

Amateur Radio and World War II

And the impact each had on the other....

By Dan Davis, W8LUX
1672 Snyder Road
East Lansing, MI 48823

There have been significant events that have shaped the history of Amateur Radio: the invention of the spark transmitter, the move to wavelengths shorter than 200 meters, the invention of the vacuum tube, the development of single sideband, the application of FM and narrowband FM technology to ham radio, the use of digital communication techniques, the introduction of no-code licenses, etc. To this list we should add still another element—World War II.

World War II was a turning point for Amateur Radio in the United States. Before the war, Amateur Radio activity had progressed pretty much at a steady rate—both in terms of the number of licensed amateurs and the development of the technology. From 1942 to 1945, however, Amateur Radio was redefined, and the effects of this process are still being felt today. As one studies what occurred during those eventful years, three factors stand out:

1. Although Amateur Radio communication as such ceased during the war years, radio communication by amateurs actually continued. This was important because it provided continuity in the hobby.

2. Amateur Radio operators made a significant contribution to the US war effort, both overseas and at home.

3. Because of their efforts and accomplishments during the war, amateurs strengthened the hobby and shaped the course it would take over the next 50 years.

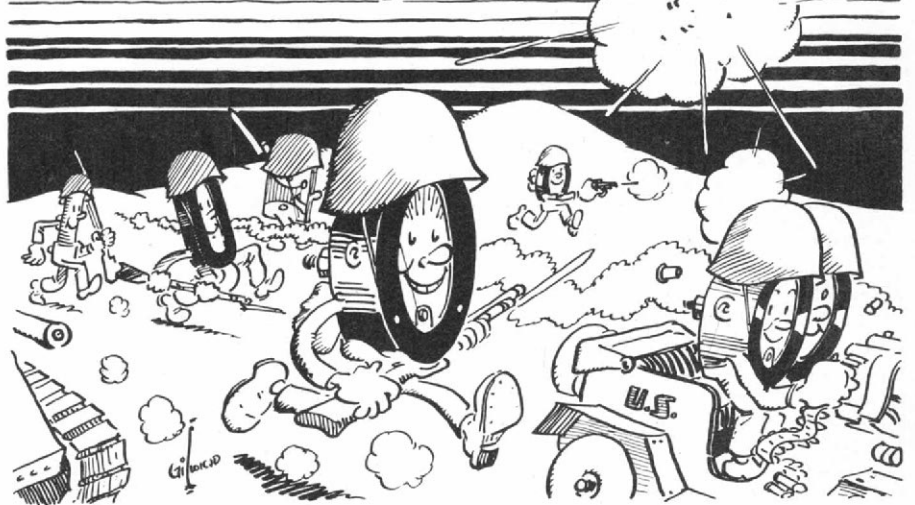
It only seems right that, on this 50th Anniversary of the end of World War II, we review the story of what happened when Amateur Radio went to war.

Except for a handful of visionaries, few Americans, even as late as 1939, were predicting US intervention in foreign disputes at any time in the near future. The isolationism that grew out of World War I served as a shield, hiding the real significance of events taking place throughout the world. This detachment extended into the world of Amateur Radio as well.

In 1939, there were about 52,000 licensed amateurs in the United States. Life was rather uncomplicated. In September, however, all that was to change forever. War broke out in Europe, a fact noted in October's *QST* editorial:

"In Europe there is war again.... This war means more to us radio amateurs than to people in most walks of life, for the simple reason that communication has been our raw material and we have all made

SEND YOUR METERS TO WAR!



HELP THE WAR EFFORT AND GET MORE MONEY FOR WAR BONDS

One of ham radio's (and any advertiser's!) strongest allies, cartoonist Phil Gildersleeve, W1CJD, puts his talents to his country's use.



countless friends in many foreign countries.... We have no part whatever in the politics of nations and peoples."

About one-third of all licensed amateurs outside the United States soon disappeared from the bands. Events in Europe and the Far East developed with frightening speed, and countries disappeared from the radio spectrum almost daily. The November 1939 issue of *QST* reported:

"The following countries are off the air as belligerents: G, GI, GM, GW, F, SP, VE, VK, YM and ZL. All the innumerable colonial possessions of the British and French empires are also off. Apparently purely as a precautionary measure, ON and PA hams have been closed down; in fact, the Belgians seem to have been the first amateurs to be put off. Portuguese amateurs received orders to close down September 12th.... Switzerland and Ireland are off the air. At this writing, it is rumored that OZ was closed October 1st.... Haitian amateurs were closed September 13th."

By the end of 1939, the ARRL's analy-

sis of the situation sounded dramatic, but it probably was not too far off base: "We in the Americas are now the custodians of Amateur Radio for all the world." This custodial role, however, depended on maintaining neutrality with those foreign stations still on the air.

American amateurs tried to make a go of things as best they could. There was the Byrd Antarctic Expedition, which contacted almost 1200 stations between November 25, 1939, and May 4, 1941. In addition, the 12th annual ARRL DX Contest was held in March 1940, with more than 9000 US operators and 138 foreign operators participating. But *QST* carried a notice warning that US stations would be disqualified if their submissions contained evidence of any contact with European stations, or with stations in Australia, Canada, India, New Zealand, the Union of South Africa, or with any British or French colonies. Further attempts at working what DX remained came to an end in June 1940, when the FCC issued Order 72 restricting US amateurs from engaging in foreign communications. The directive contained four major points:

"1. Do not contact any European station.

"2. Do not relay anything from one country to another; confine any international contact to technical subjects or trivial small talk.

"3. Do not use any code; use plain language, English recommended. Sign each transmission with your assigned call.

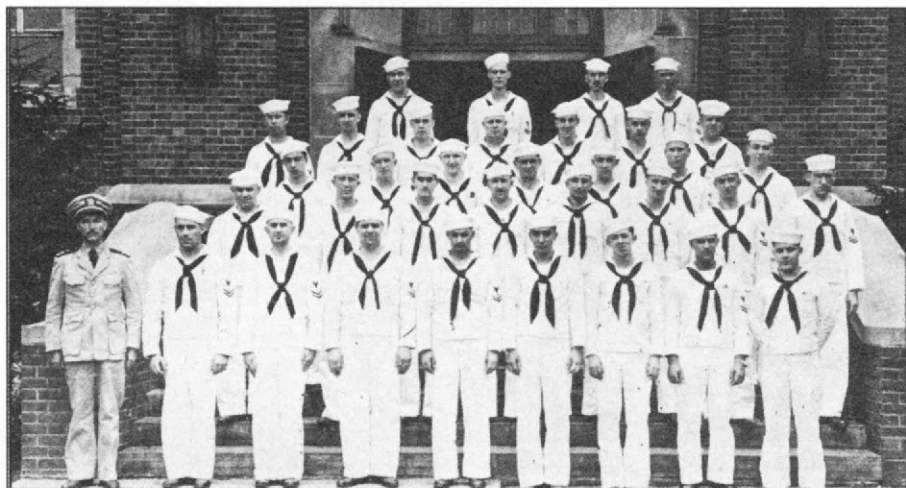
"4. Do not talk about the war over the air (even among ourselves)."

Practically, Order 72 was probably not even necessary. There was virtually no DX left to contact. Almost all European Amateur Radio activity had ceased, with the British and Irish Governments even confiscating Amateur Radio equipment.

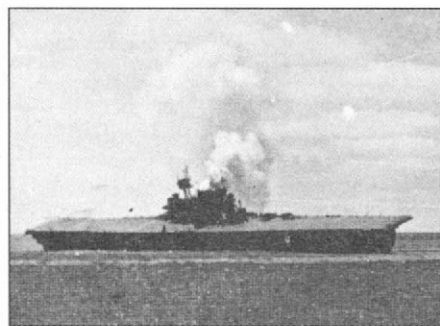
As the international situation deteriorated, military planners in the United States began to cast their attention toward amateurs of draft age. In February 1941, the War Department sent a questionnaire to every ham listed in the *Callbook*, asking for information about their code proficiency, military status, education, occupation and dependents.

Many amateurs did not wait for the draft. *QST* began to recognize amateurs who were volunteering for military service by publishing a standing column. "In the Services" recorded monthly the contributions of those individuals who participated in national defense programs. "U.S.A. Calling," was a job mart in which various branches of government listed employment opportunities for individuals with electronic backgrounds.

Also during the winter of 1941, the Defense Communications Board was established to plan a coordinated system of communication capable of serving the country in what was termed a "national



Hams in one Navy RT class at Grove City College (1942).



USS Yorktown, lost at Midway.



Captain Elliott Buckmaster, K6SNL (Hawaii) and W6SNL (California), Captain of the Yorktown.

emergency," but which more likely meant war. Included on the Board was the Amateur Radio Committee, a body that was to write the rules to govern Amateur Radio during an emergency. This was an important recognition of the role played by Amateur Radio and its potential for even greater service to the country. The development of Amateur Radio had done more than just create a pool of trained radio operators for the military services; it had actually built "an institution devoted to communication, complete with its methods, morale and traditions."

Unfortunately, government bureaucracy interfered with the actual development of feasible plans. Almost 10 months later, *QST* complained:

"For a great many months we have been passing on to you fellows the word we got to QRX on defense communications activities until plans were officially approved.... Nothing has happened.... It seems to us that the time has come for us, of our own initiative, to reorganize our communications in terms of the most intelligent approximation of defense needs that we can make, without waiting any longer for blessings, requests or green lights from anybody."

But the luxury of time, essential to any kind of planning for the effective use of Amateur Radio, was abruptly removed from the equation. Events of December 7, 1941,



THE skill and knowledge you have acquired as a radio amateur qualifies you for service in the Signal Corps. Men with technical experience are urgently needed. . . . Now's the time for all good hams to come to the aid of their country!



changed not just Amateur Radio but the entire world order forever. The lead article in the January 1942 issue of *QST* told the story: "Since December 7th, Amateur Radio has been operating under wartime controls.



Lt Bill Geysler, K7HYK (l), a medium bomber pilot with the AAF.

Eight hours after the first bomb fell on Pearl Harbor, Amateur Radio as we have known it in peacetime was suspended for the duration."

FCC Order No. 87 then withdrew all amateur frequencies from private use. In a letter to *QST*, W. W. Adams, then W8VQV, noted:

"I'll never forget Sunday, December 7th. I was trying to get my little 22-watt rig on the air. The 160-meter band was bad, as usual. Then the ARRL station began to pull the boys off one at a time, two at a time. It was most disheartening to listen to, but I followed W1AW until almost 3 a.m. sliding up and down the band to catch the 'CQ' calls as they came in."

Although the ban on amateur activities was pretty definitive, the FCC allowed W1AW to remain on the air for awhile. The HQ station was asked to convey government announcements to amateurs, keeping them informed of developments affecting radio transmissions and the state of the hobby.

The period immediately following the attack on Pearl Harbor was filled with confusion, to say the least. This was particularly true in Hawaii. L. A. Walworth, then K6CIB, wrote,

"Hawaiian radio amateurs had their equipment confiscated during the first two days of the war. The Army requested the local police to 'bring in' all amateur transmitting gear. My station was confiscated, too. The police broke in the door to my station and took my transmitter, 15-tube Patterson receiver, electric clock, 20 pole steps, a Boy Scout axe, over \$100 worth of spare tubes and meters, and many other items not related to radio transmission."

On the mainland, federal authorities were also interested in obtaining Amateur Radio gear. In March 1942, *QST* noted that the government wanted to buy amateur transmitters. The services were interested in equipment of 100 to 1000 W input, especially Collins, Hallicrafters, RCA and RME.

With the cessation of normal amateur



S/Sgt Jim Marglin, W9THS, radio instructor at Fort Knox, and Mickey Marglin, W9ZTU, first female radio operator in the Signal Corps, with baby Patricia.

communication, the problem in the amateur community became one of finding things to do to maintain interest in the hobby. For the next three years, *QST* published numerous articles about aspects of the hobby that, in other times, would have been considered on the far periphery of Amateur Radio. For example, in March 1942 the magazine carried a lengthy article about wired wireless communication (low-frequency communication over commercial power lines), complete with plans for a 25-W transmitter. This form of communication "would not radiate into space so that enemy planes could pick up the signal and use it for direction finding." Later, there would be articles about designing better test equipment, the availability of more sophisticated receivers after the war, how radar works, and adapting television for use in the hobby.

But by this time, the real story of Amateur Radio was its shifting location. It was moving out of thousands of basement, bedroom and attic ham shacks across America into military classrooms. In these classrooms the intrinsic value of Amateur Radio to the war effort would be realized.

A licensed amateur operator represented a great asset to any branch of the military services. But, as any former serviceman knows, there are three ways of doing something—the right way, the wrong way, and the military way. The amateur-recruit may have known about the first two, but he still had to learn the military way, thus leading to the establishment of technical training centers in each branch of the military. *QST* Executive Editor Clinton B. DeSoto, W1CBD, visited many military communication training schools and described them in detail in a series of articles



Veterans of the Tunisian front and the Sicilian campaign (l-r): S/Sgt Arthur Knapp, W1AJ; S/Sgt Adwin Rusczyk, W1MPO; and M/Sgt Stephen Schnell, W2HNC.

that appeared in 1942 and 1943.

The US Army Air Forces Radio School at Scott Field, Illinois, was one such school. It produced radio operators and technicians for the aviation branch of the Army. The students were to receive a dual classification. As radio operators, the trainees had to be able to copy CW at 16 wpm on a typewriter, recognize standard radiotelephone and radiotelegraph procedures, know net procedures and the principles of flight operation, and be able to shoot navigational bearings and plot fixes. As radio technicians, they had to have a complete knowledge of the operation and tuning of all standard Army Air Forces equipment, be able to install the equipment and put it into operation, recognize components and understand their performance and functions, perform standard inspections and do prescribed maintenance work.

The training was demanding, but, as DeSoto noted, hams had a distinct advantage because their amateur experience well qualified them for the job. In fact, he continued, the best of the students and the sharpest of the instructors were hams.

The need for aviator-communicators was particularly acute, and training was provided in shifts 24 hours a day. In addition to the school at Scott Field, there were also schools in Chicago at the Stevens and Congress Hotels as well as at Sioux Falls, South Dakota. While no one knows for certain the exact number of airmen who received training, it is estimated that as many as 30,000 between the ages of 18 and 50 attended the Chicago schools alone.

The US Army also maintained training schools at other locations. The Signal Corps operated large facilities at Camp Crowder and Fort Monmouth; the latter included the impressive Signal Corps Laboratory.

The importance of radio communication was critical in each branch of the military; this was certainly the case in the Army's tank-destroyer units. Training was provided at Camp Hood, Texas. According to DeSoto, "It isn't the conventional military radio, however. It's the new World War II variety, where every tank destroyer is two-way radio-equipped and every man in the

These U.S. Navy Planes Carry Collins Autotune Transmitters



GRIMMAN 121 AVONCET

125-1 COCKNARD

MAKIN COAST 121 AVONCET

The voice of thousands of Navy fliers



The Collins Autotune transmitter (model 1000) is the most reliable and longest-lived type of Navy aircraft transmitter which was adopted by service of the great communication systems before the war. Since Japan struck the States has received many thousands of orders for design and rugged construction. The A.C.C. reflects the finest of our best in every quarter of the world. It is a feature of the reliability and efficiency to be expected of Collins by amateurs and in use since after victory. Collins Radio Company, Cedar Rapids, Iowa, 11 West Third Street, New York 16, N. Y.



125-121 HELICOPTER

125-121 HELICOPTER

MAKIN COAST 121 AVONCET



Lt Col F. E. Handy, W1BDI, ARRL Communications Manager, serving with the AAF.

Doolittle's 16 B-25 bombers as they took off from the carrier USS *Hornet*. He was also at Midway, and he covered the Marshall Islands raid, the Coral Sea battle and the fighting at Guadalcanal.

Unfortunately, many hams never returned and were listed in honor-roll fashion in the "Gold Stars" column of *QST*. The following are just a few examples: Lt JG Ralph Hollis, W4AFC, communication officer on the USS *Arizona*, was killed when his ship was sunk at Pearl Harbor. Rocco Torra, W1FYT, died from wounds received while performing his duties as chief radio operator on a Merchant Marine ship when it was torpedoed and sunk in April 1942. Sgt James W. Wright, W6SAP, a radio operator-gunner on a bomber, was killed during the first US Army Air Forces raid on targets in Germany in July 1942. Lt Frederick C. Harrington, W9WDR, was killed while serving as radio operator aboard the aircraft carrier USS *Wasp* when it was sunk in the Pacific in September 1942. PFC Alex C. Rules, W9FJH, was killed in December 1943 while serving in Italy with an armored unit. Lt Irving H. Hoyt, W7EDV, was killed in June 1944 on Biak Island while trying to rescue a wounded comrade.

These, as well as hundreds of others whose deaths in combat were not reported by the War Department at the time for reasons of national security, served our country with devotion and valor, and ultimately made the supreme sacrifice for their country.

Bill Graham, W9BNC, a reporter in civilian life and an Army combat intelligence officer, wrote in a letter: "In nearly every one of my missions there has been a ham at the bomber's radio—a mighty important fellow on the crew of a bomber. No, after this one is over, the amateur will have no excuses to offer for his part in this three-dimensional war. He has functioned to the everlasting glory of us all." Graham was killed March 20, 1944, the day after he penned those words, while on a reconnaissance mission over the jungles of New Guinea.

While hams on active duty were writing a distinguished history for themselves, those in civilian life were filling a less

NATIONAL RECEIVERS ARE THE EARS OF THE FLEET

3 out of 4 of the Navy's ships—landing craft and larger—use receivers designed by National.

A capital ship is no place to use anything but the finest in radio equipment.

NATIONAL COMPANY
MALDEN, MASS., U. S. A.

NATIONAL RECEIVERS ARE IN SERVICE THROUGHOUT THE WORLD

outfit can double as a radio operator."

The other branches of the military had their own training centers. The US Coast Guard trained its radio operators at a facility in Atlantic City, New Jersey, where there was emphasis placed on Morse code, in addition to other aspects of communication and naval procedures. The course of instruction there lasted 24 weeks.

Like the Army, the US Navy decentralized its communication training facilities. Naval Training Centers were located at numerous sites: Noroton Heights, Connecticut; Grove City College, Grove City, Pennsylvania; Utah State Agricultural College, Logan, Utah; the University of Houston, Houston, Texas; Texas A&M College, College Station, Texas; Oklahoma A&M College, Stillwater, Oklahoma; Bliss Electrical School, Takoma Park, Maryland; and North State Street, Chicago, Illinois.

US Marine Corps radio operators were trained either at Gallups Island, in Boston Harbor, or at Camp Lejeune, North Carolina. Their course included Morse code, procedures, theory, lab and seamanship. The theory department was staffed almost exclusively by hams.

Pilots in the US Army Air Forces received specialized Morse code training at Maxwell Field, Alabama—cadets could not write out messages, so they had to copy all messages "in their head." A pilot had too many other duties in the cockpit and could not take his eyes off his instruments to jot down letters and numbers.

It was estimated that by August 1943 some 25,000 hams were in uniform (more than six times the number in World War I), and their performance was exemplary. Jack Rice, then W6RTH, was just one example. Jack was an Associated Press war photographer who photographed General Jimmy

glamorous but equally important role. Several aspects on the civilian front stand out.

Radio amateurs made a significant contribution in the manufacture of communications equipment. Bringing their technical expertise to the assembly lines and design shops, they were able to help the war effort by turning out a steady stream of high-quality receivers, transmitters and electronics components, especially during the early days. Women were especially prevalent in this effort. Over the years, a number of communications equipment manufacturers were awarded the War Department's "E" for Excellence awards for the quality of their equipment, including Eimac, Hallicrafters, Mallory, Meissner, National, Shure and Zenith.

Rather proudly, *QST* editorialized in September 1943 that "most of the outstanding features of the military communications equipment so far put into service are essentially no more than the practical application and refinement of the best of the ham practices in use before the war." The editorial pointed out that, until the outbreak of war, standard military communications equipment resembled that used by hams in the period from 1928 through 1932. But it was only during 1942 and 1943 that the design of military gear caught up with amateur progress. The manufacturers of Army and Navy equipment took the VFO, bandswitching, and various amateur-developed circuits, and included them in the new military sets.

Initially, civil defense efforts in the United States were supposed to rely on the Amateur Radio community for a large degree of support. The FCC and ARRL worked together to allow several thousand hams back on the air in early 1942 to facilitate emergency communication. The focus

of civil defense activities was the local community, with police, fire and medical teams linked together by means of radio communication. But what could have been and should have been never quite materialized.

The main problem was that civil defense preparedness was only minimal by the time of the attack on Pearl Harbor, and it did not improve significantly in the weeks after. In fact, two months after the outbreak of war, the Office of Civilian Defense in Washington was still preparing operations manuals for the communications element! Amateurs who had equipment and experience very often had no place to offer their resources.

Plans for using Amateur Radio as an integral part of civil defense operations were finally scrapped on January 9, 1942.

In June 1942, however, a new element was added to the civil defense equation. The FCC and the Office of Civilian Defense worked together to create the War Emergency Radio Service (WERS). This new system was requested by the Office of Civilian Defense "to avoid the 'looseness' and the uneasiness about security that characterized the earlier reactivation of amateur stations." WERS looked good on paper, but petty political bickering hindered its full development. Nevertheless, by mid-1944 more than 200 organizations throughout the country operated stations in the WERS system and most relied on hams to fill supervisory positions. Amateur Radio operators were still communicating with each other, even if under nonham call signs. WERS activity in the 112 to 116 MHz band was the introduction to VHF for many hams.

In reality, WERS was a new type of radio service, temporarily using amateur frequencies and relying heavily on amateurs. Quite often, the equipment was not available and *QST* frequently published articles about designing practical pieces of gear, such as a nifty little 2½-meter transceiver that could be constructed from parts scavenged from a defunct broadcast-band receiver.

While much of the equipment used in the WERS operation was designed by hams, several pieces of communications gear being used by troops on the battlefields also bore the imprint of Amateur Radio. The civilian model HT-4 transmitter (later known as the military BC-610) was a large mobile unit produced by Hallicrafters. The BC-610 was the heart of the SCR-299 truck-mounted communication station that was used in all theaters of the war. An SCR-299 provided the first communication between British Generals Montgomery and Alexander in the battle of Tunisia.

Another piece of equipment that deserves mention is the SCR-194, a hand-held FM VHF transceiver that is probably the forerunner of today's popular 2-meter H-Ts. Its genesis occurred almost a full decade earlier, when Frank Gunther, then W2ALS, designed a 5-meter transceiver in 1932 and described it in *QST*. This unit

became the prototype for a military mobile/portable transceiver for artillery spotting. It eventually became the SCR-194, which, in turn, spawned the SCR-300.

As victory began to appear certain in 1945, hams both in and out of uniform looked to the future and liked what they saw. In fact, two years earlier a group of servicemen-hams met at Fort Monmouth and discussed the shape Amateur Radio should take in the post-war years. First, they felt that licensing should be made more difficult for all three classes of licenses then in effect. Second, although the FCC had authorized phone operation from 7.250 to 7.300 MHz, Pearl Harbor came along before such operation became a reality. Most of these hams were opposed to phone operation on 40 meters. They said the band had traditionally belonged to the CW operators. Finally, none of this group was in favor of increasing power limitations.

By early 1945, however, hams were becoming more visionary in terms of the type of technology they expected to find in the years ahead. Two examples stand out because of their eventual development:

- A driver that would instantly yield any frequency in any amateur band by punching buttons on a device like a cash register, and which would display, in figures at the top, the frequency that had been "rung up."

- Remote-base operations in which the operator would be able to work HF DX by means of VHF links back to his home or club station.

Also by 1945, the FCC leaked its plans for the restructuring of Amateur Radio after the war. For one thing, frequency allocations in the old 5-meter band were going to shift, but it was not certain exactly where. A new HF band would be added—21.000 to 21.500 MHz—to replace 160 meters, which was going to be given to the military for future loran operations. And a tenth call area (using 0 as the numeral in call signs) would be added to accommodate the new hams expected in the immediate years after the war (the ARRL and the FCC estimated a total US ham population of 185,000 by 1948 and 250,000 by 1950). The new call area would relieve the lack of available call signs in the W9 area. All these changes

were eventually adopted, although with some modification.

When hostilities actually ceased on August 15, 1945, there was tremendous anticipation about resuming ham operations. On August 21, 1945, the FCC suspended the ban on Amateur Radio operations—3 years, 8 months and 13 days after it had been imposed. Operations were initially limited to the old 2½-meter band (112 to 115 MHz), with resumption on other bands taking place in the months ahead as the military services relinquished their frequencies in the HF amateur bands.

Overseas, many hams still on active duty were champing at the bit to resume activities. Sunny Williams Jr, W4KJV, was stationed in India when the war ended and recalls how he got back on the air with a rare DX call sign: "With 'air time' nearing, thought was given to selecting call signs. None of the hams wanted to use their US calls—besides, we wanted to be DX! An enterprising sergeant visited a nearby Indian Post Office where he had heard all types of licenses were being issued. He not only got an amateur license, but was asked what call letters he wanted. He selected my initials, and thus we became VU2SW."

It had been a long night from December 8, 1941, to August 21, 1945. When the sun finally rose again on ham radio, it illuminated a world that had been inexorably altered—its political, social and economic landscapes changed forever. But Amateur Radio had survived.

Amateur Radio had not only survived but had begun a metamorphosis that would make it stronger and more dynamic in the future. This occurred because thousands of brave men and women recognized and accepted their responsibility, turning their avocation into a vocation that made a direct contribution to the war effort and which improved the technology. Their contributions were made in a thousand different ways in a thousand different places around the world—on beaches in France and small islands in the Pacific; in remote outposts in Alaska and training bases in Alabama; in factories in Iowa and laboratories in New Jersey. They helped win the war, and also set the stage for the future. QST



THE Navy appreciates the patriotic work of the United States radio amateurs in preparing themselves for service in the defense of their country and then loyally entering the service at the outbreak of the war.

I concur with the statements made by Admiral Joseph R. Redman, USN, Director of Naval Communications, and add my commendation of work "well done."

James Forrestal
Secretary of the Navy