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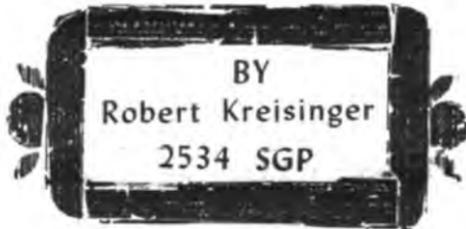
NAA-NSS EDITION - 1980

## WORLD-RENOWN WIRELESS STATIONS

### "N A A" -- ARLINGTON

### THEY MADE HISTORY

#### The Towers of NAA

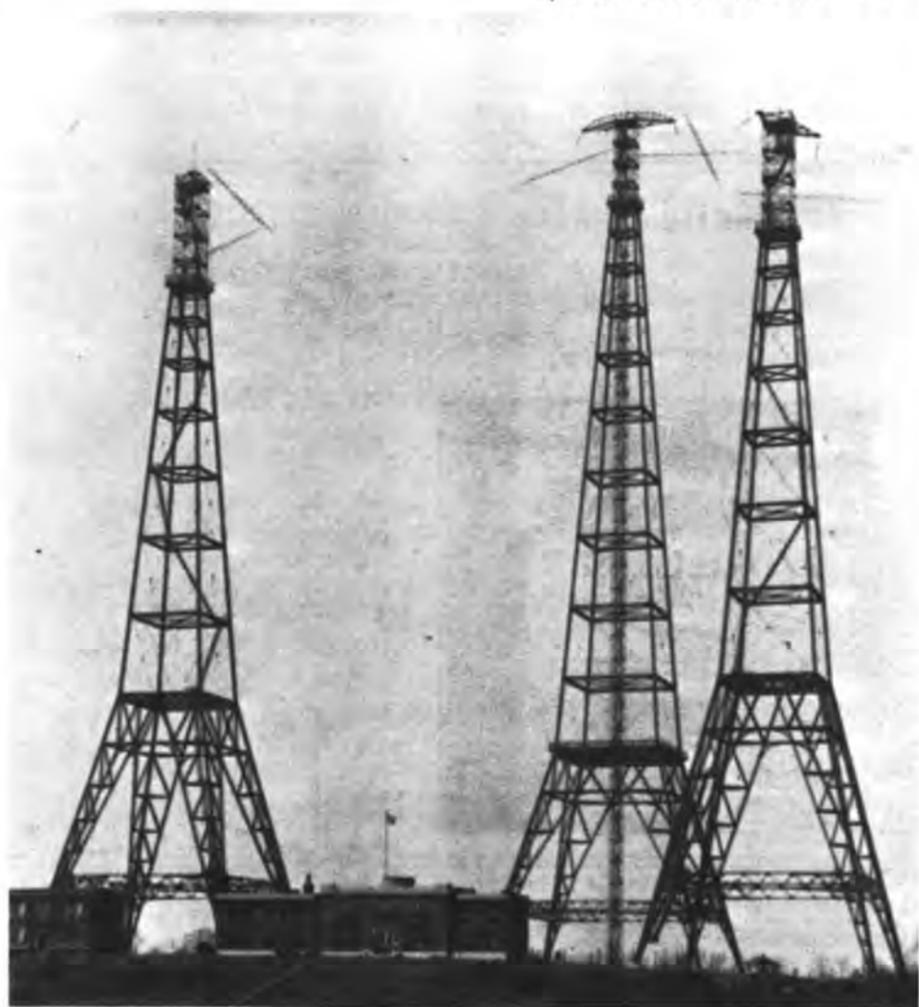


The three main towers were constructed by the Baltimore Bridge Company, under Contract No. 1532, dated June 30, 1911 at a cost of \$105,541.

( CONTINUED TO PAGE 6 )

1913 - February 13th -- Commissioned  
 1956 - July 1st -- Decommissioned

This is the story, furnished by member Robert Kreisinger of the "Old NAA Station" at Arlington, Virginia. It is for the most part a reprint of records from the Naval Library in Washington. The photographs were copied from glass plates from the Naval Observatory in Washington and the National Archives. Member Kreisinger has spent considerable time and effort in securing the material and photographs which appear in this article. The Society thanks him on behalf of our members over the world for furnishing this background history of one of the world's most famous wireless stations.



UNITED STATES WIRELESS STATION AT RADIO, VIRGINIA, HAVING DIRECT COMMUNICATION WITHIN RADIUS OF OVER 3000 MILES -- TALLEST TOWER IS 600 FEET HIGH AND THE OTHER TWO, 450 FEET EACH.  
 Photo - U.S. Naval Photographic Center

US Naval Radio Station, Arlington, Virginia, generally referred to as "Arlington" or "NAA" was first started in operation on 13 February 1913. It was the first high power radio station constructed by the Navy Department. It was primarily intended to link High Powered Radio Stations, whereby naval ships in the continental limits of the coast could always be reached directly or by relay. After examining many sites around Washington, including Naval Observatory, Soldiers' Home and St. Elizabeth, the ground, 13.4 acres, was transferred from the War to the Navy Department by an act of Congress. Three additional acres of ground were purchased from A.B. Casselman and Wife, Pension Bureau, Washington, D.C., on 9 July, 1917 by the Navy Department at a cost of \$3,000. The property so purchased is located due south of the south tower. The average elevation in the vicinity of the towers is 190 feet above sea level. The distance from the capital is about 4-1/2 miles, WSW direction, latitude 38-52-05 N., longitude 77-04-47 W., this being the west tower, which is 600 feet in height.

**Recording the Early History & Development of the Wireless**



ROBERT KREISINGER

AUTHOR

THE ARLINGTON STORY



## The "Magic" Call of Early Day Wireless

(CONTINUED FROM FIRST PAGE)

These towers are of ornamental steel construction, one six hundred and the other two four hundred and fifty feet high. The center of the larger tower is at the apex of an isoscles triangle and the centers of the small towers are at the end of the base of this triangle. The base is 350 feet long, the perpendicular from the center of the base to the apex is 350 feet and the legs about 391 feet. The large tower has a base 150 feet square and each leg of which rests upon and is bolted to a concrete foundation. The small towers have a base 120 feet square with each leg supported as above. These concrete foundations are about 6 feet square at the top and gradually increase in size until at the bottom, 14 feet from the top, they are 12 feet square and each foundation is sunk from 10 to 14 feet into the ground. Each leg of the towers is insulated by means of a large slab of marble and marble washers thoroughly dried and varnished. This slab has been tested up to 150,000 volts. The holes in the marble through which holding down bolts pass are filled with sulphur to further preserve the insulation. At the present time the towers are securely grounded. On top of each tower there are two outriggers each 30 feet in length. There are hand winches on top of each tower for use in handling antennas. Motor driven antenna hoists are installed on the ground at the base of each tower. These were installed by the Ledgerwood Mfg. Co. Contract 1974, dated June 27, 1913 at a cost of \$5,437.50.

The 600-foot tower has an elevator shaft framing and two rung steel ladder stairs with landing platforms at 15-foot intervals. It has a weather vane, three electric panel cabinets and a conduit lamp post at the top with electric cable to the ground. The 450-foot towers have steel stairs with landing platforms at various intervals. The north legs of the north tower are at a level 20 feet lower than the other legs. The 450 and 600 foot towers weigh about 275 and 442.5 tons respectively.

In 1922 two new towers were erected east of the station; one about two hundred feet east of the south tower and the other about eight hundred feet east of the north tower. They are steel skeleton construction, self supporting, 190 and 200 feet high respectively and were completed about September 1922. These towers are 34 feet on a side at the base, one tapers to 2 feet at the top and the other with a similar taper, has had ten feet of the top removed. Each of these towers has a single rung steel ladder.

During 1926, four (4) mast, forty (40) foot high were erected on the roof of the wireless buildings to support the high frequency antennas. These masts are of 4" galvanized steel pipe, set in concrete and supported by guide-wires insulated every ten feet.

### Buildings and Grounds

The grading, etc., for the foundation of the wireless buildings was done by R.J. Beall Construction Co., Contract No. 1864, dated June 28, 1912 at a cost of \$5,420.20.

The wireless buildings were constructed by Arthur Cowsill, Contract No. 1521, dated June 29, 1911 at a cost of \$68,883.

The wireless buildings consist of a transmitter building, a receiving building, and a small well house, the first two of which are connected by a covered passageway.

All buildings are built of tapestry brick and the main buildings are furnished off with cornices of buff terra cotta, which was later covered with sheet metal and painted buff color. The roofs of the buildings are of concrete and tiling with five layers of three ply tarred paper, topped with a thick coat of tarred slag for water proofing. These roofs are supported by very heavy "I" beams, and the roof of the transmitter building is made stronger to support a cypress water tank having a capacity of 10,000 gallons.

The well house has an ordinary sloping roof of wood and tin. This house contains a motor driven well pump of a capacity of ten gallons per minute, which pumps water from a well 155 feet deep to the water tank above mentioned. This well supplied sufficient water for the station until 1916, at which time the Bureau of Engineering was requested to plan to connect this station with the water supply at Fort Meyer Military Reservation. This connection was completed in the fall of 1916.

The Administration Building was constructed by W.E. Mooney, Specification No. 2141, dated July 30, 1915 at a cost of \$16,966. This building is built of tapestry brick and furnished off with buff terra cotta cornices. It contained ten office rooms, a coal storage room, furnace room, two storage rooms for old correspondence and a garage. This building was recently converted into quarters for the Officer in Charge, on the first floor and the second floor was converted into quarters for two Chief Petty Officers.

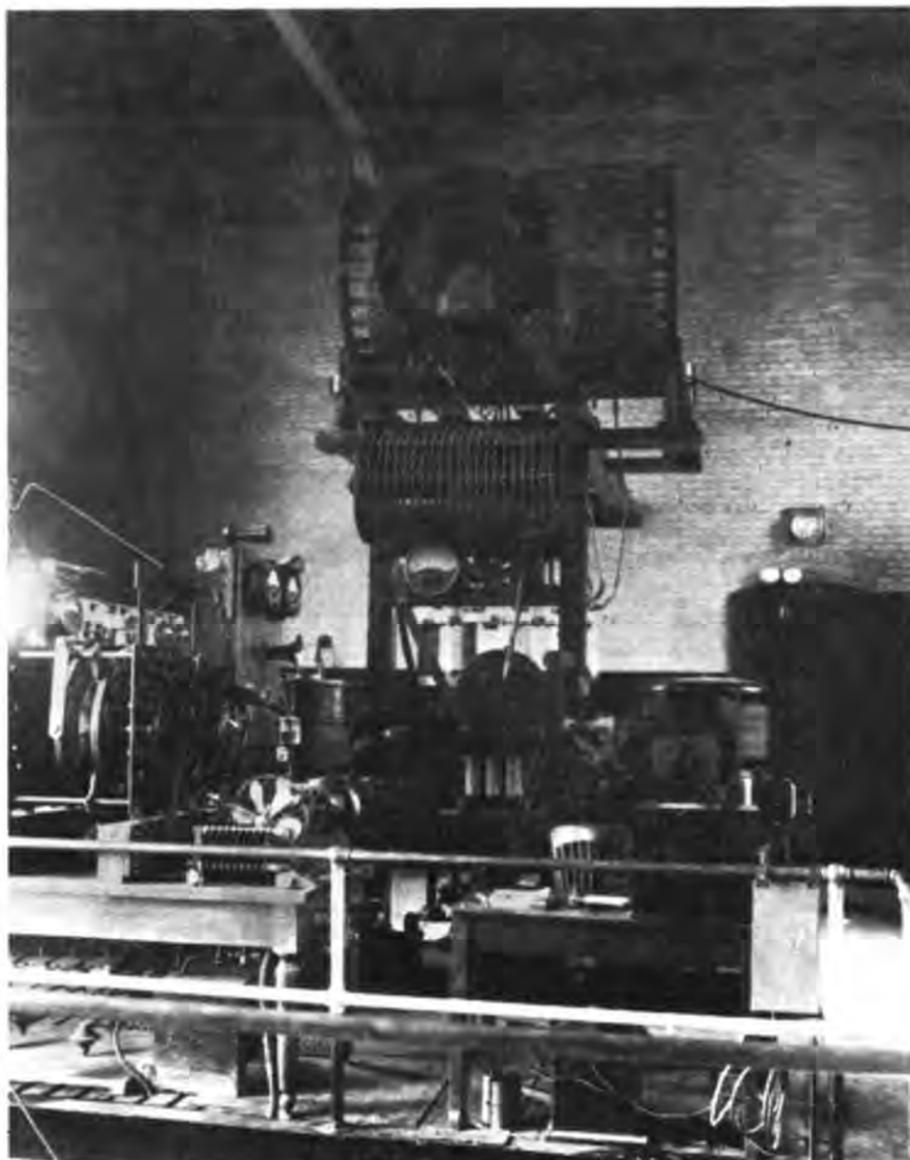
The Septic Tanks were constructed under Contract No. 1521. The tanks have a concrete foundation, reinforced concrete side walls, and reinforced concrete roof. These tanks are connected with all the buildings at this station.

The reservation fence and gates were constructed by L.M. Johnson, Contract No. 1982, dated June 27, 1913, at a cost of \$2,206.41.

The reservation roads and walks, etc., were constructed by B.M. Smith, Contract No. 2230, dated June 12, 1916, at a cost of \$1,129.50.

### Original Installation

The original installation consisted of a 100 K.W. spark set constructed on the Fessenden system. The main driving unit was a Westinghouse 200 H.P., 220 volt, 25 cycle, 3 phase, Synchronous motor, 300 revolutions per minute. The 100 K.W. (General Electric Co.) 500 cycle, belt driven, 1250 revolu-



THE OSC. TRANS. TO THE LOWER LEFT OF THE PRINT APPEARS TO BE THE 5 KW SPARK TRANSMITTER. IT IS SIMILAR TO THE NAVY STANDARD 2 KW TRANSMITTER USED IN WW-1. THE WHEEL FOR CHANGING WAVE AND THE LEVER FOR ADJUSTING THE COUPLING CAN ALSO BE NOTED.

tions per minute, generator had the revolving portion of the Synchronous rotary gap. The condensers were of the compressed air type, the antenna consisted of three flat top sections stretched between the three large towers, 23 wires to a section, individual wires were 7 strands of 0.032" diameter (#20) phosphor bronze, spreaders of each section being 88 feet long. The two west ends of flat tops were open at the 600 foot tower, the sections between north and south towers were connected by jumpers to the other flat tops, the lead down to the transmitter was a fan shape down 300 feet, then all wires were bunched for entering the building. This antenna appangement had a fundamental of 2100 meters (142.9 KCs) with a capacity of 0.0094 M.F. It was provided with a switch to be used as a transmitting or receiving antenna. The second set installed was a small 5 K.W. transmitter with antenna 300 feet high. This set was for communicating with Philadelphia, New York, Norfolk and for local radio work. The third set was a 100 K.W. Federal Telephone Co. arc set. The power unit consisted of a General Electric Co., 500 volts, 100 K.W. D.C., the two units direct connected.



THE FAMOUS "VOICE OF ARLINGTON" ... THE 100 KW TRANSMITTER. REMOVED FROM SERVICE IN 1925.

During 1924 and 1925 the 100 K.W. spark and arc sets, also the 5 K.W. spark set, were removed from the station and five vacuum tube transmitters were installed by Navy personnel. During 1926 four (4) High Frequency 10 K.W. sets were under construction at U.S. Naval Research Laboratory, Bellevue, D.C., for this station. The first set was delivered early in the year 1927. Much experimental work was done during the year and the last set was delivered and installed December 1, 1927. One 250 watt High Frequency set was installed at this station on April 15, 1927. The present installation consists of one 20, one 10, one 1-1/2 and one 1 K.W. vacuum tube transmitters, also four 10 K.W. and one 250 watt High Frequency transmitters.

The 1000 watt broadcast radio telephone formerly at this station was removed during December 1926 and installed at the Navy Yard, Washington, D.C.

During the twelve months ending June 30, 1915 arlington handled 78,921 messages. This station has been used for important experimental work along with the development of the Radio Art, including long distance radio telephone tests in 1915 and later electron vacuum tube transmitters.

### TFK

A study of traffic handled by the Navy Department for a month in the early part of 1926 shows that the 20 and 10 K.W. transmitters alone cleared 367,000 words and as an equal amount or more were received, one month's work in 1926 amounted to almost as much as one year's work in 1915, besides longer distances were obtained and work handled more expeditiously.

The record of words transmitted and received by the Navy Department for twelve months ending December 1927 totaled 8,760,000, 60% of which were transmitted. This consisted of official messages, weather and hydrographic information and press news 80% of all messages originating in the Navy Department were handled through the Arlington Station.

The records of words transmitted by the War Department for twelve months ending December 1927 totaled 3,260,340. This consisted of official messages and weather information. 100% of all messages originating in the War Department was handled through the Arlington Station.

### Inspections at NAA

Since January 1, 1925 the following inspections were held at this station:

One June 30, 1925 by Commander R.T.S. Lowell, U.S.N., who graded operations, personnel and material as excellent and made following remarks as a summary of work accomplished in two months previous to inspection:

- "(a) Installed a 1-1/2 K.W. C.W. tube transmitter for the Army replacing the 500 watt A.C. tube transmitter previously handling this traffic.
- (b) Conversion of the 6 K.W. C.W. tube transmitter to 10 K.W. output on same wavelength.
- (c) Installation of 500 watt broadcast transmitter.
- (d) Installation of 20 K.W. C.W. master oscillator coupled circuit tube transmitter - 95% complete, and now undergoing test.

All installation but the 20 K.W. was performed by the station force. In addition, the station force has also constructed a new 350 foot antenna for the 1-1/2 K.W. transmitter and a 70 foot antenna for the broadcast set. The station force further removed the General Electric 500 watt TD transmitter and the old broadcast set. All of the work performed has been of the highest order and has been done absolutely without any interruption of traffic."

One December 13, 1925 by Lieutenant W. Klaus, U.S.N., who graded operations, personnel and material excellent and made following remarks:

"When the 20 K.W. tube transmitter was completed it was found that the existing main antenna was too small to take the full output of the set. The station force, assisted by the Navy Yard, remodeled the antenna by the addition of wires in the top and replacing the rat tail with a cage lead in. This permitted operation of the set at around 25 K.W. output. When the set was pushed to full output corona occurred at the free end of the antenna attached to the west tower.

The condition of all the transmitters is excellent. Amount of stores and replacement parts on hand not considered sufficient but are limited by the insufficient maintenance allowance of a station with the number and power of first-class transmitters such as at Arlington.

The cleanliness and preservation of the station and material as a whole are excellent."

### Picture Credit

The pictures used in this article are official U.S. Navy pictures furnished by courtesy of the U.S. Naval Observatory and made from their original glass plates. Thanks to Member Kreisinger for his time and effort taken to obtain these early-day pictures for the Society's use. They present a truly remarkable glimpse into the past and our early heritage.



# EARLY DAY PICTURES - NAA & NSS

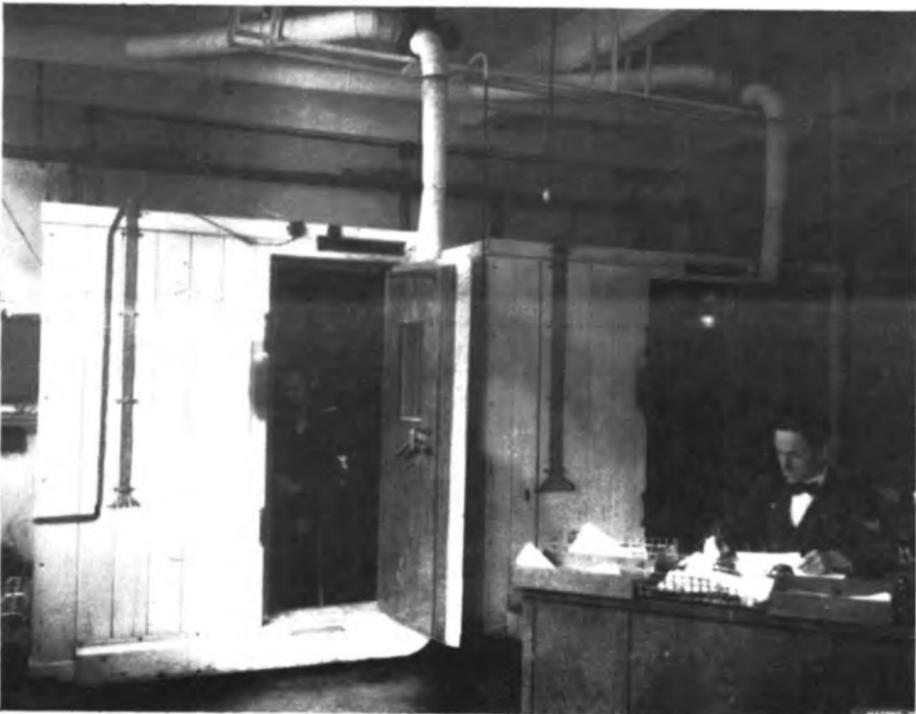
## Receivers & Operations



OLD NAA - RECEIVING ROOM, JULY 1913



OLD NAA - QST DE NAA ... PRESS ...PRESS ...

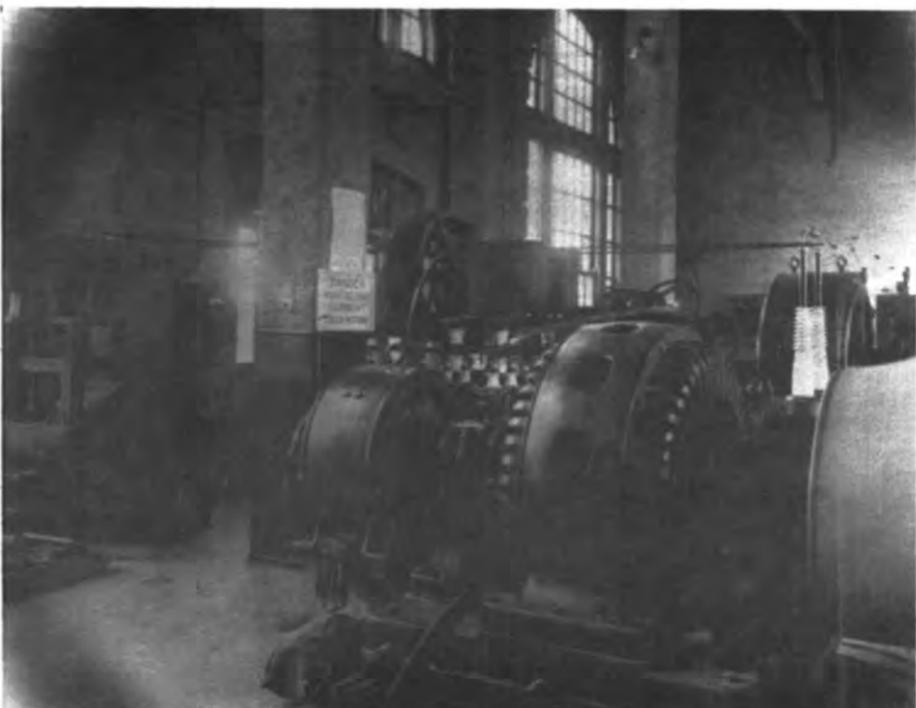


OLD NAA \_ SOUND PROOF RECEIVING BOOTHS

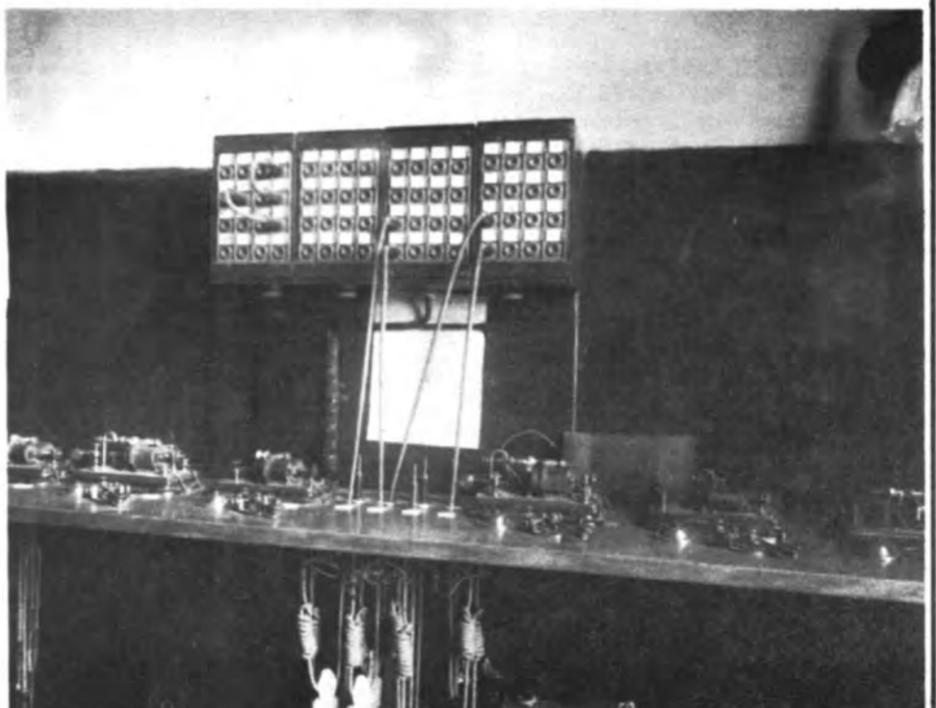


OLD NAA \_ "ON DUTY"

## Control & Equipment



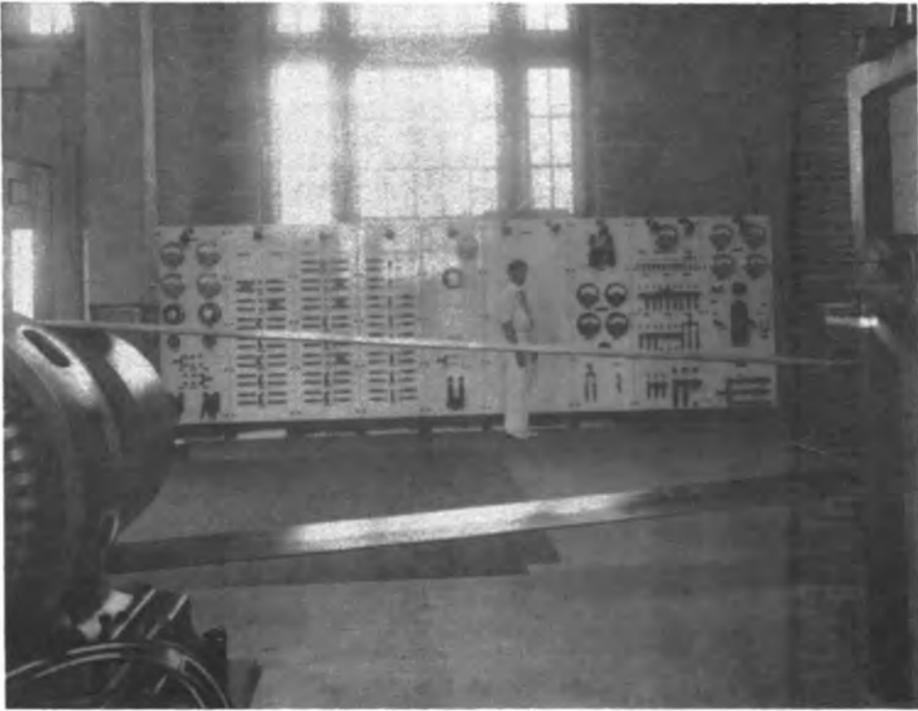
OLD NAA \_ ENGINE GENERATOR AND EQUIPMENT ROOM.



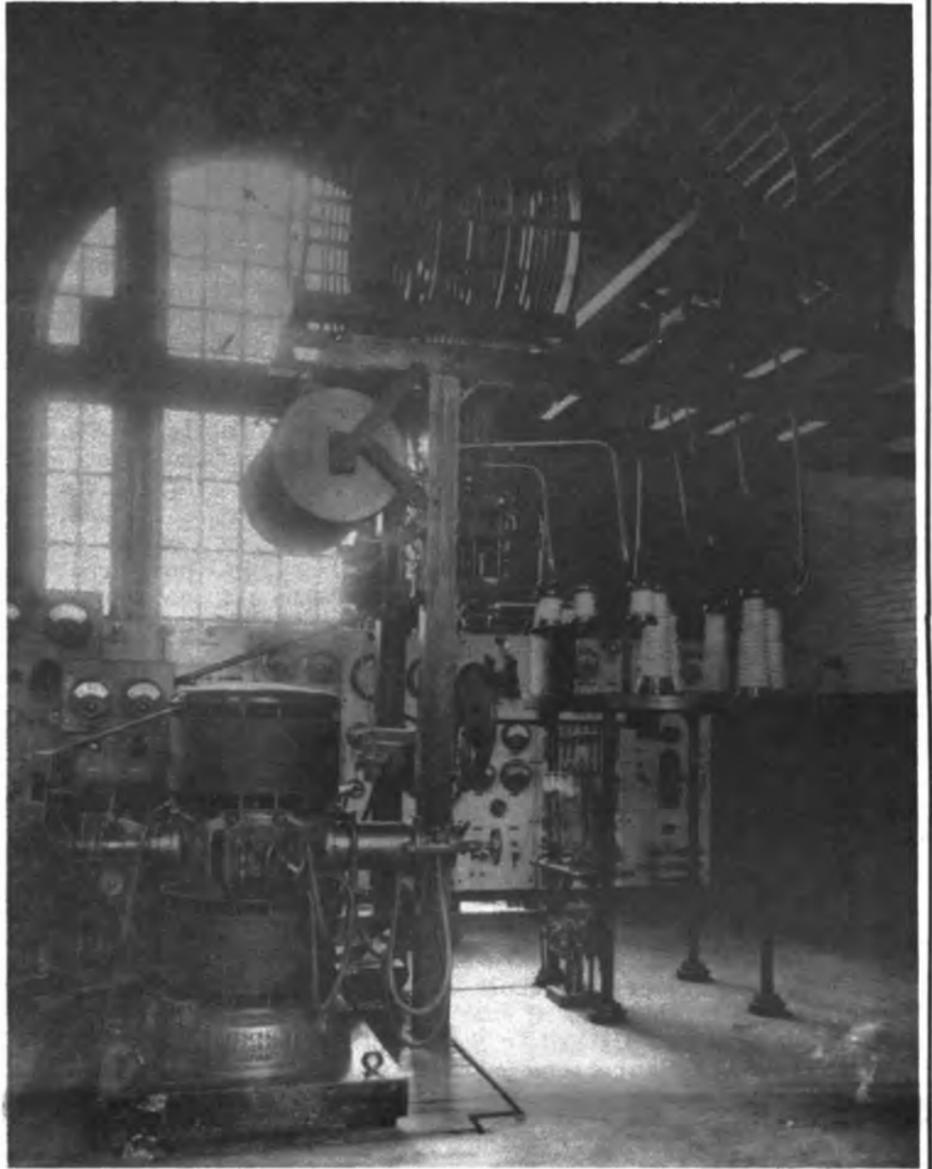
OLD NAA - CONTROL PATCH PANEL RACK

# OLD NAA

## Transmitters



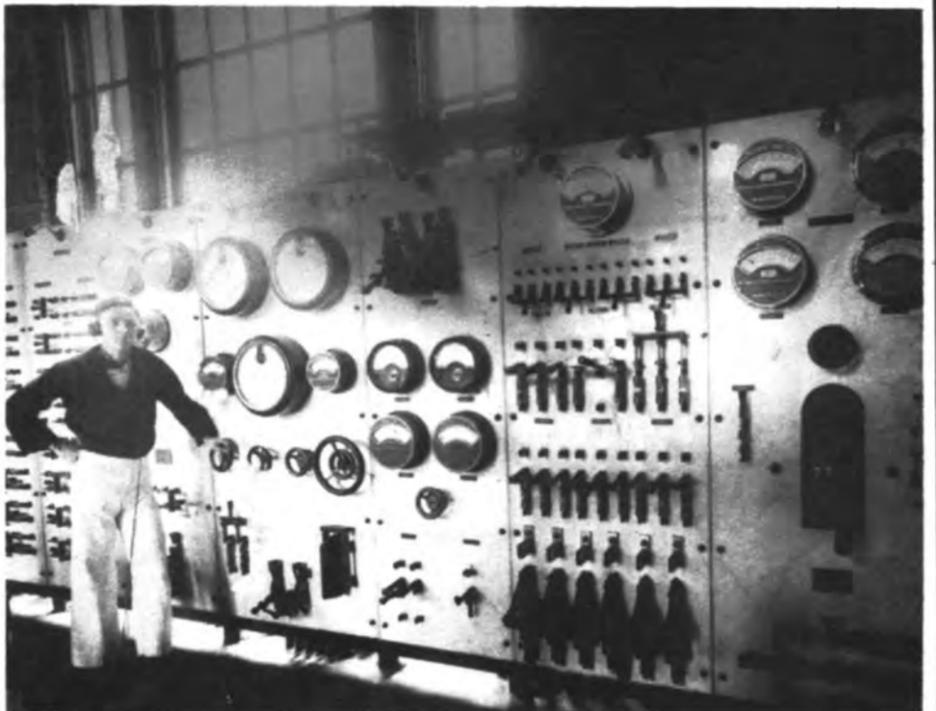
OLD NAA -- SWITCHBOARD AND CONTROL OF THE STATION (JULY 1913)



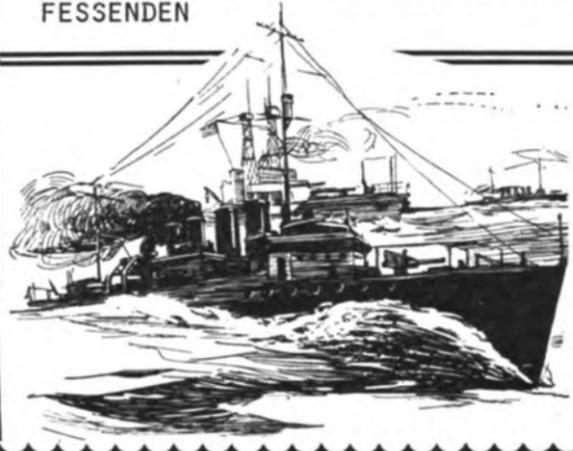
OLD NAA --- 30 KW POULSON ARC INSTALLED BY THE FEDERAL IN LATE 1912



OLD NAA - CLOSE UP OF THE SYNCHRONOUS ROTARY GAP OF THE 100 KW SPARK TRANSMITTER FURNISHED THE NAVY BY FESSENDEN



OLD NAA - MAIN CONTROL PANEL - TRANSMITTERS



## My Assignment at Arlington Circa 1922

As Related by John A. Blackman

Dear Bill:

I believe that you wanted a brief resume of my radio experience while assigned NSS-NAA, so here it is:

My Dad was a telegrapher for the Missouri Pacific RR, so I learned Morse at an early age but, of course, was not proficient at it. I joined the U.S. Navy in January 1919 and was assigned to the USS UTAH (Battleship—now at the bottom of Pearl Harbor) and I was assigned to the Radio Shack - I stayed on the UTAH for 19 months - My job was mainly copying NSS Press and maneuvering the Atlantic Fleet when we were at sea. From the UTAH I went to a mine-sweeper and from there to NSS and NAA at radio central in Washington - At NSS we had circuits all over the world and used a 1,000,000 watt Arc transmitter located at Annapolis, MD, but controlled by radio central - We also controlled NAA which was a 100 KW spark transmitter at Arlington, VA - We also had wire circuits to Bar Harbor Maine and when static was too severe on our frequency (17,000 Meters) we would take the traffic from Bar Harbor where the static conditions were not usually bad.

The Ten PM Weather and press we sent from NSS was hand sending and we rarely made a sending error - we were all good operators as we spent eight hours per day doing nothing but handling traffic - My roommate (Edward Adler—now dead) won the world's championship speed receiving about 1921 - speed was then (1921) 58 WPM without visual help.

I spent a few months of the five years that I was at Radio Central over at Arlington (NAA) where we built 21 tube transmitters to replace the 100 KW Spark transmitter. (I have a picture of the transmitter men at Arlington taken about 1922 which I am going to send you for your files.)

One interesting thing - I was handling traffic to Guam (NPN) with the Arc (1,000,000 Watts and 17,000 Meters) and receiving conditions were very difficult so I was sending priority traffic words three times with 250 Amps in the antenna over at Annapolis. We were not allowed to put over 250 Amps in the antenna without the communications watch officers approval, so I went

in to see him and he authorized increasing power 50 amps at a time until I could clear the traffic - I did this 50 amps at a time into the antenna until Guam could copy words twice until we had 500 amps in the antenna over in Annapolis and we cleared the priority traffic, but when we had it cleared Annapolis Land-wired me that they had burned a bark down about a mile away - the tin roof was bonded but evidently one of the grounds had broken loose.

I am sure that we in the Society of Pioneer Wireless have many things to reminiscense over - Am 79 years old now and wonder if I ever told the NPN operator that we had burned a barn down - probably not as it was too very difficult to get every word through that awful static on that frequency - (It would roll in like ocean waves). Be funny if he read of it fifty years later in a Wireless Pioneer's bulletin.

After leaving the Navy in 1929, I went to South America as a radio flight operator on the New York, Rio, Buenos Aires line. From there I returned to the states and started working for TWA at LA, was transferred to Mid-Continent Airlines at Wichita Falls, Texas and was transferred after about eight months to Western Air Express in Denver, Colorado, and also later at KC and Indianapolis. Came as Radio Engineer to AM station WAGF in 1933 and am still with them, but had a break of 5½ years during WW 2 when I was a radio code instructor for the Naval Training at Pensacola.

Am sure that most of the old timers over the whole world has copied my fist (Sine JB) during those days and perhaps through SOWP might possibly hear from some after 50 years but of course, many are passed on by now.

Will send a picture of the radio gang on the USS UTAH in 1919 for your files and would like to hear from any of them.

Also will send a picture of a few of the top operators at NSS about 1922 on the roof of the receiving station at NSS.

Fraternally and 73,

John A. Blackman, 833-SGP  
AiK4



PICTURE TRANSMITTER MEN AT ARLINGTON-TAKEN IN 1922 FURNISHED BY MEMBER JOHN A. BLACKMAN 833-P. IDENTITY OF THOSE IN PICTURE, FURNISHED BY MR. BLACKMAN AS FOLLOWS: (L/R)

STANDING  
GUNNER MCKAY (CO), WALSH, FOUNTAIN, CHIEF BURNS, HOLT, WILCOX, ROBINSON,  
ADLER, BARTOS AND WEBSTER.

FRONT ROW  
YORK, 'LITTLE' MILLER, VAN DEVEER, JOHN BLACKMAN, 'BIG MILLER' & MCDUGAL.