The "Ghost of Guam" and an American Guerrilla

by Stan Lopes

"The Ghost of Guam," U.S. Navy Chief Radioman George Ray Tweed, was assigned to Guam, an island in the Marianas, in August of 1939. Tweed had a great time there as KB6GJX working many hams on the West coast, Hawaii, and the Pacific Islands. While in Guam, he assembled a 20 meter phone "rig" using schematic information and parts, listed in the 1940 Amateur Radio Relay League (ARRL) Handbook, which he had shipped from San Francisco. The "rig" worked flawlessly when he went on the air in early 1941, but in June of that year censorship was started on the island and all amateur radio activity on Guam was stopped. When the Japanese attacked Guam on December 8, 1941, one of the first bombs was dropped on his house and practically demolished his ham shack. He narrowly escaped capture, but failed to take any equipment with him. Later he obtained a receiver, a Super Skyrider 16, and with the help of a native Chamorro then was able to provide a newspaper of sorts called *The Guam Eagle* with the war news, written in pencil at first and then on an old battered Underwood typewriter. Copies were read until they wore out. He stopped when it became too dangerous.

Tweed got close to building a transmitter, but again he was not able to establish communications with the military because a native took his parts for safe keeping and never returned. He evaded the enemy, until the island was retaken some 31 months later, by hiding in caves and in the jungle, just as several Japanese soldiers did after WWII ended - some for as long as 8 years or more. Tweed was promoted to Warrant Officer upon return to the States.

On the other hand, Lt. Iliff Richardson, USNR never was a ham. Prior to January of 1944, he was completely unfamiliar with the technical side of radio, as opposed to Tweed. His hobby was gas engines, motorcycles, and such things and he apparently knew them very well. He was Executive Officer on a PT boat that was sunk by the Japanese; how he got to Leyte Island is a long story that can be read about in the book *American Guerrilla in the Philippines,* by Ira Wolfert. For our tale, he appears as the chief of staff of the guerrilla forces on Leyte, an island 100 miles long and about 45 miles wide at the widest point. Their mission was harassing the Japanese, sometimes killing a few, and they did it well with very few casualties on their side.

In January of 1944, General MacArthur's headquarters got in touch with the guerrillas. Plans were already under way for the reconquest of the Philippines and they wanted to set up ship-watching posts and to build radio stations for reporting the movement of Japanese convoys.

There were just a few obstacles to overcome. Leyte was infested with the enemy – who wouldn't exactly approve of such a ship-reporting system– and the Japanese were well equipped with radio direction-finding equipment. Plus, there wasn't a radio transmitter available on the island and one couldn't be sent in. Most importantly, no one in the outfit had any real radio experience. There is an old military motto that says, "The difficult we do immediately; the impossible takes a little longer." This could have been the spark in Richardson's mind when he started on this assignment. His first step was to determine

what assets were available to them, if any, which could be used to offset the list of liabilities.

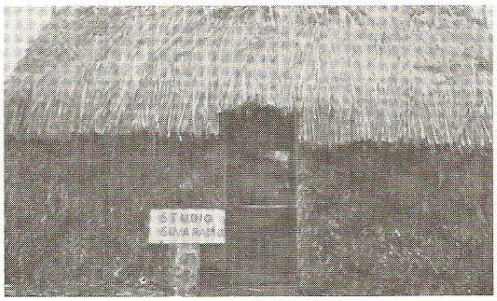
He had plenty of money, about the only item that could be sent in. The island had telephone exchanges, telegraph stations, and small power houses which contained equipment: some good, some wrecked, but all of which were a possible source of raw materials. Finally, he found a young Filipino, Joe Rifereal, who had been interested in radio and was able to read wiring diagrams. Somewhere they located an old UV-211 "50 watter" vacuum tube and an unmarked mica condenser. The big find was a copy of ARRL's 1932 *The Radio Amateur's Handbook*, which belonged to a fellow who had been a telegraph operator for the Philippine Bureau of Posts. It was dog-eared and moldy and had been sampled by white ants, plus the cover was long gone and someone had bound it together with wire – but the essential information was still there, all the practical knowledge that was necessary to build and operate a radio station. It became Lt. Richardson's Bible!

With available money, they started to buy as many radio sets as they could find. The first purchase included a RCA, Philco, two Airlines, and a Phillips receiver made in Holland. The Phillips and one of the Airline sets seemed to be in the best condition. They were used together as the receiver with one functioning as a Beat Frequency Oscillator (BFO) to permit CW reception with the other set. The other sets were dismantled for parts to make a transmitter. Another find was a Power Amplifier (PA) using a 200 watt transformer, and. when someone brought in the field coils from a damaged generator they had an almost inexhaustible supply of No. 28 copper wire.

Some of the details of that first "rig" are a bit hazy, but Richardson learned the *Handbook* and could quote it by line and page. The PA transformer was rewound with wire from the generator, insulating the layers of the windings with waxed paper that had been used as wrapping for dynamite. They wound six-layer RF chokes on glass tubes found in a drug store using No. 30 d.s.c. wire taken from a telegraph relay. Lacking coil dope, they used natural gutta percha obtained from trees on the island. The tank coils were wound from No. 6 telephone wire.

A socket for the 211 tube was unavailable, but American ingenuity solved the problem by cutting up old hard rubber storage-battery jars for insulation. The tube was wedged into a hole cut in the receiver chassis and spring contacts were fashioned from a brass nameplate from one of the telegraph relays. These proved to be too flexible, so broken hacksaw blades were used for the contacts. A 150 watt transformer from one of the larger receivers was rewound as a 12 volt filament supply.

Richardson's knowledge of gasoline engines came in handy providing a source of power for all of the equipment. Most of the electrical equipment on Leyte was designed for 220 volt AC operation and a large Fairbanks-Morse gasoline-driven generator for that voltage was located. The engine was beyond repair, but the generator was still good and was hooked up to a 2 horsepower single-cylinder engine salvaged from a farm. The makeshift power generator had two huge flywheels, firing only once in every half-dozen revolutions after getting up to speed. It was started on gasoline but after it was running, it worked well on coconut oil. The main drawback was the lack of a muffler; the exhaust noise from that big cylinder could be heard too far away for comfort. This was one problem not covered in the *Handbook*, but was solved by burying 30-odd feet of bamboo tubing underground at random angles and sending the exhaust through this "pipe."



Fiji's only broadcast station circa 1934

Red and green pilot lights from the PA were used to indicate when plate and filament voltages were on and a white lamp with a pickup loop of wire indicated transmitter output. The lamp burned out several times before they got it adjusted properly, but fortunately there were plenty of spare bulbs. The first time the rig went on the air the key had inadvertently been wired into the high-voltage lead and they had to operate it with a long plastic-handled screwdriver for a few days until the reason for the "fireworks" was discovered.

Regular antenna wire was not available, but there was plenty of No. 24 enameled wire from another old field coil and a hand drill was used to twist

together 17 strands of this wire. Zepp spreaders were cut out of hard-rubber battery cases and there were plenty of trees in the jungle to use as "sky hooks." The antenna was strung about 130 feet above ground and oriented for maximum signal strength in the direction of Australia.

If you had guessed that Lt. Richardson at least knew Morse code before he ever undertook such a job, it would be a bad guess. But on page 30 of the *Handbook* was the code, which had to be learned in-between dodging the enemy, building radio equipment, and conducting full-scale guerrilla warfare! When the first transmitter was finally in good running order, it operated with an input of 85 watts. The plate supply was 940 volts of raw AC from the rewound transformer and the note sounded like someone clearing their throat, but it did the trick.

All was not smooth sailing. The transformers were the main source of trouble; the waxed dynamite wrapping seemed to encourage condensation. Ordinary typewriter paper worked better between the windings and it wasn't long before all hands became expert at detecting burn-outs and rewinding in a hurry. They even invented a new "Q" signal to cover the situation: QAB (My transformer is smoking. Please stand by for an hour).

With the first rig on the air and working successfully, it was time to expand the organization. The search for more broadcast receivers, preferably with 6L6 or 6F6 output stages continued. A five-station network was eventually in operation with each capable of reaching Australia. Calls were often varied to fool the enemy eavesdroppers. The most popular transmitters were those using two 6L6's in push-pull circuits driven by two 6F6's. A four-tube push-pull parallel circuit was tried, but it wasn't practical. There were ultimately 60 personnel in the radio net, of whom 15 were former Bureau of Posts operators.

A few already knew the Continental code and those who didn't quickly learned it from the still indispensable *Handbook*. Quite in the amateur tradition, Lt. Richardson and his crew wanted to experiment and try something more promising. Adapting a portable police rig about the size of a walkie-talkie, sent to Leyte before the war and never used, they would try to borrow the crystal control system to stabilize the frequencies and tones they were using. Since the crystal frequency was too low, they turned to "that wonderful book" again and found a doubler circuit. After considerable difficulty, they finally got on the air with a T9 (best tone) crystal note. Their accomplishment was soon squelched, as their only 5Z3 tube shorted its elements within an hour and the smaller rectifiers available from the BC sets couldn't handle the load.

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Don't imagine that the equipment building, code learning, and station operating was done under ideal conditions of undisturbed peace and quiet. The Japanese were very active and they had excellent direction finders. Many other clandestine stations throughout the Philippines were found and captured, but the Leyte group under Lt. Richardson lost only one station – and even then all of his men escaped. He attributed his success to the fact that he changed station locations every two or three weeks thus avoiding the Japanese pinpointing them. Because of the strength of the guerrilla forces, the enemy could not suppress the American stations by sending out small patrols. After finding an exact location for a station, they had to organize a heavily armed expedition. By the time they were poised to strike, the Lt. and his crew would be elsewhere. Richardson returned safely to the U.S. ending his career as a "home brew" radio engineer in the Pacific. The Navy stated that his work on Leyte was quite valuable and the information he sent using his home-made transmitters was vital to the successful invasion of the Philippines, saving thousands of American lives.

Since the results of Naval radiomen were dependent on the 1932 edition of the Radio Amateur's Handbook, the ARRL, which compiles and publishes an updated version of the book annually, can take pride in the accomplishments of those American Navy and Filipino guerrillas. Many amateurs have used the publication to advance their hobby from learning the code to building their own equipment. Also many amateurs have contributed improvements to radio communications by designing new circuits, enhanced antennas, and better usage of the radio spectrum by reading and studying the *Handbook*. It is no surprise that some amateurs, as well as radio enthusiasts, are collecting complete sets of these books for their role in the history of radio.

It would be interesting to follow up on the lives of the men described above, especially Tweed and Richardson.

References: *QST Magazine,* March, 1945, "American Guerrillas in the Philippines," by Ira Wolfert