

PIONEER WIRELESS STATION

By HOWARD S. PYLE

Description of Marconi Wireless' "high-power" Alaska radio station KPB, a radio giant of the year 1913, by an Old Timer who was one of the station's operators.

ALASKA! In earlier days what a name to conjure with—the mere pronouncement of the word was rhythmic! If you closed your eyes and said "Alaska," a mental picture immediately associated it with long, bitterly cold winters with but an hour or two of daylight; short summers with an almost never-ending brightness where it was actually possible to read a newspaper at midnight without the aid of artificial illumination. Truly, the "Land of the Midnight Sun."

It was in a setting such as this that the *Marconi Wireless Telegraph Company of America* chose to locate one of its then "high-powered" stations in 1913 after having earlier acquired all of the assets of the then-defunct *United Wireless Telegraph Company*.

At that time the only existing telegraphic communication between the United States and the some 5000 people who inhabited this vast northern Territory was by means of an underwater cable which was installed, owned, operated, and maintained by the U.S. Army Signal Corps through their agency known as Washington-Alaska Military Cable and Telegraph System (WAMCATS). The cable had been laid with great difficulty several years before and ran from Seattle, Washington to its northern terminus at Skagway, Alaska—headquarters of the Yukon gold rush of 1898. Cable "drops" were provided at Ketchikan, Juneau, Fort Wm. H. Seward, and a number of intermediate points.

Maintenance of such cable through the treacherous waters under which it ran proved as difficult as its initial installation. It was necessary to keep an Army cable ship available on immediate call, to pick up the cable and repair the frequent breaks. The cable was the life-line of the Territory—food, supplies, steamship and fisheries, business communications, personal messages as well as mili-

tary traffic—all were dependent upon the WAMCATS cable. Let it be chronicled here that the Army accomplished a yeoman job in spite of the terrific handicaps and great cost of maintaining such communication.

The *Marconi Wireless Telegraph Company of America*, always alert to expand its rapidly growing system of world-wide communication wherever it appeared profitable to do so, saw opportunity here. Wireless required no cable, no wires, no interconnecting medium other than the ether which Nature supplied and maintained.

Alaska's population was rapidly increasing and the fisheries industry, with on-the-spot canning, was becoming "big business" calling for much communication between the various cannery superintendents in the far north and their home offices in Seattle, Portland, and San Francisco. Shipping interests as well, as the freight and tourist trade increased, were finding greater need for fast communication between the Territory and the world outside.

Antennas

Thus was KPB, the "high-power" station of *Marconi Wireless* born at Ketchikan, Alaska. Once the decision was made, it was not long before four graceful, self-supporting steel towers, each 300 feet high, were erected two miles north of the city of Ketchikan and on the shore of Revillagigedo Channel.

The towers were located at the four corners of a rectangle, 400 feet by 600 feet, with the long axis pointing directly toward Astoria, Oregon—some 600 air miles to the south. At Astoria, an identical station was being erected to provide the southern terminus of the link. Between the two northern and the two southern pair of towers, triatic stays were stretched to support a twenty-wire antenna. From the southern stays a "rat-

tail" lead-in, also of twenty wires, led down to the corrugated steel transmitter building for the high-power equipment—the building being centered on the long axis of an extension between the towers, some 300 feet south of the southern pair. Atop each of the four towers, a 15-foot wooden topmast supported a single wire encircling all four towers and leading down to the operating building. This served the dual purpose of receiving antenna, as well as transmitting antenna for the 5-kw. marine transmitter used to communicate with ships.

Equipment Used

One of the two rooms in the small operating building, some 75 feet north of the transmitter house, accommodated the 5-kw., 240-cycle non-synchronous rotary-spark marine transmitter. In the other room were operating controls for both the marine transmitter and the 25-kw. "high-power" transmitter in the corrugated steel building.

Receiving equipment was also located in the control room and consisted of standard *Marconi* receivers of the loose-coupled type, using crystal detectors. Two separate tuners, one with a range of from 100 to 4000 meters and the other 100 to 7000 meters, were used with long-wave loading coils permitting tuning up to 18,000 meters. For crystal-type receivers (De Forest's "Audion" had not been widely accepted by commercial interests at this time), the Ketchikan receivers were remarkably efficient. The *Marconi* station in Honolulu was easily readable in the daytime and Bolinas, Cal. could be copied on a typewriter.

Perhaps greatest historical interest, however, centers in the high-powered, long-wave transmitting equipment used to work with the southern terminus of the circuit at Astoria, Oregon. Rated at 25 kilowatts, this was of the synchronous rotary-spark-gap type. Power at 2300-

volt, 60-cycle a.c. was supplied to the station from the city of Ketchikan and ran underground into the building from a terminal pole 300 feet away. It was then distributed through a switchboard to the various heating, lighting, and power transformers.

In the steel-and-concrete transmitter building, which was about thirty feet square, were located the high- and low-tension switchboards, a rotary converter which furnished direct current for operating keying relays—the shaft of the converter also serving to drive the three-foot disc of the rotating spark gap. Remote-control oil switches and all power transformers, the solenoid relay key, and miscellaneous equipment were arranged around the inner walls of the building. The center of the room was occupied by a huge bank of earthenware tanks, thirty in all, in which alternate glass and metal plates were immersed in transformer oil. Each tank was about 10" x 18" and stood approximately four feet high. Interconnections were made on top of the bank by heavy copper strap, the whole comprising the high-voltage secondary capacitor.

The oscillation transformer was of the spiral-wound type using heavy copper ribbon and consisted of two such spirals hinged so that the coupling between them could be varied by swinging them closer together or farther apart. Each coil was about five feet in diameter.

A novel keying arrangement was used in that the 60,000-volt secondary circuit was broken by a solenoid-operated lever about three feet long fitted with contacts at each end with an air gap of several inches between them. A 15-pound blast of compressed air played continuously between the contacts while keying, serving to extinguish the heavy arc which followed each break. Action of this key was, of course, rather sluggish and, as it required two solenoids—one to "make" and one to "break" the contact—a similar double-action hand key was manipulated manually by the operator. Speed of transmission was necessarily slow and rarely exceeded 25 wpm, usually being closer to 20 wpm.

The station ground system consisted of some 3000 pounds of zinc plates buried around the steel transmitter building. Three strips, each four feet wide, ran down to the beach to low-tide level—one strip being routed for about 100 feet through the bed of a small creek.

This station proved very efficient both on the longer waves of 3000 to 4000 meters employed with the 25-kw. transmitter and on 300, 600, 1700, and 3000 meters used with the 5-kw. marine transmitter. The latter had a regular range of about 1200 miles while the 25-kw. installation could be easily read at all Alaskan points, including the Pribiloff Islands in the Bering Sea, southern Cali-

fornia, Honolulu, and on occasion, its signals were reported very readable in Japan.

The Navy Takes Over

At the outbreak of World War I, the U.S. Navy took over all commercial wireless telegraph stations, including the *Marconi* installations at Ketchikan and at Astoria, Oregon, staffing them with Naval operating personnel or, where expedient, accepting *Marconi* operators into Naval Reserve service.

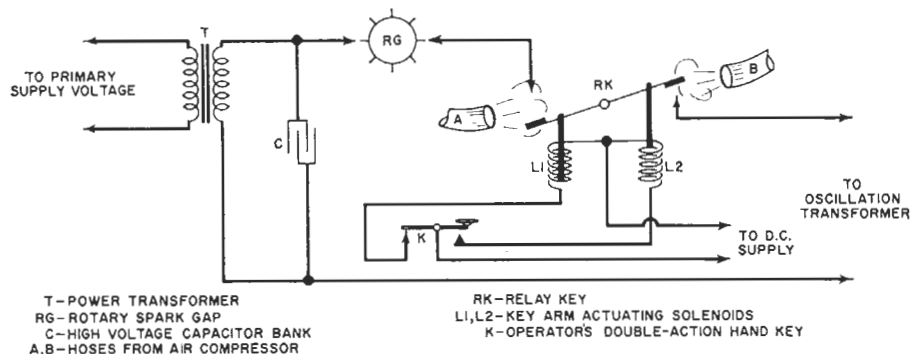
The Navy made a few improvements at each station. The 5-kw. marine transmitters were relocated from the operating building to the main transmitter building and the ground system was extended by laying a web mat of copper wire on the underbrush between the four towers. The *Marconi Company's* receiving equipment of the crystal type was replaced by the recently developed Navy SE-143 receivers with "Audion" detectors and two-stage audio amplifiers, which enormously increased the sensitivity and receiving range at both stations.

The duplex dwellings which the *Marconi Company* had erected to house their Chief Operators and their families, as well as providing similar accommodations for the senior assistant operators, were also taken over by the Navy and served to house the equivalent Naval operating personnel.

This writer, as a Chief Radio Electrician USN, was assigned to the Ketchikan station whose original KPB call letters had been changed to the Naval call, NVH, in 1919. After a two-year tour of duty at NVH, the author was transferred to NPC at Puget Sound Navy Yard (Washington) and not long thereafter the Navy turned the Ketchikan station over to the Alaska Communication Service of the Army (ACS), successor to the older Signal Corps WAMCATS. The ACS soon replaced the somewhat obsolete 25-kw. rotary-spark equipment with a 30-kw. *Federal* arc installation and made other major changes including, some time later, dismantling two of the 300-foot towers.

Operating under the Army call letters ALE, Ketchikan is still in service although many changes have taken place in the past few decades. Modern vacuum-tube equipment of both radiotelegraph and radiotelephone type has long since replaced the arc and marine spark type of transmitters and automatic transmission and reception has greatly increased the traffic capacity of the station to meet the demands of increasing population—both prior to and subsequent to Statehood.

The two graceful steel towers still remain—standing as a monument to one of the early pioneers in high-power, point-to-point wireless telegraphy. ▲



The novel keying method that was employed at the Ketchikan, Alaska radio station.

The famous Navy SE-143 receiver with audion detector box. This receiver replaced the *Marconi Co.* crystal receivers at Ketchikan when the Navy took over the station for the duration of World War I. A two-stage audio amplifier was used with the set.

