

N A A

By DONALD WILHELM

AT NIGHT, visible from all directions for miles around, there are now three lights glowing atop the Arlington Towers, one six hundred feet up, the others four hundred feet up from the hill that looms above the Potomac overlooking Washington. The towers of NAA, and these lights, now constitute a landmark for the aviator, signifying that he should bear off a bit southeast, or swing over the Washington Monument, the Capitol and the Navy Yard, and that Bolling Field is underneath. With the coming of planes and of radio, what a changed aspect this Arlington hill has taken on since George Washington and Major L'Enfant stood there, as tradition has it, and planned the city of Washington!

Not so long ago, when an amateur radio convention was about to assemble in Washington, more than three hundred of its delegates were asked what landmarks they desired most to see in and about the Capitol: should the Capitol come first, or the White House, or should it be NAA? Back came the post-card replies, almost unanimous for NAA. The giant on the hill has a distinct personality, and has long been immensely popular with thousands of acquaintances. It has had some great experiences, too. In February, 1920, for instance, there was that memorable snow and sleet storm that for whole days tied up nearly every railway wheel on nearly every railroad up and down the Atlantic Coast. It concentrated on Arlington. "Our antenna then consisted," said Charles Range, who is still in charge of the station's crew of six men, "of three wings, triangular in shape, each consisting of two spreaders eighty-eight feet long and each weighing 3,000 pounds. There were twenty-three wires in each wing, there was ice eight inches in circumference on each wire—eleven tons of ice on each wing, thirty-three tons altogether, if you figured it out, after that sixty-mile gale did its darnedest. Well, the evening of February 7, 1920, about 7:30, there were three reports that sounded like a battleship coming on the range—the first sounded like a three-inch gun, when the shackle in one of the insulators gave way, the next was a 14-inch gun,

when one end of the antenna parted from the big tower, and the last sounded like the explosion of the whole works, when that débris buried itself in the frozen ground."

But the point in all this is, not that the station kept working for two days before the last wing crashed, but that, during the ensuing six days, mariners, jewelers, farmers, amateurs and others, by radio, by telegram, by letter, and in sundry other ways, transmitted one long wail to the Navy: "What in the world has become of our old friend, NAA?"

And there were others who addressed themselves to the Secretary of the Navy, and to their Congressmen and Senators, about like this: "Save money if you have to, but for heaven's sake give us back NAA!"

NAA has a bigger circle of friends in fact than any gentleman we know. If service rendered is immortality, in radio history this station will always be what it is to-day—as much a landmark and institution as almost anything east or west of the Potomac.

NAA has given more service to more agencies and people and to the progress of radio itself than any other station. One can safely go further and say that its original 100-KW Fessenden spark set, which now seems as ponderous and noisy as a steam shovel, has given more service than any other set in existence. It is still hard at work, with its heavy rotor and forty-eight glistening tractors not much the worse for wear. It is still serving hundreds of people who are equipped only with crystal receivers. Yet, progress in radio is so rapid that this much-celebrated set with its 200-hp motor and belt drive is likely to be retired before many more years, and there is a movement on foot, which all loyal devotees of radio will join, to set this old fellow up in the National Museum for the benefit of posterity, with an inscription about like this: "Here lies the original set in the first high-power station. From February 13, 1913, until arc and tube sets supplanted it, it was a good neighbor and a friend in need to hundreds of thousands."

NAA, remember, was the first of the Navy's chain of high-power stations—that chain which, when combined with American Private

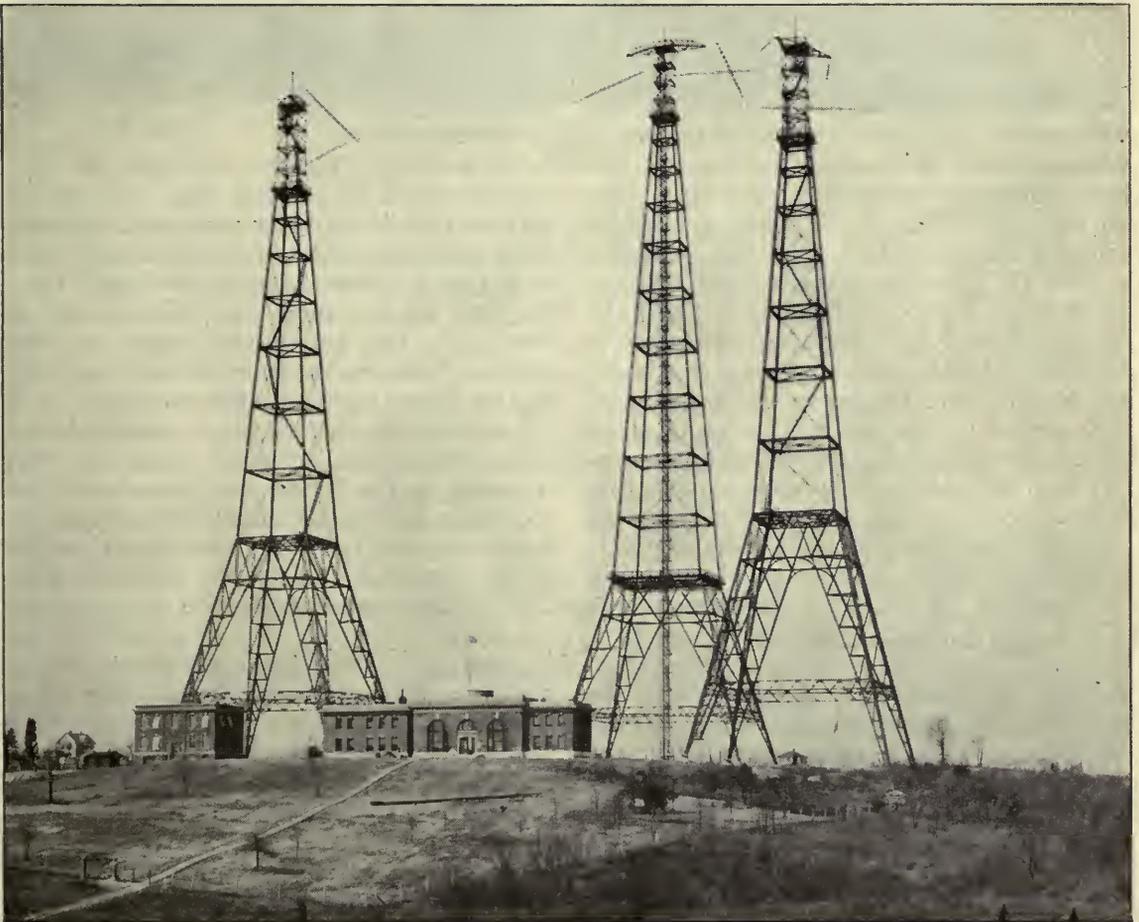
Enterprise, Inc., absorbed links from Germany's supreme chain, links from Britain's imperial chain, and in less than a decade gave America the world's radio supremacy and a more effective guardian of such international understanding and peace as is possible these days than any other agency on earth.

It was from NAA that the human voice first leaped the Atlantic. Very early in that morning of October 22, 1915, a little group of Naval officers and others were routed out of bed to be told that they might hasten to Arlington and from there talk to other Americans in the Eiffel Tower, with the bustle and roar of a thousand guns only a few miles away from Paris and the Tower itself used as a target now and then in the daytime. They talked, and were heard in France and at Pearl Harbor, in the Hawaiian Islands at the other side of the world. There's an epic in itself—how American Enterprise,

Inc., perfectly confident that we would have to enter the war, went secretly to the Navy in 1914, explained that it wanted to lend a hand to the Navy by developing the radiophone with the help of such facilities as the Navy alone could offer, and how, with the Navy, it put up a wooden shack beneath NAA's big towers, went to work, and came through, that October morning.

It was via Arlington, too, on September 29, 1915, that the human voice, Mr. Vail speaking, was first transmitted from New York to the Mare Island Navy Yard on the Pacific Coast, via land wire to NAA, then via ether westward.

It was NAA that first broadcasted a President's voice, and it has been NAA that has enjoyed all sorts of similar but less important distinctions. When the argument, spark vs. continuous wave, was raging, and the Navy wanted only the better system for the rest of its



THE BEST KNOWN RADIO STATION IN THE WORLD

NAA, Arlington, Virginia, whose distinctive spark note is heard every noon and evening by thousands of people, both afloat and ashore, who tune in to keep posted on the time, news, and weather

chain, it was NAA that served at the land end while a cruiser, the *Salem*, moved eastward toward Gibraltar with experts on board, testing out both systems. And now, at the end of a period of not quite ten years, the same station is making experiments with tube sets, with the result, perhaps, that before long the Navy will be satisfied that even NAA's C.W. sets are destined for the National Museum.

Some years ago, the question arose as to whether a big and a little set could be worked at NAA simultaneously without the big one burning out the little one. There were those who declared it couldn't be done. It was Commander Hooper, as the story goes, who was one of those who said: "Let's try." So, it seems, suiting the action to the word, he pressed the keys of both sets at once,—and nothing disastrous happened.

Again, in 1915, authorities doubted whether the Navy Department, hardly more than half a mile from NAA, could receive with an antenna atop its own building while NAA was transmitting. Up the flag-pole of the State, War and Navy Building an antenna was run, with a wire down to the telegraph room. That worked. Now there is no receiving at NAA and no gob hammering a key either—receiving is done via a 5-wire antenna strung half the length of the new Navy Building just over the Potomac from NAA's big hill, and sending is done from a booth on the top floor of that building, by land wire and automatic key—by remote control, in other words. That's why, in the brick building hard by, but still entirely separate from the main radio building at NAA, you find two rooms, having doors half a foot thick with soundproofing and walls quite as thick, of which the doors are no longer closed. And that's why, in the smaller of these rooms, on a narrow shelf fastened to the wall, you see eight keys in a row and likely as not a couple of them working automatically, while perhaps the spark set next door is snapping or the C.W. or tube sets work in the adjoining building with nary a sound except the low hum of motors.

Now, after you've climbed NAA's big hill and looked about—at the neat brick buildings faced with limestone, at the towers rising high above you, at the fine lawn and flower gardens, at the wonderful view of Washington, and at other interesting things in and about the station (it cost originally only \$300,000, by the

way, and is maintained with a crew of six men at a cost of only \$18,000 a year), you wonder how they guarded this station during the war, and what happened. It dawns on you how fine a site it has—and that means a lot. You realize that there are no mountains, hills or big buildings anywhere near to divert or absorb electrical energy. You realize that NAA is far enough inland to be fairly safe from any attack except that of enemy aircraft, which might more likely make the Capitol itself the target. You see that the site adjoins Fort Myer; that there are ample sources of outside power; that the place, with screen protectors about the base of the towers and barb-wire entanglements all about its 16½ acres was, with a guard of marines on duty, safe enough from even pro-enemy fanatics. "But *did* anything happen?" you want to know.

"Nothing much."

"Well, what?"

"Well," your informant confesses at last, "not a doggone thing happened except one night."

"Then what?"

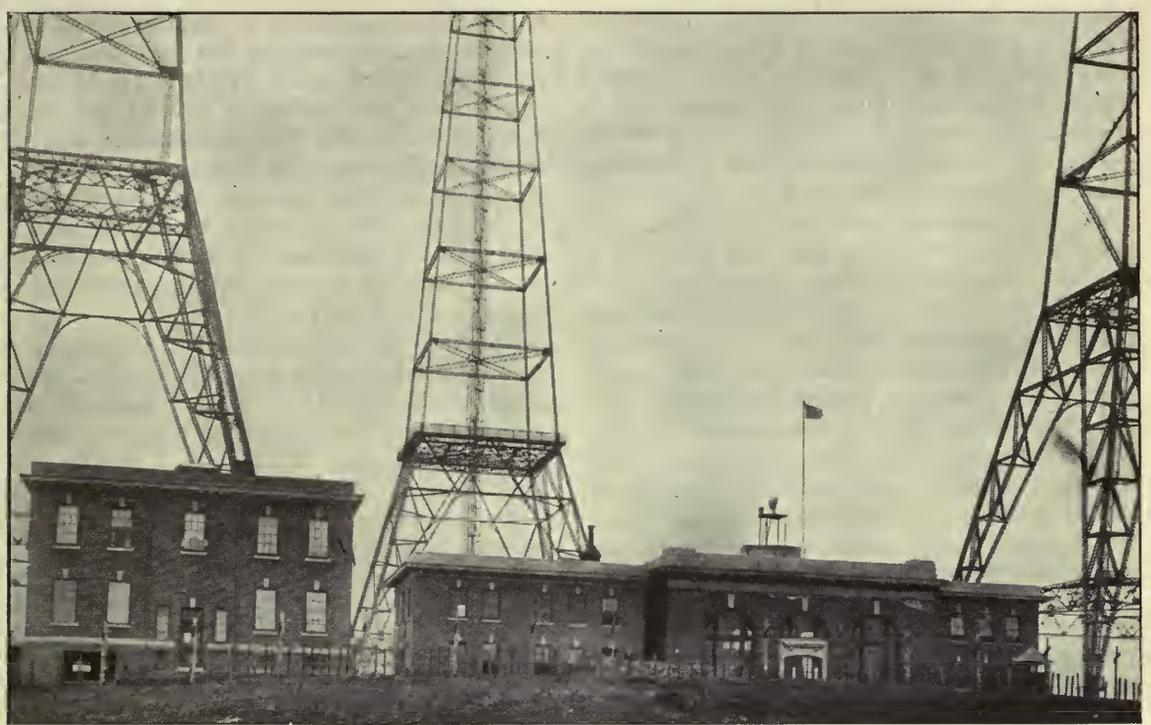
"O nothing! You see we had the wire entanglements all charged with just enough current to hold anybody that touched them. That particular night, a society flapper that took a fancy to one of the Marines, and I can't see that, tried to climb over, and he tried to help her. The searchlight picked up this romantic picture, the guard stopped the yells, and the flapper was sent home to mother!"

But there are other things you want to know, all in short space, about this giant and what it means to the Navy and the nation. The ground system is particularly interesting. It is a checkerboard of wires buried from 14 inches to two feet, extending over the entire 13½ acres of the original reservation. All of these wires are bonded at crossings. At one side of the reservation they terminate at a running brook and all are brought together at two sides of the transmitting building.

Above this checkerboard, resting on blocks of Vermont marble, with the ground switches evident enough, rise the three towers with their 1050 tons of steel.

These three main towers—there are now two new 200-foot ones receiving a final coat of paint—form an isosceles triangle with a base which runs magnetic north and south. The main antenna is lowered with electric winches





THE ARLINGTON HILLTOP IN WARTIME

Showing a part of the barbed wire barrier which was charged with electricity as a reminder to the mean or meddlesome

twice a year for inspection and overhauling. At the peak of the highest tower, by the way, there is now a wind-recording instrument tracing its records on a paper cylinder in what used to be one of the transmitting rooms. It is precisely 790 feet above sea level and it operates automatically, with no added labor for the Weather Bureau. East of the station about 100 yards rise the two new towers, each with an antenna strung back to the 400-foot towers. The Army built these in cooperation with the Navy, and they are on ground owned by the Army.

So there are now five sets of antenna, at NAA. These, with the new towers, indicate that, though the Navy Department is handling its own and other Federal long-distance work via NSS at Annapolis, NAA, at the advanced age of not quite ten years, is setting out on new ventures. It has long been sending out time, hooked up to the master clock at the Naval Observatory—but this is an old story. It has long been sending out, every day, weather reports and ship orders. Also Naval press news, so that mariners in and out of the Navy, shore stations up and down the Atlantic Coast and remote agencies and individuals innumer-

able have their daily newspaper, including the baseball scores, the football scores, almost everything except the morning murder.

You have only to consider what time, one of the constants in navigation, means to mariners, as well as to jewelers, to realize a phase of the service NAA renders when, at 11:55 A.M. and 9:55 P.M., the warning dashes flash out three or four thousand miles in all directions, followed by the longer dash that says "noon" or "10 P.M." exactly, 75 degrees meridian, Washington. Or go out with the Atlantic Fleet, see how the news is welcomed, and you understand even better what service that old spark set gives. Or consider what the weather forecasts mean to farmers and mariners. Yet these are only part of NAA's work. A big bulk of official orders, warnings about lightships out of position and of derelicts and icebergs,—to help prevent disasters like that of the *Titanic*—Shipping Board orders and re-routings, and thousands of other messages for the Navy or other Federal departments are all handled via NAA.

But this isn't all; for while NAA is giving over much of its former long-distance work to NSS, the more powerful near-by Annapolis station, it is going about the business of greatly

enlarging its usefulness in other directions. On that 7,416 square feet of floor space of the main building, which includes a well-equipped machine-shop and much other equipment in addition to motors from one-fourth horsepower up to 220, there are now six sending sets: (1) The spark set; (2) a 500-cycle A. C. tube set, for local work, such as traffic with New York, Boston, etc., and with ships out of range of shore stations along the Atlantic Coast and for Army work via one of the new antennas; (3) a 30-kw arc set for Navy long-distance work traffic to Guantánamo, Key West, Cuba, etc., for broadcasting general information from other Departments, for aeronautical reports, weather reports, etc. This set is going almost twenty-four hours a day and uses the big antenna mainly; (4) a 250-watt tube set for airplane work, using, generally, a secondary antenna swung between the two 450-foot towers; (5) another 250-watt tube set using the big antenna, for speeches, concerts, etc; (6) a long-wave 1200-watt telephone tube set, for band concerts, talks by the President and Cabinet, etc., with which the large antenna is also used.

Three of the sets use, it will be noted, the big antenna, but since all the four tube sets at NAA are used experimentally, and the antenna used with the arc set varies with the wavelength employed, all five antennas are used in various combinations. Here, again, now, you see NAA functioning, while doing a man-size routine job, as a great experimental station.

But from the popular point of view the transformations and experiments at Arlington are interesting mainly for the following reasons:

In the first place the Army and the Navy are for the first time consolidating their radio forces on a large scale. This means that the Signal Corps, confronted with the necessity of building a powerful station to serve, as none other could, as the control station of its net, was able, by pooling its interests with the Navy, to save \$50,000 or so by making use of Arlington instead of building a new station.

There's an economy for you and other taxpayers, but the mere matter of saving money is not the big story. This pooling of forces means a lot more. It means that the Army and Navy are pulling together better than ever before in radio; that the provisions by which the Army handles Navy inland business, such as traffic with recruiting stations, and the Navy

handles Army business to distant transports, stations, etc., are working out with real promise; that the Army and Navy have the promise, together, of developing an aircraft net, with NAA as the control station, that will, first by supplementing the Post Office airplane chain, later, conceivably, by coöperative work with it, get vastly better results than ever before. And since the radio work of the Shipping Board is also handled by the Navy, the Shipping Board is also in the picture.

But the important thing is that the strengthening of NAA for other than long-distance work alone means this: That the Government itself anticipates the time when, with the incredibly rapid development of all sorts of private and public utility intermediate broadcasting stations, *one* Federal station can do *all* Federal broadcasting to the public. And that station, if one reads the signs aright, will be NAA.

The Federal squabble in radio, in other words, is settling, and the passing of the pending radio legislation will simplify the station more. For months now, ever since the Radio Conference formulated that legislation, the inter-departmental radio board called into being by Secretary Hoover has been meeting pretty regularly, to discover ways in which to give all Federal Departments their due in radio and to make the most of the situation as it stands. Even as this is written, steps are being taken to allocate to each Federal Bureau such opportunities as it requires for broadcasting via the Navy's Anacostia laboratory station, NOF. And those who know the Navy's plans know that NOF is not long to retain this function—NAA is to have it.

In other words, NAA, so far as the radio public is concerned, is on the eve of becoming the biggest thing on the Federal horizon. Pending that time, the old giant on its hill is being rejuvenated and in large measure re-equipped.

As a pioneer and as a great experimental station, NAA has done its bit and is continuing to do still more; yet two years ago there was serious talk of dismantling it. We have seen how, as a public utility, it has become almost indispensable, with its weather reports and so on.

But that isn't all. The time is coming when even debates in Congress are to be sent out by tube! That's cheaper and better than paper, easier than reading the *Congressional Record*. Will NAA be the station to do it?