. The radio world was awed –no other Amateur station existed, or would ever exist, to compare with this tribute to the ingenuity and skill of wireless enthusiasts.



Every aspect of the installation was carefully designed wholly by the ARRL station staff. With the exception of the commercial receiver (National HRO-50) and the tape keying head, all the equipment was built on site by the staff. Initially, individual one kilowatt transmitters provided coverage of the of 80, 40, and 20 meter bands in either CW or AM phone mode the latter utilizing a common modulator. Shortly, transmitters were added for 160 and 10 meters.



EARLY LAYOUT

The awesome rhombic, 350 feet long on each of its four legs and at a height of 55 feet was the principal antenna. The rhombic was augmented by a long wire and Zepp antennas. Supports brought the feed lines to the rear of the station and entered on brass rods through

glass panels where each was manually switched to the tuner for the selected transmitter or transmitters. Internal design provisions included the positioning of a control desk centrally with cables running in conduit under the floor as well as the wall mounting of a large commemorative bronze plaque.



AERIAL VIEW WITH SKETCHED RHOMBIC

Ultimately, the system had the unique capability of broadcasting by CW from each of the five transmitters individually or simultaneously providing great spectrum coverage. As we will see this ability was greatly expanded over time to include more services, bands of operation and operating modes. Except for the addition of a 6 meter transmitter and up grading of receivers the station remained essentially unchanged for four years until January 10, 1942 when it was silenced by the US entry into WWII. This is the only the second time in its 78 year history that W1AW was silenced. In late September of its inaugural year the station was subjected to a power outage caused by a devastating tropical cyclone which struck New England. Within hours however, emergency communications

were resumed from the unaffected home of a staff member. Although, the station building underwent major renovations in 1964 and 1989 skeleton operations continued through the construction periods.



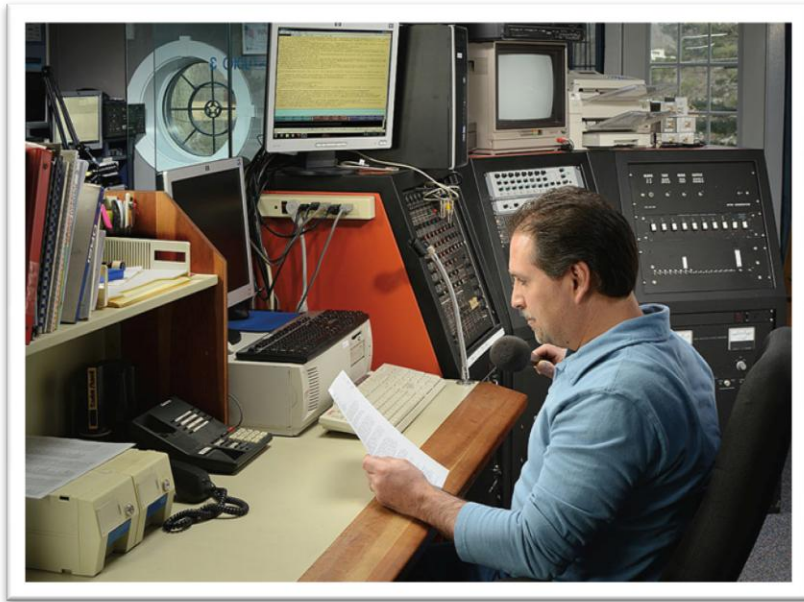
The station returned to the air on October 31, 1945 and began the seven decade plus period of evolution which has brought us the Super Station of today. Constantly at the leading edge of technology during this time the station consistently reflected what is innovative in the fields of radio and antennas:

- Modes of operation expanded to include RTTY, SSB, and digital.
- Moon bounce and satellite operations supported.
- Individual hand built transmitters gradually evolved to all commercially built exciters, transceivers and linear amplifiers.
- The rhombic succeeded by four towers with Yagi arrays and dipoles.
- Services broadened to include more broadcast code practice and provisions for visitor operating.





**Today, true to its heritage, the station maintains an extensive operating schedule reaching out to the entire Amateur world. The station broadcasts bulletins and code practice each weekday for approximately eight hours with the potential to transmit on seven bands simultaneously. About 270 bulletins are sent annually. And, on the air presence is augmented from three “studios”, equipped with the most up to date gear, extending visiting Amateurs the opportunity to make personal contacts from W1AW. Five to seven hundred guest operators visit the station annually making approximately 9, 000 contacts for which about 500 responding QSL cards are issued.**



CENTRAL OPERATING POSITION – JOE CARCIA STATION MANAGER



STUDIO THREE





PRINCIPAL BROADCAST EQUIPMENT

The remarkable presence that the W1AW signals occupy in the Amateur Radio spectrum and the services provided to worldwide listeners are revealed by the station Operating Schedule. This comprehensive Schedule is published regularly in the League journal *QST* and on the League website as <http://www.arrrl.org/w1aw-operating-schedule>.

While at the site take a tour of the W1AW of today at <http://www.arrrl.org/inside-w1aw>.

**W1AW** the world's most renowned Amateur Radio station and the League's voice to the world welcomes you.

# EXHIBIT #1 W1AW Operating Schedule

## A Study in Versatility

(Illustration only- subject to change) Updated November 7, 2016

Pacific	Mtn	Cent	East	UTC	Mon	Tue	Wed	Thu	Fri
6 am	7 am	8 am	9 am	1400z		<u>Fast</u> <u>Code</u>	<u>Slow</u> <u>Code</u>	Fast Code	Slow Code
7 - 9 am	8 - 10 am	9 - 11 am	10 am - Noon	1700z to 1700z					
				-	Guest Operator Time				
10 am -12:45 pm	11 am -1:45 pm	Noon - 2:45 pm	1 - 3:45 pm	1800z to 2045z					
1 pm	2 pm	3 pm	4 pm	2100z	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code
2 pm	3 pm	4 pm	5 pm	2200z	<u>Code Bulletin</u>				
3 pm	4 pm	5 pm	6 pm	2300z	<u>Digital Bulletin</u>				
4 pm	5 pm	6 pm	7 pm	0000z	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code
5 pm	6 pm	7 pm	8 pm	0100z	Code Bulletin				
6 pm	7 pm	8 pm	9 pm	0200z	Digital Bulletin				
6:45 pm	7:45 pm	8:45 pm	9:45 pm	0245z	<u>Voice Bulletin</u>				
7 pm	8 pm	9 pm	10 pm	0300z	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code
8 pm	9 pm	10 pm	11 pm	0400z	Code Bulletin				

W1AW's transmitting schedule occurs at the same local Eastern time throughout the year.

### **Morse Code Transmissions**

Frequencies are 1.8025, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7-1/2, 10, 13 and 15 words per minute (wpm).

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code bulletins are sent at 18 wpm.

### **Digital Transmissions**

Frequencies are 3.5975, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz.

Bulletins are sent using 45.45-baud Baudot, PSK31 in BPSK mode and MFSK16 on a daily revolving schedule.

### **Keplerian elements**

For Amateur satellites will be sent on the regular digital frequencies on Tuesdays and Fridays at 6:30 PM Eastern Time using Baudot and PSK31.

### **Voice Transmissions**

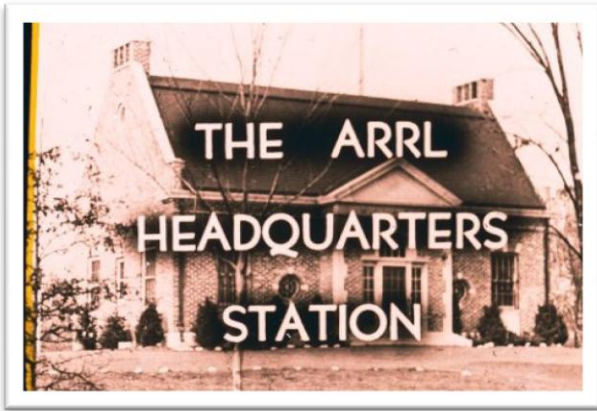
Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

Beginning in January 2017, the voice mode used for W1AW's 40 meter voice bulletins will be full-carrier, double-sideband AM.

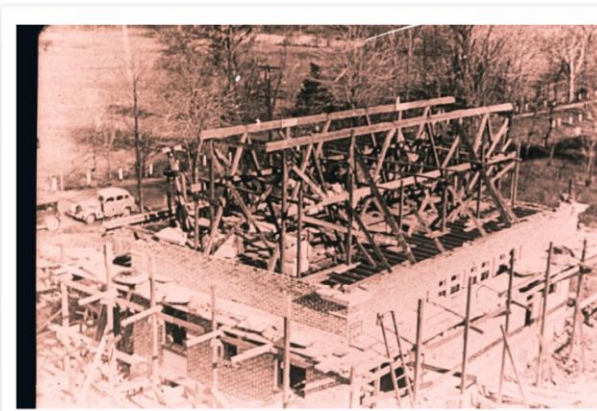
### **W1AW EchoLink Conference Server - W1AWBDCT**

Audio from W1AW's CW code practices and CW/digital/phone bulletins is available using EchoLink via the W1AW Conference Server "W1AWBDCT."

## **EXHIBIT #2 THE INSTITUTION**



BREAKING GROUND



FRAMEWORK EXTERIOR



FRAMEWORK INTERIOR



SETTING ONE OF FIVE '65 MASTS

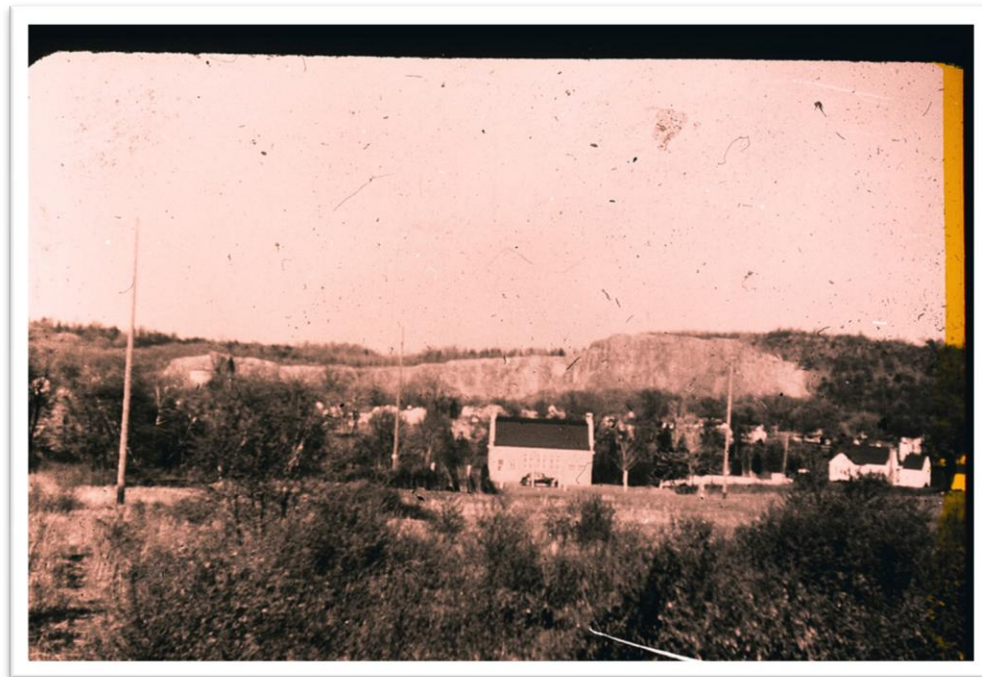


STRINGING THE ANTENNAS





BUILDING SIDE VIEW, MASTS AND LEAD-IN SUPPORTS



BUILDING VIEW FROM REAR OF PLOT, MASTS AND LEAD-IN SUPPORTS

**By: Michael W; Marinaro, WN1M**  
**League volunteer Historian & Archivist**  
**Revised 05/01/2017**









