Early Radio Communications in the Twelfth Naval District San Francisco California

"NPG"

Bay Bridge & S.F. skyline

Picture by Les Funston

Early Radio Communications in the Twelfth Naval District, San Francisco, California

Collected, assembled and prepared for the OLD TIMER COMMUNICATORS

by George B. Todd, LT USN RET

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Robert L. Abbott, CRE USN RET	NPG 1924-1926
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Ernest P. Briggs, LT USN RET	NPW, NPG, NYW 1922-1924 and 1929-1931
Raymond B. Brightman, LCDR USN RET	NPI, NPK, NPW 1920-1921 and 1922-1924
Roy E. Brown, LT USN RET	NPG, NPW 1935-1937 and T.I. 1950-1952
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Donald L. Hyde, LCDR USN RET	OinC Dixon 1949-1952. OinC Jim Creek 1954-1957.
Chester C. Jolly, RMC USN RET	NPG 1919
Sue Lemmon	Historian, Mare Island Naval Shipyard
Robert E. Melling, RADM USN RET	DCO 12th Naval District, 1935-1937
Clarence W. Mulligan, former RM3	NPI, NLH, NPG 1920-1923
Harold B. Phelps, LT USN RET	NPG 1916-1917, 1919, 1936-1942 as civilian telegrapher, 1942 Asst. OinC.
George B. Todd, LT USN RET	NPG 1930-1932 and 1950-1952
John W. Trott, CDR USN RET	NPG 1929-1931. Historian and keeper of the archives, OLD TIMER COMMUNICATORS.
Lee H. Vernon, LCDR USN RET	OinC Mare Island 1951-1954.

(continued)

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Sanders H. LaMont, Executive Editor.

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San Francisco and Stockton. Compiled about 1960 or 1961.

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Naval Communication Station, San Francisco at Stockton, 1960.

History of the U. S. Naval Communication Station, San Francisco. Prepared
about 1965 by the Headquarters Component of NAVCOMMSTA.

History of the Mare Island Naval Radio Station, 9 February 1953. Author
unknown. Written on U. S. Naval Radio Station (T), Mare Island, Vallejo,
California, letterhead. Copy marked for "Mr. O'Hara."

Handwritten notes found in the "Radio Station" files at Mare Island. The author
is unidentified and the article is incomplete. Mr. E. D. Wichels, a Mare
Island employee from 1912 until his retirement as Administrative Assistant to
the Commandant, states that the notes could have been written by Mr. George K.
O'Hara, who was intimately associated with the early wireless history of Mare
Island.

"History" of the Electrical Shop, Mare Island Navy Yard, 7 July 1953. Written on
Mare Island Navy Yard letterhead. Author unknown. Probably George K. O'Hara
as he was the only member of the original shop crew still employed at the Yard.
The "history" lists the names of the shop crews, who built all of the early
Pacific Naval radio stations.

CONTENTS

The lists of personnel included in the appendix were obtained by the historian of the Old Timer Communicators (OTC), John W. Trott, from Christmas cards and other documents provided by members, and others. Some lists were compiled strictly from names recalled by shipmates. Others were provided with group photographs included in the appendix.

The historian has researched the names to include first names or initials, Bellevue, San Diego, WORES and Electronic Maintenance schools class numbers, the ranks at which the men retired and dates, their current status (living or deceased) and any other pertinent data that would be of interest to readers.

Members and others who happen to read this history can help to augment these lists by searching their scrapbooks and their memories for any records, including Christmas cards, of officers and men who served in communications at any Naval shore communication station or any Naval ship.

Readers are also invited to contribute (or loan) additional material for these histories including, but not limited to, personal recollections (sea stories), with dates, of their experiences in Naval communications. Of special interest are lists and photographs of personnel, photographs of early equipments, buildings, towers, antenna systems, etc. If possible, identification and dates of photo subjects should accompany each photo.

Please send such material either to the Old Timer Communicators historian, John W. Trott, 4512 Pescadero Avenue, San Diego, California, 92107, or to George B. Todd, 822 La Salina Place, Oceanside, California, 92054. Indicate which items are to be returned to you.

EARLY RADIO COMMUNICATIONS

At the turn of the twentieth century, when Guglielmo Marconi had demonstrated that wireless telegraphy was practical, the U. S. Navy realized that such a method of communication was ideal for contacting ships of the fleet underway at sea. Rapid, direct control from Washington of its sea forces would be possible.

The Navy then proceeded with installation on its ships and at its shore stations of the best radio communication equipment that it could procure. The initial equipments were very crude. Effective communication distances were relatively short so the shore stations had to be spaced along each of our continental coasts to provide for relay of messages from one station to another for the full length of each coast.

Taking steps to obtain the most desirable locations for shore radio stations, the Bureau of Equipment, in May 1902, recommended that the Secretary of the Treasury be asked to permit the Navy Department to erect a mast and small operating building at the following lighthouse stations: Cape Cod, Mass; Montauk Point, Long Island; Highlands of Navesink, N. J.; Cape Henry, Va; and Golden Gate (Bonita) California. These stations were to communicate, respectively, with the Boston Navy Yard, the Torpedo Station, Newport, R. I., New York Navy Yard, Norfolk Navy Yard and Mare Island Navy Yard and the Yerba Buena Training Station. These stations would also be used to communicate with naval vessels fitted with radio equipment.

This request was approved by the Secretary of the Treasury in a letter of 4 June 1902 with the following reservations: That the masts and other appliances be established and maintained at the light stations without cost to the Treasury Department and erected at such points on the light station sites as the Lighthouse Establishment designated; that Navy personnel connected with the erection and maintenance of the wireless installations at light stations not interfere with employees at the light stations and that they be subordinate to and under the supervision of the Principal Lightkeeper at each station; that the masts and wireless equipment be removed from the light stations by the Navy Department whenever requested by the Treasury Department in the interest of the Lighthouse Establishment.

The Bureau had begun the planning for establishment of stations at Mare Island and on Yerba Buena Island, in San Francisco Bay, and negotiations for a site at Point Bonita, on the military reservation at the entrance of that bay. After correspondence lasting over a year, it had abandoned the idea of the latter site because the Army was insistent upon establishing a station there. The Bureau then considered the possibility of erecting a station on South Farallon Island off the entrance to San Francisco Bay. This idea was also abandoned because the Department of Agriculture had erected a station there and it was considered undesirable for another one to be established near it. As a result, the Navy Department, which was most dependent upon radio, was placed in a position of dependence upon stations operated by men not under its control for the transmission of messages between its ships at sea when beyond the range of the station on Yerba Buena Island.

Faced with the increasing indignation of the public created by the quarrels among the commercial radio firms and the lack of coordination between the several Government departments, President Roosevelt's cabinet, at its meeting of 19 April 1904, reached an agreement on the desirability of the Government establishing general supervisory control over the operation of radio during peace and absolute control in time of war.

The Secretary of Agriculture then forwarded a memorandum to the President via the Secretary of War, expressing his views as to the capabilities of his department

to operate the Government radio stations along the coasts. In forwarding this, the Secretary of War advocated a joint Army-Navy record keeping in peacetime with the Navy Department assuming full control in wartime.

President Theodore Roosevelt, in the meantime, had forwarded a copy of the Secretary of Agriculture's memorandum to the Secretary of the Navy for comment by the General Board. After considerable deliberation by its members, Admiral George Dewey, President of the General Board, forwarded the opinion and recommendations of his associates:

"The following facts must, in the opinion of the General Board, form the basis of the decision:

The principal defect of wireless telegraphy, the liability to interference, renders some central control indispensable to the integrity and effectiveness of any wireless telegraphy station. Without control over the placing of other stations, any wireless telegraphy station may be rendered absolutely useless either by design or accident.

The control of all wireless telegraph stations belonging to the Government can be accomplished by Executive Order. In order to control private stations, general legislation by the Congress will be required, both because wireless telegraphy bridges the boundaries between States and because it stretches beyond the territorial limits of the Nation.

The principal use of wireless telegraph is now, and long will be, at sea, between ship and ship, or ship and shore. On shore other means of communication always exist, often better, always possible substitutes. The common telegraph or telephone, or the heliograph, permanent or portable, is everywhere available to the soldier or meteorologist. Permanent outlying stations can be connected by submarine cables. Although wireless telegraphy may be an added convenience, on shore it can never be indispensable. But from ships at sea, out of sight of flags or lights, and beyond the sound of guns, the electric wave, projected through space, invisible and inaudible, can alone convey the distant message.

In the present state of the science, development and experiment must be carried on largely at sea. We know as yet little of the limitations or possibilities of marine and transmarine communication. The Navy is the only department of the Government that has the facilities for this branch of work, and irrespective of what is done by other departments, the Navy must, in its own interest, continue to experiment and to communicate between its ships and the shore.

To the Navy wireless telegraphy is absolutely essential. All the battleships and larger cruisers, perhaps even torpedo boats, are or will be equipped with it - as foreign navies are - to communicate with each other, as well as to the shore.

The Navy has already 20 wireless telegraph stations on the seacoast and proposes to establish no less than 60 more. The Navy has already made arrangements to receive at its stations and to transmit over the land telegraph lines, wireless messages from passing merchant vessels. The Army has two stations in use in Alaska, and two others for experimenting, and has considered placing one at the Golden Gate on the Pacific Coast. The Weather Bureau has two stations and proposes to erect seven more. All these stations, except the two in Alaska, which are for communicating with each other, are for the purpose of communicating between ships at sea, or in a few cases outlying islands and the mainland. Several of the Army and Weather Bureau stations interfere, or will interfere with those of the Navy.

From these facts it appears clear that it would be in the interest of all to put the seacoast wireless telegraph stations belonging to the Government under the control of one department. That control must extend to the determination of sites, and probably to the choice of systems, in order to prevent the several departments from frustrating one another's efforts. It does not seem to the General Board that there will be much difference of opinion on this question.

It remains to consider which department can best exercise control. For the reasons given - that the Navy has preponderant interest in wireless telegraphy, that to the Navy it is indispensable, to other departments merely accessory; that the Navy alone has facilities for experimenting with seacoast stations, and whatever other departments do, the Navy must continue to experiment; that the Navy already has five times as many seacoast stations as all other departments of the Government together - for all these reasons, the General Board is of the opinion that the Navy should exercise such control over the placing of all Government seacoast wireless telegraph stations as to prevent their mutual interference. It is better and simpler for the department that has the predominating interest, even if it does not actually operate all the Government stations, to control their positions, rather than to attempt to exercise control by mutual agreements.

But if more than one department is to operate wireless telegraph stations on the seacoast, duplication and interference are inevitable. The two existing wireless telegraph stations of the Weather Bureau and the one proposed by the Army prevented the Navy from establishing its own station in the best place to communicate between ships at sea and the principal navy yard on the Pacific Coast. Several of the new stations proposed by the Weather Bureau are on sites already occupied by the Navy, or within range of their interference, and all the rest would clash with stations projected by the Navy. A promontory best for the Weather Bureau is likely to be best for the Navy. For the purpose of receiving wireless telegrams from the ships at sea, the same seacoast station serves the need of all concerned. Obviously then, it is more economical that the department that controls the placing of all Government seacoast stations should operate them all.

It would, in the opinion of the General Board, be far easier for the Navy to transmit the messages of the Weather Bureau than vice versa. The seacoast wireless stations of the Weather Bureau are now but a 10th, and with the new stations planned will still be less than half as many as the Navy has already. Granting that the Weather Bureau would be willing, as the Secretary of Agriculture says, to establish the greater number of additional seacoast stations needed by the Navy, there are still two important reasons why the Navy cannot depend, either in peace or war, upon stations controlled by the Weather Bureau:

It is absolutely necessary in time of war that the observers stationed to receive messages from the fleet should be subject to military law - that is enlisted men of the Navy. Civilian marine observers, however skillful in reporting merchant ships, could not so well be trusted to distinguish the wireless messages of friendly from hostile men-of-war, or to transmit accurately technical naval signals, and could not be trusted at all with the secret signal codes of the Navy. Whoever mans the seacoast in time of peace, the Navy must man them in time of war.

Unless the Navy mans the stations in time of peace it will not have the trained force ready to man them in time of war. Practice with instruments on shipboard alone will not suffice. The man to be trusted at a seacoast station in time of war, alert to detect the unexpected, must be familiar with the usual local business in time of peace. The opportunity for training the signalmen is no less important than testing the apparatus.

The single instance cited by the Secretary of Agriculture of the weather observer at Jupiter Inlet reporting what he saw and having the good fortune to be the first to see the arrival of the OREGON is far from proving that the Navy can trust to anyone but its own trained men to receive wireless signals from ships at sea. From every point of view, therefore, it appears to the General Board that the seacoast wireless telegraph stations of the Government are essential to the Navy and to no other department; and the General Board therefore concurs in the recommendation of the Chief of the Bureau of Equipment that an Executive Order be issued placing them all under naval control to be manned and operated by the Navy.

The subject of legislation to control private wireless telegraph stations on the seacoast is of growing importance to the Government because of the increase in the number of them and their liability to interfere, maliciously or accidentally, with the Government's stations. In order to safeguard its own interest, both in peace and war, the Government must have some means to prevent the erection of a private wireless telegraph station within the range of interference of one of its own. It would not be wise, in the opinion of the General Board, for the Government to undertake to manage all the seacoast wireless telegraph business of the country, nor for an industry of such growing commercial utility to be controlled directly by a military branch of the Government. The Department of Commerce and Labor, now charged with the administration of the Lighthouse Service, the Coast Survey, the inspection of steamboats, and the jurisdiction over merchant shipping generally, would perhaps be the most natural ones to control private wireless telegraph companies. The law should clearly give the Government priority of right and prohibit the erection of any private station without the approval of the Government."

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Acting on a recommendation of his Navy Secretary, the President, on 24 June 1904 appointed members of a board to consider the entire question of radio in the service of the national Government. The report of the Inter-Departmental Board of Wireless Telegraphy was submitted to the President on 12 July 1904. Its recommendations constitute the first well-defined radio policy of the United States Government.

In brief these are:

(a) The Navy be designated to provide efficient coastwise radio communications for the United States Government and, when not in competition with commercial stations, to receive and transmit all radio messages to and from ships at sea.

(b) The Army be authorized to erect such stations as deemed necessary provided they do not interfere with the coastwise radio system of the Government under the control of the Navy Department.

(c) Legislation to prevent the control of radio telegraphy by monopolies or trusts should place supervision in the Department of Commerce and Labor.

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On 29 July 1904 President Roosevelt approved the recommendations of the Board and directed that such recommendations as concerned the Executive Branch of the United States Government be effected immediately.

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With this clear directive, the Navy proceeded at full speed with the planning, site selection and erection of the coastwise system of radio stations and with the installations on naval ships. 20 shore radio stations had already been commissioned. Following the spring 1903 purchase of 20 Slaby-Arco equipments, action had been initiated to obtain final decision as to the shore stations to be established. In order to insure the availability of sufficient apparatus, it was suggested that the apparatus that had been used during comparative tests to choose the best equipments be modified and used at the less important stations such as the Norfolk Navy Yard and the San Francisco Training Station and Annapolis where their shorter range would not be a material disadvantage.

In June 1903, the Boston, New York, Norfolk, Mare Island, and Puget Sound Navy Yards were provided guidance to assist them in fitting radio equipment in naval vessels. With the envisioned establishment of quite a few stations and the consequent requirement for operators, plans were made for setting up school units at Newport, New York and Mare Island for the instruction of personnel in operation and maintenance.

Lieutenant G. C. Sweet, USN, was detailed by the Bureau of Equipment to assist in the installations of three equipments, one at Mare Island, one at Yerba Buena Island and a third on the USS SOLACE.

The U. S. Naval Radio Station at Mare Island was the first naval radio station on the West Coast. This station, commonly referred to as the "Hill Station" was commissioned 27 April 1904. Authority for the establishment was contained in a Bureau of Equipment letter, Serial 72241 dated March 16, 1903. The original site was located on a hill southward of the shipyard proper. An Abandoned pigeon cote was moved to the site and fitted up as an operating and transmitting room. R. B. Bradford was Chief of the Bureau of Equipment, Rear Admiral M. Miller, Commandant Navy Yard Mare Island and Commander C. B. T. Moore Equipment Officer at the time construction started. In addition to the pigeon cote, one ship type mast, 130 feet high, was erected.

The first equipment consisted of a Slaby-Arco open-gap spark transmitter together with a Slaby-Arco coherer and decoherer for receiving, which had been purchased from the German General Electric Company and shipped to the Mare Island Navy Yard for installation. The first call sign used was "MI" which was probably self-assigned as the first officially assigned call sign was "TG."

The Yerba Buena station (Goat Island) was commissioned May 5, 1904. The first official call sign was "TI." (Was this a prediction that an island would be created alongside Goat Island in the 1930s by the dredging for the Bay Bridge support piers that would be named "Treasure Island?).

The first message was transmitted by the Mare Island station to Yerba Buena, approximately 20 air miles distant, by Mr. R. B. Stuart, Electrician First Class. The message was received by a Mr. Carroll, not further identified.

On 21 May 1904 the first communication with a ship at sea (USS SOLACE) was held. The following is quoted from LT Sweet's report of those tests:

"Contrary to my expectations, I am pleased to state that at no time did we lose communication with Mare Island until we were well outside the heads and within about three miles of the Farallon Islands, then through an accident to our receiver, we lost communication with Mare Island. Communication with Yerba Buena was then established and was continued until we were well out to sea. I am very much pleased with the results with both Mare Island and Yerba Buena, as I did not expect, with the intervening hills, to carry communication as far as we did."

A second ship type mast was erected at Mare Island on 15 April 1905 and the height of both masts increased to 150 feet. After the erection of the second mast, the original cage type antenna was replaced with a flat top. As first installed, the station power supply was as follows: the yard power supply, 60 cycle 110 volts, was used to drive a suitable motor belted to a 110 volt DC generator which furnished power to the step-up transformer. This primary power was interrupted by a Slaby-Arco mercury interrupter. During the year 1905, the 110 volt 60 cycle current from the yard power supply was successfully connected to the primary of the step-up transformer, thus eliminating the motor, generator and mercury interrupter.

On 20 December 1905 reports show that communications with the USS LAWTON at a distance of 200 miles was had. The Mare Island station used a DeForest electrolytic responder and a Slaby-Arco tuning coil.

The original station was continually improved by the installation of new apparatus and the erection of new masts and buildings.

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No history of early radio communications in the Twelfth Naval District would be complete without an account of the contributions made by the Mare Island Navy Yard. This yard was the "granddaddy" of all Navy Yards in the Pacific. Established in 1854, the yard has experienced "the evolution from canvas to coal to fuel oil to atomic power; and from copper-bottomed wooden ships to iron, steel, aluminum and plastics. The island has seen carrier pigeons give way to wireless; hand leads replaced by sonar; spy glasses replaced by radar." During its long life, Mare Island "has built 513 craft, from a wooden paddle-wheel steamer to nuclear-powered ballistic missile submarines."

"By 1915 Mare Island had built all of the radio stations which spanned the Pacific Coast from Point Loma at San Diego to the Pribilof Islands in the Bering Sea. The guiding genius in this was George Hanscom, whose grandfather came to Mare Island in 1853. In 1918-1920 the Mare Island team installed the duplicate 1000 KW arc transmitters at the Lafayette Station in Bordeaux, France, and turned the station over to the French Government. Next the team went to Siberia to build the first station erected in Vladivostok for the American Expeditionary Force. The rigger supervisor for all these stations was Mare Island's Joseph Ryall. Others who helped introduce "wireless telegraphy" to the Navy were George K. O'Hara, Bob Stuart and Lieutenant Commander George C. Sweet."

Among the radio stations built by the Mare Island crew were: Mare Island, 27 April 1904; Yerba Buena, 5 May 1904; Farallon Island, 8 December 1904; Point Arguello, 6 February 1906; Point Loma, 12 May 1906; Table Bluff, near Eureka, 23 October 1906; followed by Cape Blanco, North Head and Tatoosh.

During the early 1920s the Mare Island team also built the chain of direction finder stations at Point Montara, Point Reyes and Point St. George, California; Fort Stevens and Klipsan Beach, Oregon; New Dungeness, Cattle Point, Smith Island and Destruction Island, Washington. They also added direction finder buildings and equipment to existing stations at Point Arguello and Farallon Island, California and at Tatoosh, Washington.

The Army Signal Corps was early assigned the responsibility for interior telephone and telegraph facilities in Alaska and the Aleutians. Radio communication between these areas and continental United States was, by the Rooseveltedict of 1904 and in the absence of commercial facilities, the responsibility of the Navy. Commercial and Government business necessitated the establishment of radio stations to provide rapid communication between those areas and Seattle, Washington. In the spring of 1911,

material for three stations was embarked in the USS BUFFALO with a construction force from the Mare Island Navy Yard. Temporary stations were set up at Kodiak, Dutch Harbor and St. Paul. The station at Kodiak was totally destroyed by fire when struck by lightning on 8 June 1912. Another expedition departed Mare Island on 20 May 1912 under command of Lieutenant E. H. Dodd, USN, assisted by Expert Radio Aid George E. Hanscom, to make permanent installations. Under most trying and difficult weather conditions, with winds of gale strength and torrential rains, this expedition, which was to be away from Mare Island for a period of 6 months and 3 days, erected and established stations at Unalga, St. George, Kodiak and Cordova and refitted the stations at St. Paul and Dutch Harbor. The Cordova station was established with the receiving and control station at Eyak on Mile 7 of the Copper River and Northwestern Railroad and the transmitter station at Mile 14. The latter was named Hanscom in honor of the Mare Island Expert Radio Aid. All of these stations were equipped with the latest quenched gap spark transmitters and could maintain communications with stations on the Pacific Coast at night utilizing frequencies between 165 and 300 Khz. It is of interest to note that those frequencies were considerably lower than those used by other coastal and insular chains.

in 1912

Mr. E. D. Wichels came to Mare Island/and served as Secretary in the Commandant's office. He later became Administrative Assistant to the Commandant of the Mare Island Navy Yard and served in that capacity from 1934 until he retired in 1963. During the planning stages for the annual Alaskan expeditions, he served as additional typist. His principal job was to type the voluminous inventories and purchase requisitions for the items to be loaded on board the three ships (USS BUFFALO, SATURN and NERO). He states:

"One of the puzzling items (boondoggling?) was the expensive camera which was purchased each year in order that the progress photographs could be taken at each station. Those were the days when wireless people were a law unto themselves, because how could any other naval engineer understand this new-fangled operation? They never submitted a request for funds - - they simply submitted bills and someone paid them. Eventually they joined the team. Then we had another group beyond the pale, the "flyboys." They too simply submitted bills, because how could anyone ever understand their budgets? Eventually they too joined the team. Then came the electronic people, whose God was Sperry Rand. Between sonar and radar, etc., we had another group of untouchables, but they also became part of the team. The latest "specialty" group were the nuclear people, also a country unto themselves." E. D. Wichels, 12 February 1979.

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Early radio installations utilized the spark transmitter, which derived its energy from the discharge of a capacitor (Leyden jars) across a fixed gap. The capacitor was charged by an induction coil operated on direct current through an interrupter (vibrator, mercury or electrolytic) or by a transformer powered by alternating current. Antennas were made as large and high as ship masts and superstructure permitted. The wavelength of the transmitter was largely controlled by the characteristics of the antenna. Only rudimentary tuning was incorporated in the circuits. Due to the spark method of generation, the radio frequency energy was spread over a very wide frequency band, resulting in serious mutual interference between stations. By 1906, coupled circuits were extensively utilized, with the primary and secondary circuits separately tuned. This innovation provided some improvement in limiting the spread of the energy in the radio frequency spectrum. Subsequently, the spread was further reduced through "quenching" of the spark. The fixed enclosed quenched gap, the rotary quenched gap and the "timed spark" were introduced to accomplish this reduction. The standard wavelength for spark transmitters from Navy ships and shore stations was first set at 320 meters (938 Khz). Later this was changed to 600 to 1000 meters (300 to 500 Khz) for ships. Shore stations were assigned wavelengths up to 2700 meters (111 Khz).

In comparative long distance test, a 100 Kw spark transmitter installed at Arlington, Virginia, in 1912, proved inferior to a 35 Kw "arc" transmitter developed by the Federal Telegraph Company and installed at the same station. This event, together with the subsequent availability of the vacuum tube transmitters, resulted in the decline in procurement of spark transmitters, which ceased altogether after World War I. The spark technique basically was not capable of improvement to meet the Navy's recognized requirements for interference-free communications. However, it had served well in providing a simple, readily available means of generating radio frequency energy to facilitate the early utilization of a new and important communication capability.

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When the Navy was designated to be the Department to provide coastal communication and to receive and transmit all messages to and from ships at sea, when not in competition with commercial stations, it had to assume the responsibility for providing essential services to other Government departments.

On 30 November 1904, the Navy directed all naval shore stations to promptly transmit all weather reports and storm warnings provided by the Weather Bureau. Additionally they were directed to transmit hurricane warnings as soon as information was received. All U.S. naval vessels fitted with radio were directed to transmit meteorological observations, addressed to the Weather Bureau, at least once daily or oftener when storm conditions existed.

In 1906 the masters of approximately 50 ships agreed to provide the Weather Bureau with radio messages containing weather observations once daily. The increasing number of the Navy's radio installations enabled the Weather Bureau to obtain information from constantly widening sources thereby increasing the reliability of the reports.

Another important aid to maritime security was instituted by the Navy on 7 August 1907 when an item was included in the Notices to Mariners stating that the radio warnings of obstructions dangerous to navigation would be broadcast three times daily by naval radio stations.

With exact time being of the utmost importance in celestial navigation, the Navy realized at the very beginning of the establishment of the shore radio stations the desirability of providing a scheduled broadcast of exact Naval Observatory time. In September 1903 experiments were commenced with the short range, low powered radio transmission of time signals from the station at the Highlands of Navesink, N. J.

During 1904, the stations at Cape Cod, Mass., and Norfolk, Va., were directed to transmit time signals and during the next year, Portsmouth, N. H., Key West, Fla., and Mare Island, Calif., were added to the list.

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On the evening of 17 April 1906 the USS CHICAGO departed San Francisco. Early the next day that city was in the center of the most disastrous earthquake this nation has ever suffered. The damage from it and the fires that followed destroyed much of this western metropolis. Upon learning of the disaster, the rear admiral on the CHICAGO directed her return to port to render all possible assistance. Among other aids, she provided the only rapid means of communication from the stricken area. The Navy radio stations played a major role in providing the means of remaining in touch with the outside world. As soon as it was realized that this was the city's sole rapid contact with the outside, they were flooded with messages from military and municipal authorities and the general public. In about two weeks the CHICAGO sent and received over 1,000 messages. The naval radio station on Yerba Buena was fully occupied acting as relay between the CHICAGO and Mare Island which provided telegraphic connection with

The rest of the country. The radio station on Farallon Island provided the means for directing the shipping headed to the stricken port.

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In 1911, the Bureau of Steam Engineering issued the first U.S. Navy radio frequency plan. In accordance with international usage, 600 meters, designated "F" was assigned as the wave length for calling ships and shore stations. 1000 meters, designated "J," was provided shore stations as a calling wavelength. The portion of the radio spectrum from 300 to 8000 meters was divided into 26 channels designated "A" through "Z." Channels "A" through "E," separated by 50 meters, were assigned ships fitted with "short wave" apparatus and "G" through "I", separated by 100 meters, to ships fitted with "long wave" apparatus. Channels "K" through "P", spaced 100 meters apart, "Q" through "V," spaced 400 meters apart, and "W" through "Z" beginning at 5000 meters, were authorized for the use of both ships and stations in the transmission of messages.

Legislation regulating radio communications, effective 13 December 1912, required that certain naval shore stations be opened to commercial traffic and that charges be made for handling this traffic with the monies derived to be turned in to the U.S. Treasury. In view of the increased workload and responsibilities, the Secretary of the Navy directed the establishment of the Office of the Superintendent of the Naval Radio Service under the Bureau of Navigation. The shore stations were divided by geographical consideration into three areas, Atlantic, Pacific and Philippines. Each of the shore stations was placed under an area superintendent who reported directly to the Assistant Superintendent, Naval Radio Service. Military command of the shore stations was under the Commandant of the several naval stations.

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In 1912, the Naval Radio Station at Mare Island received and installed one of the new 5 Kw, quenched gap spark transmitters to replace the original Slaby-Arco open gap transmitter. The quenched spark gap, which energized the antenna circuit one or two impulses and then electrically opened the antenna circuit allowing the antenna to continue to oscillate at its own frequency, materially reduced the spread of radio frequency and thus reduced the interference to other stations operating in the vicinity.

The station was also continually improved by installation of newer and more efficient receiving apparatus. The original Slaby-Arco coherer-decoherer receiver had been replaced first by an electrolytic detector type and then an IP-76, crystal detector receiver. The IP-76 receiver was a simple two-circuit receiver with so-called untuned secondaries (secondary coils of fine, closely wound wire whose natural period could be approximated to that of the incoming signal by selection of turns). Those early crystal detectors were soon improved by the addition of a fine metal point maintained in light contact with the crystal. The fine metal point was called a "cat whisker."

The station later received apparatus containing an "audion," a three element vacuum tube which had been invented by Dr, Lee De Forest. The audion unit could be connected to the binding posts of the non-vacuum tube detector units. In later units the detecting and amplifying units were packaged together in one unit such as the type A, B and C receivers and still later the SE 143 and SE 1420.

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At the beginning of World War I in Europe in 1914, the maximum range of all but a few radio stations was a few hundred miles. Reliable long distance communication was still in the future. This made it necessary to continue the maintenance of naval radio stations a few hundred miles apart along our coasts to relay messages to their final destinations. The radio stations at Arlington and Mare Island were interconnected by landline telegraph, for relay of traffic from the Navy Department to ships and stations on the West Coast. Congress had authorized and appropriated funds for six high powered stations for long distance transoceanic communications but several years would elapse before they would be available.

In June of 1915, the Bureau of Steam Engineering established a group of Expert Radio Aids at the Navy Yards to provide the design and rigid specifications for future procurements of radio equipment. Each Navy Yard was assigned responsibility for improvement of certain components for which the assigned aid was the qualified expert. The Navy Yard at Mare Island was assigned the following components: transformers, quenched gaps and motor generators, under Expert Radio Aid George Hanscom.

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In 1915, 30 Kw arc transmitters were installed at Mare Island, San Diego (Point Loma) and Puget Sound (Keyport). With these higher powered transmitters, direct, 24 hour communication was then possible between Mare Island and the other two stations and it was no longer necessary to relay messages through intermediate stations. However, arc "mush" and other interference from the arc transmission made reception impossible in the immediate vicinity without shutting down the arc. Duplex operation was only possible by locating the transmitter and the receiver several miles apart.

The new naval district system was scheduled to become effective shortly. The headquarters of the Commandant of the Twelfth Naval District would be centered in the San Francisco area. A decision was made to establish the Yerba Buena Station as the control station and Mare Island as the transmitter station for the communication complex. At that time the Mare Island station was changed from a transmitting/receiving station to a transmitting station only, with control (keying) of the transmitters accomplished by the Yerba Buena Station (NPG). Mare Island relinquished the radio call sign NPH, and the transmitters carried the call sign of the Yerba Buena Station. (The call sign NPH was later assigned to the Russian Island, Siberia (Vladivostok) station for the American Expeditionary Forces in 1919, and later in 1924 to the Naval Radio Station at Hilo, Hawaii, after the Vladivostok station was dismantled.)

That year, 1915, is considered the beginning of the Naval Communication Station as it is known today. Established atop Yerba Buena Island in the middle of San Francisco Bay, it held forth on the island jointly with the Naval Training Station for the Pacific Coast and a leper detention camp for lepers awaiting transportation to the colony in the Hawaiian Islands.

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The superior qualities of undamped, continuous waves, particularly with respect to mutual circuit interference, were recognized quite early, but difficulties in generation, frequency stability, control and reception had to be overcome before they were acceptable. The "arc" method of generating continuous waves through the use of a resonant circuit containing a direct current arc between carbon-copper electrodes in a magnetic field and a hydrogen atmosphere had been introduced by Valdemar Poulsen in 1903. Based on the 1912 comparative tests between the 100 Kw spark and the 35 Kw arc transmitters at Arlington, the Navy ordered ten 30 Kw arc transmitters for shore station and shipboard use and one 100 Kw arc for installation at Darien in the Canal Zone, and subsequently developed its high power chain of radio stations, utilizing

arc transmitters of higher power installed at San Diego, Pearl Harbor and Cavite, and later at Annapolis.

The arc transmitter, due to its output of undamped waves, produced much less interference than the spark transmitter, however, reception aboard the same ship during arc transmissions, even with large frequency separation, was impractical due to interference from arc "mush" and the proximity of equipments, even with key open. This interference could be avoided in shore installations by adequate physical separation of receiving and transmitting facilities.

The arc transmitter reached its peak at the 1000 Kw level as developed by the Federal Telegraph Company under Navy sponsorship and installed by a Mare Island team for the Lafayette Radio Station near Bordeaux, France. This station was turned over to France in 1920.

By this time the vacuum tube transmitter proved capable of greater effectiveness than the arc. Vacuum tube circuits were capable of amplification and modulation with greater flexibility and precision, a capability not possessed by the arc. By 1922, the problem of producing a vacuum tight seal between copper and glass had been solved, making the use of water cooled metal anode tubes feasible. High radio frequency power to match that of the arc could then be produced. The arc was thereafter displaced by the vacuum tube transmitter. Its demise was accelerated during the 1920s through the advent of extensive national interest in radio broadcasting and the reaction of the public to annoyance by the "arc mush" interference.

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On 28 July 1916, Navy General Order No. 226 established the Naval Communication Service, under a Director of Naval Communication in the Office of the Chief of Naval Operations, and abolished the Naval Radio Service under the Chief of the Bureau of Navigation. Initially there were five assistants with these titles: Assistant Director of Naval Communications with additional duty as Atlantic Coast Superintendent; Pacific Coast Communication Superintendent; Philippines Communication Superintendent; Assistant for Commercial Traffic; and Communication Officer, Navy Department.

Outside the Navy Department, the Naval Communication Service was organized following the recently established naval district system. All stations in a district transmitted their traffic to the district center station which relayed it through the various district center stations to its ultimate destination.

The Pacific Coast Division was divided into the 12th Naval District, consisting of the San Diego and San Francisco Districts (The 11th Naval District was not established until 1921); the 13th Naval District consisting of the Puget Sound and Cordova District (Alaskan Stations); and the 14th Naval District, consisting of the Pearl Harbor District, including Tutuila, Samoa. Guam was included in the Philippines Division, however it was under the command of the 14th Naval District Commandant and radiomen personnel were assigned by the Pacific Coast Communication Superintendent.

The Director of Naval Communications was charged with assignment to duty of all enlisted personnel of the communication service in accordance with instructions issued by the Bureau of Navigation.

The San Francisco District consisted of the stations at Yerba Buena Island (District Center), Mare Island, Farallon Island, Eureka, Marshfield and a station at Monterey which had been authorized but was never built.

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With war clouds on the horizon, a new and bigger radio station was built on top of Yerba Buena Island in 1916 in anticipation of the possible need for spaces for additional circuits and personnel. There were four operating booths, a wireroom and offices for the Communication Chief, the Chief Operator, the District Communication Officer and the Pacific Coast Communication Superintendent.

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By Executive Order, issued on April 6, 1917, the day war was declared, the Navy Department was directed to take over such radio stations within the jurisdiction of the United States as might be required by the Naval Communication Service. The order further directed the closing of all such radio stations not necessary to the Government. Amateurs were directed to cease operations and to dismantle their transmitters.

The President's signature to the resolution declaring war (WWI) was the signal to place into effect previously prepared war plans. The mobilization of naval communications had commenced sometime earlier with the voluntary acceptance of active duty by hundreds of reserves. With the country at war, the remainder of the Communication Reserve was immediately called to active duty. They were augmented by the almost immediate enrollment of hundreds of commercial and amateur operators who had not previously joined but who now saw it as a patriotic duty. The closing of the commercial stations made additional hundreds of operators available for duty. The immediate requirements for trained operators were well met by these people. However, as war progressed, more and more ships were built and commissioned, creating a constantly increasing demand for qualified radio operators and other communication personnel.

Radio schools were established in each naval district to provide preliminary training in radiotelegraphy, and to eliminate those who lacked the essential aptitude. To provide advanced training, two schools were established, one on each coast. Following the close of the college year, 1917, Harvard University offered buildings for classrooms, laboratories and dormitories. This offer was gratefully accepted, the school was established and grew rapidly into an institution of mammoth size. A similar, but smaller one was established at Mare Island, California. By the end of 1917, almost 5,000 students were attending the four month intensive radio operating and indoctrination courses and were being graduated into service at a rate in excess of 100 a week. By early 1918 this was increased fourfold.

A comprehensive system of landlines connecting local activities with naval district headquarters and connecting the latter with the Navy Department was leased, to make available more frequencies for mobile and transatlantic use and to reduce interference with those uses.

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In 1917, the offices of the Commandant, Twelfth Naval District were located in the Sheldon Building in San Francisco. A communication office was located there with a government leased telegraph line to the Communication Office, Naval Training Station, the District Center Radio Station on Yerba Buena Island and to the Hobart Building.

There was also a direct private telephone line, passing through no exchange, from the Commandant's office to the offices of the Commandant of the Naval Training Station and of the Pacific Coast Communication Superintendent at the San Francisco Naval Radio Station. Communication facilities were available from the 12th Naval District to all Army posts, radio stations, district and stations Commandants and Communication Superintendents on the Pacific Coast.

At the start of World War I, the San Francisco District was comprised of these stations:

U. S. Naval Radio Receiving and Control Station, San Francisco: (NFG):

Located at the Naval Training Station, Yerba Buena Island, San Francisco, California. Equipped with one 1/4 Kw, 500 cycle quenched gap spark transmitter for communication with Mare Island and the Farallon Island stations, and ships in the harbor, in case of failure of distant control lines or other emergency. The station had four receiving antennas and one transmitting antenna.

U. S. Naval Radio Transmitting Station, Mare Island, California:

Equipped with one 30 Kw arc transmitter adjusted for these wavelengths: 4000 (calling), 4800 (working), 6000, 8100 and 12000 meters; and one 5 Kw, 500 cycle quenched gap spark transmitter, adjusted for: 600 (commercial), 952 (calling) and 2400 (working) meters. Both transmitters were operated by remote control from the Yerba Buena station. Separate antennas were installed for the arc and spark transmitters. Receiving apparatus was also installed at the Mare Island station.

There were four private landline circuits between Yerba Buena and Mare Island; three telegraph circuits for arc control, spark control and message circuit; and one telephone circuit used as an order circuit for operation of apparatus and adjustment of wavelengths, etc. That circuit was bridged into the offices of the Pacific Coast Communication Superintendent at Yerba Buena and the Radio Officer at Mare Island.

The arc set at Mare Island was used for communication with San Diego, Lents, Oregon, Puget Sound, Cordova and Great Lakes, Illinois. Traffic with Puget Sound, Cordova and Great Lakes was by schedule only. Traffic with San Diego was on a continuous call basis.

The spark transmitter at Mare Island was used to communicate with Farallon Island, Eureka, Marshfield, Oregon (night only), North Head (night only) and with ships equipped with spark sets.

Time signals were transmitted simultaneously daily at noon and 10 PM, 120th meridian time, on both arc and spark transmitters on 4800 and 2400 meters. This was accomplished by the Mare Island station switching control of both transmitters direct on the Western Union wire which was connected to the Naval Observatory at Mare Island.

The station broadcast local weather conditions, storm warnings and hydrographic information in accordance with Radio Regulations.

U. S. Naval Radio Station, Farallon Island (NPI):

Located on one of the Farallon Islands about 30 miles west of the entrance to San Francisco Bay. Equipped with one 2 Kw, 500 cycle quenched gap spark transmitter, adjusted for 300, 600, 756, 952 (calling) and 1200 (working) meters. The station communicated with San Francisco, Point Arguello, Eureka (night only) and ships. The chief purpose of the station was to collect weather data and to transmit same to shipping. The station also exchanged weather information with Eureka, San Francisco and Point Arguello.

U. S. Naval Radio Station, Eureka (NPW):

Located at Table Bluff near Eureka, California. Equipped with one 5 Kw, 500 cycle quenched gap spark transmitter, adjusted for 600, 952 (calling), 1512, 1905, 2000 (working) and 2400 meters.

The station communicated with San Francisco, Farallon (night only), Marshfield, North Head, Tatoosh (night only) and ships. The station handled commercial traffic. It's chief purpose was to handle ship traffic and furnish weather reports to shipping.

U. S. Naval Radio Station, Marshfield (NPF):

Located at Marshfield, Oregon. Equipped with one 5 Kw, 500 cycle quenched gap spark transmitter adjusted for 600, 756, 952 (calling) 1200 and 1512 (working) meters. The station communicates with North Head, Eureka, Tatoosh (night only), San Francisco (night only) and ships.

The Marshfield station was in the 13th Naval District but in the San Francisco Communication District as it can be controlled better from San Francisco, and was constructed by and is maintained by the Mare Island Navy Yard.

The Marshfield station was commissioned on July 12, 1917, taking the place of the former station at Cape Blanco, which was abandoned. The station handles commercial traffic. It's chief purpose is to handle ship traffic and furnish weather reports to shipping.

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These commercial stations were taken over by the Navy:

U. S. Naval Radio Station, Bolinas-Marshall (KET):

Located in Marin County north of the entrance to San Francisco Bay. Equipped with a high power spark transmitter. (300 Kw).

The stations were taken over by the Navy on April 6, 1917, and were subsequently operated by the Naval Communication Service. The Pacific Coast Communication Superintendent had these comments regarding the stations:

"The Bolinas station is the most prolific source of interference on the Pacific Coast, from San Diego to Puget Sound between 4000 and 8000 meters and is at a maximum in the vicinity of San Francisco. The Bolinas station should be closed as soon as efficient and satisfactory means are available for handling the commercial traffic now handled by Bolinas. The establishment of the San Diego - Pearl Harbor circuit may offer this solution.

The installation of an arc transmitter or other apparatus using undamped waves at Bolinas, would, it is believed, permit the operation of the station with minimum interference, and at the same time prove equally efficient in handling commercial trans-pacific traffic. A set of less power would be required. Communication could be effected with Pearl Harbor.

The retention of the present spark installation is advisable for military purposes in case its use would be required in time of war to create interference with the signals of enemy ships or stations. If required, the Bolinas station can be operated by distant control from the San Francisco naval radio station."

The station was closed to commercial traffic February 25, 1918, and the Bolinas station was returned to the former owners. The buildings of the Marshall station were retained for use as a radio operator training school, under the direction of the Pacific Coast Communication Superintendent.

U. S. Naval Radio Station, Hobart Building-South San Francisco (KSS):
(formerly operated as a Federal Telegraph Company station)

Receiving and control station located in the Hobart Building in San Francisco. Transmitting station located at South San Francisco. Equipped with one 30 Kw and one 40 Kw arc transmitters, operated by remote control from the Hobart Building, adjusted for 6000,,8500, 10100 and 10600 meters. Until about 3PM the 10600 meter wave is used. During the afternoon, after 3PM, the 10100 meters is used. After 7 or 8PM the 8500 meter wave is used. The 6000 meter wave is used as the last resort.

Transpacific commercial traffic is handled between this station and the Heeia Point station in Hawaii.

The Hobart Building station is on a government line, leased from the Pacific Telephone and Telegraph Company, connecting with the Western Union main office, the Beach (San Francisco) radio station and the Federal Telegraph Company office. It is also on the government line connecting with the Commandant's office, the Western Union Main office, the Yerba Buena radio station and the Communication Office, Naval Training Station. The latter line is used only to communicate with the Yerba Buena radio station.

The Pacific Coast Communication Superintendent has these comments: "This station was taken over by the Navy on April 7, 1917, and has since been operated by the Naval Communication Service. Its purchase and retention by the Navy is recommended, not only to avoid the possibilities of interference with other stations in this division but to increase the effective means of communication. In case of a failure of the Mare Island arc set, the South San Francisco station could be used in its place and could be operated by distant control from the San Francisco Naval Radio Station. It would also be available for government transpacific traffic in case of temporary failure at the San Diego end of the San Diego - Pearl Harbor circuit."

The Hobart Building control station was closed on February 25, 1918, and returned to the former owners. The control of the South San Francisco station was transferred to the Yerba Buena radio station.

The South San Francisco station was acquired by the Government by purchase and all properties were transferred to the Government as of 15 May 1918.

U. S. Naval Radio Station, Beach (San Francisco) (KFS):
(formerly operated as a Federal Telegraph Company station)

Located on the ocean beach at Great Highway and Norega Street and 48th Avenue in San Francisco. Equipped with one 12 Kw arc transmitter adjusted for 3000, 3350, 3500, 4000 and 4500 meters. The working wave was 3500 meters. The station was formerly utilized by the Federal Telegraph Company for point to point traffic with Lents and Inglewood, and with ships equipped with arc sets. The Navy utilized the station for handling commercial traffic with ships.

The station was taken over by the Navy on April 7, 1917. Control of the transmitter was transferred to the Yerba Buena Naval Radio Station 25 February 1918. The station was acquired by the Government by purchase and all properties were transferred to the Government 15 May 1918.

U. S. Naval Radio Station, Hillcrest (KPH):
(formerly operated as a Marconi Company marine station)

Located in Daly City, California. Equipped with one 5 Kw, 500 cycle quenched gap spark transmitter. The working wave was 600 meters. The set was also adjusted to 300 meters.

This station was taken over by the Navy on April 9, 1917 and operated for handling ship-shore commercial traffic. It was an important station and handled a considerable amount of traffic. The control of the transmitter was transferred to the Yerba Buena station in 1918.

This station was acquired by the Government by purchase and all properties were transferred to the Government as of 15 May 1918.

(The station was originally located in the Palace Hotel in downtown San Francisco where it got its first call sign: "PH.")

(An article in the Spring-1977 issue of the Society of Wireless Pioneers' "SPARKS JOURNAL" by Raymond B. Walling states: "The Navy had taken over KPH, then located at Hillcrest in the Daly City area, during the early days of WWI and the call sign was changed to NWO. RCA expected to regain ownership and operation of the station at that location on termination of WWI but the Navy chose to retain it." I have been unable to locate any confirmation of the use of the call sign NWO).

Marconi Radio Station, Eureka (KRM):

Located at Eureka, California. Equipped with a 2 Kw, 60 cycle, nonsynchronous rotary gap spark transmitter with working wave of 600 meters and adjusted for 300 and 530 meters.

This station was closed by the Navy on April 16, 1917. The traffic previously handled by the station was then handled by the Eureka Naval Radio Station.

Marconi Radio Station, Marshfield (KPX):

Located at Marshfield, Oregon. Equipped with a 2 Kw, 60 cycle nonsynchronous rotary gap spark transmitter adjusted for 300 and 600 (working) meters.

This station was closed by the Navy on April 12, 1917. Traffic previously handled by the station was then handled by the Cape Blanco naval radio station, and when that station was discontinued on July 12, 1917, by the Marshfield naval radio station.

These commercial stations were also closed at the beginning of the war:

Big Creek, Calif.	No call sign	Burnett and Kepf	1 Kw
Hollister, Calif.	KGH	P. W. Hewlett (Hewlett-Packard?)	5,Kw
Oakland, Calif.	KGI	E. W. Stone (Ellery W. Stone?)	1 Kw

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Early in 1917, at the beginning of the U. S. entry into World War I, Dr. A. Hoyt Taylor left his position as head of the physics department of the University of North Dakota and became District Communication Superintendent for the Great Lakes District with headquarters at the U. S. Naval Training Station, Great Lakes, Illinois. The Navy had to use shore station sites separated by a considerable distance for the functions of radio transmission and reception to reduce interference and to allow simultaneous operation. Naval Radio Station NAJ, located on the Training Station site, served as a relay point for messages between Washington, D. C., and the West Coast, since direct transmission was not satisfactory. Simultaneous transmission and reception at the site was not possible due to the high-power arc transmitter interference. Circuits were devised by Dr. Hoyt's laboratory using long wire and loop antennas which "balanced out" the transmitter interference, including arc mush, thus for the first time permitting simultaneous transmission and reception on a single site. A doubling of communication traffic resulted (August 1917).

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After the commercial stations in the San Francisco district were acquired by the Navy, for all purposes of operation and organization, the Yerba Buena, Mare Island, South San Francisco, Beach and Hillcrest stations were known collectively as the San Francisco Naval Radio Station. The San Francisco station was both the main station of the Pacific Division and the district center station of the San Francisco Communication District.

All transmitters at Mare Island, South San Francisco, Beach and Hillcrest were operated by remote control from the Yerba Buena station. With the increase in the number of circuits manned, the number of receiving antennas at Yerba Buena were increased to seven. Yerba Buena handled both commercial and Government traffic over the circuit to Hawaii.

For some unknown reason, the NPM and the shipshore circuits were moved from the Yerba Buena station over to the Postal Telegraph Building in San Francisco on February 25, 1919, for the purpose of handling commercial traffic with the Hawaiian Islands and the Orient. Distant control of the South San Francisco transmitters was established in the Postal Building. At the same time distant control of the transmitters at the Beach and Hillcrest stations was also moved to the Postal Building for communication with commercial ships. (This move was possibly made to eliminate the relay of commercial messages from the Yerba Buena station to the Postal Telegraph Company for further transmission to their destinations).

On September 5, 1919, the Postal Telegraph Building was closed and the control of all three stations was moved back to the Yerba Buena Station, where all Government and commercial traffic was subsequently handled.

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The President, on 11 July 1919, approved the return of the commercial radio stations to their owners on 1 March 1920. Since the Government owned most of the coastal stations, (they were purchased after the end of the war but before the signing of the peace treaty), legislation was required to permit the use of these stations for commercial purposes at locations where proper facilities were not provided or until such time as they could be provided by private interests. Pursuant to the request of the Secretary of the Navy, dated 19 July 1919, Congress, by Public Resolution approved 5 June 1920, authorized the use of naval radio stations for a period of two years for the transmission and reception of private commercial messages at locations which lacked adequate commercial facilities. This was extended until 30 June 1925 by another Public Resolution approved 14 April 1922. Still further extension until 30

June 1927 was granted by Public Resolution approved 28 February 1925. Prior to the expiration of the last extension, the authority was made permanent by the enactment of Public Law 632, an act for the regulation of radio communications and for other purposes, approved 23 February 1927.

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The purchase of the Marconi ship, coastal and Alaskan stations and of the Federal Telegraph Company, left only a few long-distance stations remaining in the ownership of two companies: the Marconi Company of America and the Tropical Radio Company. The return of the leased stations was delayed until the Radio Corporation of America could be formed. Therefor, until 1 March 1920, when the leased stations were returned to the Tropical Radio Company and the Radio Corporation of America, the latter of which had come into possession of the American Marconi interests, the Navy continued to conduct all of the commercial radio business of the United States in addition to providing radio services for itself and other Government departments.

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In 1919 the Pacific Fleet was established with headquarters in San Diego. Many additional ships were based in the Pacific. There was a need for a high powered transmitter to be used for broadcasting messages to ships of the Fleet at sea. The only transmitter on the Pacific Coast that would serve this need was the 200 Kw arc transmitter at San Diego. That transmitter was being used for point to point traffic with Washington, D.C., and Pearl Harbor, Hawaii.

A decision was made to upgrade the facilities in the San Francisco Communication District Center to enable that station to assume the circuit with Pearl Harbor, thus relieving the San Diego transmitter of that duty and freeing it to establish an intercept circuit with Pearl Harbor that could be copied by ships at sea.

During the year 1919, the Bureau of Engineering awarded a contract for two 450' self supporting steel towers to be erected in the vicinity of San Francisco (the exact location not being determined when contract for towers was let). The original intention was to effectively handle all radio traffic for the Pacific Fleet and Transpacific stations from the San Francisco Communication unit.

The three transmitting stations in San Francisco named Hillcrest, Beach and South San Francisco were under consideration with the South San Francisco station as the most probable site. A conference was held in the office of the Pacific Coast Communication Superintendent on 30 August 1919 and as a result it was recommended to the Bureau that the 30 Kw and 40 Kw arc transmitters at South San Francisco and the two 450' towers be installed on reclaimed land at Mare Island. After an exchange of correspondence authorizing the entire San Francisco transmitting situation, the Bureau of Engineering authorized the establishment of a new station at Mare Island in BUENG letter 46860-842-W of 15 November 1919.

Plans were prepared and work undertaken immediately. The original station included three 450' steel towers, a brick power house, and a brick operating building. A 100 Kw arc transmitter, formerly installed at Tuckerton, New Jersey, was moved to the yard for installation; the 40 Kw arc was transferred from South San Francisco, and the new station, referred to as "High Power," was commissioned on 1 January 1921. On the date of commissioning, the 40 Kw ex-SSF arc was the only transmitter in commission. The Tuckerton 100 Kw arc was commissioned later the same year.

When commercial ship-shore stations resumed operation in 1920, Yerba Buena phased out the operation of the Beach and Hillcrest stations.

The first signaling system of the arc transmitter at HIPOWER was the compensating system where a shift in wave length was utilized. An Elan Key was later installed on the 40 Kw arc, and in 1922 a duplicate 100 Kw arc, complete with CT filter unit was purchased and installed. A second CT filter unit was manufactured for the Ex-Tuckerton 100 Kw arc. In the latter part of 1922, after considerable correspondence and planning tests, it was decided to consolidate all transmitters at the HIPOWER station and abandon the old Hill station.

On 13 March 1923, the Radio Material Officer reported to the Commandant that all equipment had been removed from the Hill Station and re-installed at HIPOWER. Two additional 450' towers and one 200' tower were erected at this time and the equipment of the HIPOWER station consisted of two 100 Kw, one 40 Kw and one 12 Kw arc transmitters and one 5 Kw spark transmitter. (The 12 Kw arc transmitter had been moved from the Beach station to Mare Island when the Beach station was abandoned. The 30 Kw arc transmitter originally installed at Mare Island was moved to the Eureka station. It is not known what disposition was made of the 30 Kw arc transmitter originally installed at South San Francisco). Each transmitter had a separate antenna and all could be used simultaneously.

The transmitters at Mare Island at first caused considerable interference to commercial radio companies. About the time radio broadcasting became popular, the Navy became very unpopular for the intense arc mush interference the arc transmitters were causing in Bay Area home receivers. Much effort and thousands of dollars were spent to eliminate the interference. The spark transmitter and the 12 Kw arc were replaced by a 500 watt and 6 Kw ACW tube transmitters, respectively. Twelfth Naval District personnel developed a low pass filter circuit which, when used with suitable shielding, was found to be very effective in reducing the interference on broadcast frequencies to a value where there were no further complaints. This circuit was successfully used by other Navy stations as well as some commercial installations. The arcs were later replaced by 50 kilowatt modern vacuum tube transmitters.

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Following WWI, the naval shore radio system continued to handle radio communications for other Government departments. No charges were made for this service and, in the interest of economy, no accounting was made. It was estimated that this service saved the government approximately $1 million per annum during the period 1919-1925.

During 1920 the commercial companies established stations at principal U. S. ports to provide ship-shore radio communication facilities. There were numerous locations where the anticipated revenues were not sufficient to interest them and the Navy continued to provide the required facilities as well as those for isolated localities which required point to point radio communications in a volume insufficient to warrant commercial interest. In 1924 the commercial companies commenced the use of higher frequencies which allowed coverage of larger ocean areas by their coastal stations, and from that time there was a gradual diminution of the assistance needed from naval radio stations.

Plans were made, following WWI, to modernize naval communications. Stopgap measures included modifying many of the old spark transmitters by replacing the spark with an alternating current vacuum tube. Other measures included the substitution of the spark in low powered sets with a motor-buzzer and the modification of the CW 936 radiotelephony transceivers to provide for low power CW communications; the improvement of the arc transmitters to eliminate mush and harmonics, and the installation of acceptor-rejector systems to eliminate interference between different radio channels and to make possible dual reception on a single antenna.

In 1918, the SE 1440 receiver became available. It was especially designed by the Washington Navy Yard for use with direction finders and integrally contained three stages of audio frequency amplification. It was fitted with a "compass" receiver switch that permitted instant connection to the compass coil or to an ordinary antenna. Together with a 515A coil system and an SE 1762 compensating condenser, it became the Model DA shore direction finder.

During 1918, the Navy began the installation of a chain of permanent direction finder stations along the Atlantic Coast, part of which became operational at the end of WW I, giving assistance to Navy and troop ships returning from overseas. The direction finders were arranged in groups comprising a "master" and two "slave" stations Bearings were plotted at the master to provide position fixes. These were transmitted to ships through the use of an associated radio transmitting station remotely controlled from the master station. A frequency of 375 kHz was assigned as a standard for direction finder operations. By 1923 a total of 46 direction finder stations were installed along the Atlantic, Gulf and Pacific coasts, and were providing position information to over 5000 ships a month. Operational ranges for bearings out to 100 miles were normally obtained. This Navy shore direction finder system became indispensable to the Navy and the shipping of the world. The system continued to provide navigational information to shipping until early in World War II, when other navigational systems became available.

The initial Model DA direction finder equipment was followed by improved models: DK (1930), DM (1931), DP (1934-1942), DAF (1942) DAH (1942-1944) and DAP (1942).

Construction of the West Coast direction finder stations commenced in 1920. They included Point Montara (NLH), Point Reyes (NLG) and Point St. George (NYW) in the Twelfth Naval District. The latter station was established in 1925. Direction finder buildings and equipment were also added at existing radio stations at Eureka (NPW) and Farallon Island (NPI).

The typical direction finder building was usually constructed on a beach or a bluff overlooking the beach. The operating room was shielded with copper screen. Even the doors and windows were screened and, when closed, provided complete shielding for the entire room. An 8 to 12 foot loop antenna was supported by a pole which extended down to the operating position. The loop was rotated by a wheel, with azimuth markings of 360 degrees from true north, attached to the pole. A good null signal was usually obtainable after adjustment of the compensating condenser.

The transmitter, located in another building, was keyed by remote control. The control line to the transmitter and the telephone circuits were also shielded to avoid any interference from outside the building.

A ship was periodically assigned to steam back and forth within sight of the station to calibrate the direction finder. Charts were prepared to provide correction to observed bearings before they were transmitted to requesting ships. The only group stations in the Twelfth Naval District were at the entrance to San Francisco Bay: Point Montara, Farallon Island and Point Reyes. They did not operate on the "master" and "slave" basis but instead each station transmitted their bearings to the ship which could then plot his own position.

All Navy direction finder stations were transferred to the Coast Guard shortly after the start of World War II.

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During WWI, San Francisco (Yerba Buena) had a circuit with Honolulu (Koko Head) using the former Federal Telegraph Company transmitters at South San Francisco and Heeia Point. That circuit was used primarily for handling press and commercial traffic. Some Government traffic, originated locally, was transmitted over that circuit but Government traffic originating in Washington was routed to Honolulu over the San Diego Pearl Harbor circuit.

While the new HIPOWER buildings and towers were being constructed and the South San Francisco 40 Kw and the Tuckerton 100 Kw arc transmitters were being installed at Mare Island, The San Francisco-Honolulu circuit probably used the remaining 30 Kw arc transmitter at South San Francisco for that circuit.

A new Receiving/Control station was being constructed at Wailupe in Hawaii while the new HIPOWER station was being built at Mare Island. Both were completed at about the same time. A 24 hour point to point circuit was then established between San Francisco and Honolulu which, from that time forward, handled all of the transpacific message traffic. The San Diego 200 Kw arc transmitter was released to inaugurate an INTERCEPT circuit with Honolulu for broadcast of messages to the fleet.

A circuit had previously been established from Washington to the Canal Zone and thence to San Diego and on to Pearl Harbor. In 1918, a 500 Kw arc transmitter was installed at Annapolis, Maryland (NSS), which was controlled by the Washington station. A direct circuit was established between Washington and San Diego eliminating the relay via the Canal Zone. When San Francisco took over the transpacific circuit to Honolulu, San Diego forwarded all transpacific message traffic to San Francisco for further transmission.

After the second 100 Kw arc transmitter was installed at Mare Island in 1922, a circuit was established between San Francisco and Washington on a schedule basis. Washington could not receive the Mare Island transmissions direct but had to rely on their Bar Harbor, Maine, receiving station. Some traffic was handled on this circuit but mostly westbound.

In May 1923, the Yerba Buena Control Station was moved to the Appraisers Building in San Francisco. At the same time, a new receiver station was established at South San Francisco where signals received from Washington and Honolulu were piped into the control station in the Appraisers Building over lines leased from the Pacific Telephone Company. Signals from San Diego, Puget Sound, the direction finder stations and ships were received directly on receivers installed in the Appraisers Building. By then, Washington was receiving the Mare Island transmissions direct, without the use of their Bar Harbor station, but traffic was still mostly westbound. The bulk of Washington traffic was still being handled through the San Diego station.

The Naval Training Station on Yerba Buena Island was moved to San Diego at about the same time that NPG control moved to the Appraisers Building. The offices of the Commandant, Twelfth Naval District, were located in the Customs House Building, adjacent to the Appraisers Building. The Receiving Ship remained on Yerba Buena Island but had moved from the USS BOSTON to the buildings on the main grinder area.

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Then came the "discovery" of high frequency communications. Isolated cases of very long distance communications using very small power gave rise to many false hopes that it might become the usual thing. It was soon realized that considerable power would be required to obtain thoroughly dependable results. However, the many advantages of high frequency communications were soon appreciated.

The first HF experiments were conducted at the HIPOWER station in 1925 with a 500 watt set. The transmitter was located in the main operating room and results were not satisfactory due, it was thought, to the proximity of many high powered transmitters and associated antennas.

The first successful HF transmitter was constructed and installed in the old HILL station and all HF transmission was successfully carried on from that station until June 1927. In the meantime four additional, home-made transmitters had been constructed and installed there. All HF transmitters were moved to HIPOWER in 1927.

During the next ten years, the HIPOWER station continued to expand with the addition of low and high frequency tube transmitters to such an extent that equipment housing facilities and antenna space were becoming entirely inadequate. To meet those expanding requirements, a third station was planned, designed and constructed on reclaimed land in the northwest corner of the shipyard proper.

The third transmitting station, commonly referred to as "HIFREQ," was housed in a modern reinforced concrete building located in the center of the reclaimed area. This building, 505, provided adequate space for all of the existing transmitters, at the time of commissioning, as well as shop and office space required to maintain and administer the station. A large number of new high frequency transmitters together with all of the high frequency transmitters from HIPOWER were installed in this new building and the station was commissioned on 15 April 1940.

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High frequency communication between San Francisco and Washington probably began soon after the construction of the first successful HF transmitter at the Hill station on Mare Island in late 1925. We do know that the Washington-San Diego circuit was still in effect until about December 1925, as Louis Gebhard in his book "Evolution of Naval Radio-Electronics and Contributions of the Naval Research Laboratory," states: "Navy Radio Communication Control, Navy Department, Washington, used the 10 Kw HF transmitter located at the Laboratory through remote control for a period of a year beginning December 1924. This station handled official Navy communication traffic with Panama, Canal Zone, London and San Diego, California, particularly at times when the low-frequency, 500 Kw arc transmitter at the Navy's radio station, Annapolis, Maryland, could not be received due to heavy atmospherics."

As soon as reliable, high frequency communications had been established between San Francisco and Washington and San Francisco and Honolulu, the San Francisco station assumed responsibility for the transcontinental circuit with Washington and thereby relieved San Diego from that task. At the same time the move eliminated one more relay of traffic between Washington and ships and stations in the Pacific. The San Francisco station became the focal point of all transcontinental and transpacific traffic.

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In 1925 the Commandant moved his headquarters and his radio station, NPG, from the Customs House - Appraisers Buildings to the newly constructed Marine Corps warehouse building in the industrial section of San Francisco, south of Market Street. This building, at 100 Harrison Street, was next door to the Hills Brothers coffee roasting plant and adjacent to the Embarcadero. The streets in that vicinity were paved with cobble stones and laced with the tracks of the State Belt Railroad which shuttled box cars among the numerous piers to be loaded and unloaded with the goods of ocean commerce.

The Navy occupied the entire top floor of the building. The Communication activities utilized the northern portion of that floor. There were offices for the Pacific Communication Officer (his title had been changed from Pacific Coast Communication Superintendent) and the District Communication Officer.

Signals from Washington and Honolulu were piped into NPG from the receiver station at South San Francisco. Receivers, and antennas on the roof, were installed in the building for the San Diego, Puget Sound, Direction Finder Stations and the ship-shore circuits. Operating positions for duplex operation of the Washington and Honolulu circuits and for the other circuits were located around a large room with desks for the traffic chief, supervisor and local delivery clerk. Adjacent to that room was the wire room where telegraph circuits, to Western Union, Postal Telegraph and communication offices in the district, were manned by civilian operators.

High speed, twentyfour hour communication between San Francisco and Washington began at about this time. The shift from arc transmitters to the relatively noise-free signals from high frequency transmitters made this possible. The natural fading of high frequency signals prevented high speed tape recording of transmissions so the Kleinschmidt-Boehme equipments were used primarily for pre-punching traffic for later transmission at high speeds which could be copied manually.

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Rapid strides were made in improving the radio installations at the shore stations during 1927 and 1928. Many new low and intermediate frequency tube transmitters of both low and high power were developed. The Naval Research Laboratory developed several low power high frequency transmitters. These required crystal control of the basic frequency and frequency doubling and tripling for the harmonics. This limited the number of frequencies available, depending on the number of crystals provided. The old arc and spark transmitters were becoming museum pieces. Models RE, RF and RG receivers were still standard equipment because of their ruggedness and simplicity, although rapid advances in the art of receiver design and construction had been made by the commercial companies in the endeavor to dominate the enormous demand for home receivers for broadcast purpose.

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The first diversity radio receiving facilities were installed at Mare Island in the early 1930's, using the same site on the "Hill" that housed the original Mare Island station. As far as the Navy is concerned, this station pioneered diversity reception. Probably the first rhombic antenna and certainly the first multi-wire rhombic receiving antennas used in the Naval Communication Service were installed at this station.

The diversity receiving equipment provided a more constant, "fade-proof" signal for high speed operations. Signals were piped into the control station at 100 Harrison Street in San Francisco.

With installation of high frequency transmitters at the HIPOWER station, about a mile away, the Mare Island Diversity Receiving site on the Hill became untenable due to the problem of "key clicks." This was overcome with the development of a diversity mixer unit incorporating a new circuit which proved effective in eliminating interference of the impulse type.

The Mare Island stations are believed to be the first to rebroadcast time signals and the first to make practical use of the rebroadcasting of traffic by acting as an automatic relay station between Radio Washington and Radio Honolulu.

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In 1935, NPG was again moved, along with the Commandant's headquarters, to the newly constructed Federal Office Building in the Civic Center, San Francisco, where it remained for the next twentyfive years. From 1935 until the start of World War II, NPG consisted of the Radio Control Station in the Federal Office Building; the Radio Transmitting Station at Mare Island; the Time and Diversity Receiving Station at Mare Island; the Radio Monitor and Receiving Station at South San Francisco; several Direction Finder stations were included in the district communication activities.

NPG control occupied a few rooms on the third floor of the building, where operating positions were located along a conveyor belt which carried messages between the operators and the supervisor and traffic chief. High speed Kleinschmidt and Boehme tape equipments were used on the primary circuits to Washington and Honolulu. A few receivers were installed for the San Diego-Puget Sound circuit, the DF stations and the ship-shore circuits. The telegraph circuits to Western Union, Postal Telegraph and district communication offices were also moved to the building. An emergency power engine and generator was installed in the basement.

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With the increase of communication circuits and the requirement for a better, noise-free location, the Radio Receiving site at Skaggs Island was developed and construction started in 1938. Naval Radio Station (R), Skaggs Island, on the northern edge of San Francisco Bay, became a component part of NPG in 1942 as replacement for the old South San Francisco receiving station. All of Mare Island's radio receiving functions were also shifted to the new station in 1942. Initial use of the 3300 acre site was to provide receiving facilities for point to point, ship shore, local harbor, and inter and intra-district nets as the occasion demanded.

The station is situated on reclaimed land obtained by Declaration of Taking on 18 February 1941. As a matter of interest, Tubbs Island had been chosen as the new receiving site in lieu of Skaggs. This choice "leaked" out and almost overnight, the value of Tubbs Island property rose to unreasonable heights, making the choice of another site mandatory.

In 1944, supplementary and specialized communications (Security Group) were begun at Skaggs, under the direction of the Chief of Naval Operations. This service was expanded by completion of a new terminal building for conduct of this group's operations. The Security Group became part of the U. S. Naval Communication Service about 1952.

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World War II produced a phenomenal growth in naval communications, removing the wraps from prewar budgetary restrictions, spurring research and development, expanding personnel and operational boundaries, and revealing as never before the "paramount" importance of this lifeline to a nation's existence.

The tremendous growth occasioned by World War II focused attention on the inadequacies of NAVCOMMSTA SFRAN to support the fleet as it was then composed. Capacity and flexibility were sorely lacking because of the rapid transition from a peace-time situation to a full blown war. Thus, in 1942, NAVCOMMSTA SFRAN saw its most significant and lasting growth.

Like everything else, the physical expansion of Communications was commensurate with the overall growth which characterized other Naval activities. From a few rooms on the third deck of the Federal Office Building, the department expanded to include one half of the third deck, a third of the sixth deck, and a portion of the basement. In addition to this, there was a great deal of moving and shifting in the communication center itself to provide efficiency and adequacy of space. For efficiency, terminal communications must be located in the proximity of the Commandant and his staff. Because a radio station consists of an elaborate installation of radio material, it should be of a permanent nature and cannot be moved conveniently or with ease from one room to another, or for that matter, from one building to another.

Radio San Francisco (NPG) is commonly recognized as the Commandant's radio station. NPG's function was to provide communications for the Naval commands in the San Francisco Bay area and was also a primary relay station between the continental United States and overseas stations.

Control installations at NPG consisted, in 1939, of one switchboard, a control and distribution panel for connecting control lines to equipments, seven transmitter control lines to Mare Island Transmitter Station by underground, aerial and submarine; and six receiving tone lines. Three of those tone lines, one each underground, aerial and submarine, connected to the Radio Diversity Receiving Station at Mare Island; the other three (two underground and one aerial) connected to the Monitor and Receiving Station at South San Francisco.

Terminal equipment consisted of four sets of automatic receiving and recording equipments including amplifiers, recorders, tape guides, tape pullers, tape reels and rheostats. There were four sets of automatic transmitting equipments with perforators, transmitting heads, head drives and automatic time stamping clocks. There was one telegraph order line to the transmitter and receiving stations at Mare Island and one line to the Monitor and Receiving Station at South San Francisco.

During the war, one of the chief difficulties experienced was that of obtaining sufficient quantities of communications equipment. All Naval Communication Reserve equipment was turned over to Naval use. The procurement problem was further complicated by the amazing technological progress in automatic recording equipment.

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The Naval Communication Service had conducted experiments to adapt the teletypewriter to radio circuits. Performance in most such experiments during the 1920's and 1930's had been poor due to the action of the automatic volume control in the receivers which caused a large rise in the level of noise and actuated the teleprinter improperly during the "off" period of the "on" and "off" keying method used in continuous wave operation.

The Naval Research Laboratory was first to develop a teletype system for use on radio circuits which provided operationally acceptable error rates in 1944. The system

employed "frequency shift keying" in which the frequency was shifted 850 Hz between two states, "mark" and "space," with high precision. The NRL system used a continuously transmitted signal, thus holding the received signal at a constant level and avoided the rise in noise level previously produced by the automatic volume control. NRL provided a frequency shift converter for receivers to convert the FSK signal for teletype operation, a visual tuning indicator to permit precise setting on the frequency channel, and a device for automatically starting the teletypewriter. Modification units were developed to adapt substantially all high frequency transmitters in service and convert them to FSK. This system greatly increased the speed and accuracy of handling radio communication traffic, reduced the number of operators required and simplified their training.

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A simplex radio teletype circuit was installed in March 1944 to Honolulu. In September 1944 another was initiated to Honolulu and one to Washington. In January and February 1945, two diplex machines were installed. The first multiplex machine, capable of handling 240 words per minute, utilizing four separate communication channels on only one transmitter, was installed to Honolulu. Two additional ones were added in April 1945, one to Guam and the other to Washington. A fourth was added in September 1945.

In 1939 and 1940, continuous radio circuits were guarded to Washington, Honolulu, Puget Sound and San Diego, Eureka and U. S. Fleet guard. In 1941 a circuit was added to Sitka, Dutch Harbor and Kodiak, Alaska. In 1942, a circuit to Adak, Alaska, was added and discontinued in August 1945.

In November 1942, when Skaggs Island assumed the receiving functions from Mare Island and South San Francisco, control of the ship shore circuits was transferred to that station, using transmitters at Mare Island.

In September 1945, NPG maintained three continuous circuits on varying frequencies to Radio Washington, Radio Honolulu and Radio Guam. Circuits were maintained at scheduled times with Hochwan and Chungking, China; Balboa, Canal Zone; San Diego; Puget Sound and the Naval Ammunition Depot, Hawthorne, Nevada.

During the Battle of Midway, the NPM FOX was unable to carry the Pacific Fleet traffic load and an NPG FOX broadcast was established in September 1942 to handle the Eastern and Northern Pacific areas.

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In 1944, radio photo (facsimile) equipments were installed at Naval Communication Stations at Washington, San Francisco, Honolulu and Guam. The radio photo facilities at NPG were located on the top floor of the Federal Office Building.

One of the most famous photographs immortalizing World War II was the raising of the Stars and Stripes on Iwo Jima. Transmission of this picture to the mainland press companies was via the radiophoto section of Radio San Francisco.

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During WWII, all of NPG's receivers, with the exception of standby equipments, were located at the Skaggs Island Receiving Station and similarly, all of the transmitters were at the Mare Island Transmitting Station with the exception of the Very Low Frequency transmitter at Bolinas (Alexanderson High Frequency Alternator) leased from RCA, and two high frequency FOX transmitters at Palo Alto leased from Mackay. Other FOX transmitters at Radio San Diego were keyed from San Francisco over telephone company lines.

Among the most significant growths resulting from the war was the increased traffic flow. In early 1941, a monthly average of 25,000 messages were transmitted one way on four circuits: 16,000 to Washington, 8,000 to Honolulu and 1,000 to Puget Sound and San Diego. The latter circuit was split in January to provide the fourth circuit.

For comparison, the monthly total of messages transmitted in 1944 and 1945 is presented:

1944		1945	
March	141,764	January	398,510
April	200,949	February	391,810
May	268,914	March	469,764
June	263,202	April	477,612
July	234,406	May	594,064
August	273,119	June	682,802
September	263,812	July	778,300
October	305,529	August	805,844
November	366,788		
December	361,481		

Another activity, peculiar to war, was the handling of press material due to the inability of commercial companies to do so as a result of the movement of the combat theaters. Press copy was forwarded from Radio Guam because the Guam cable was inadequate. Also Radio Honolulu material cleared by the Public Information Officer was transmitted both ways for the various news services. Press material received by NPG was forwarded to the news agencies by Western Union and when that circuit was overloaded, by direct teletype from NPG to United Press and Associated Press. Statistics were:

1945	Number of messages:	Words:
January	531	117,359
February	1994	359,793
March	2302	469,762
April	3723	851,611
May	3225	684,580
June	3318	696,271
July	4326	748,448
August	4797	942,278

During September 1945 the press material fell off to practically nothing.

To handle the increased traffic flow, personnel at NPG increased accordingly. In June 1943 there were 99 persons at NPG; in January 1944 that total had increased to 171; in January 1945 to 231 and in September 1945 to 350.

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At the start of the war, the activities of the District Coast Guard were transferred from the Treasury Department to the cognizance of the Commandant, Twelfth Naval District. The Coast Guard Station at San Bruno served as a security station for the Commandant. It was also utilized as a control station for the Commander, Western Sea Frontier, medium frequency direction finder net. The station guarded the distress frequency and handled merchant ship traffic for the Commandant in lieu of NPG. There were twentyfour receivers. The station also had high frequency transmitters with frequency selection by remote control dial system.

The Mackay Radio Station near Half Moon Bay was operated under lease by the Coast Guard. The control station for the Mackay transmitters was at the Mackay Radio Receiving Station at Lobitos, California, and was connected by teletype to NPG via the District Coast Guard Office. The transmitters were at Palo Alto and keyed from Lobitos by remote control. Its primary task was to provide communications for merchant shipping and was a BAMS Coastal Station.

The Western Sea Frontier Medium Frequency Radio Direction Finder Net was established 1 June 1944. It consisted of Point Reyes, Point Montara and Farallon Islands under the Coast Guard. It was controlled by San Bruno (Sweeney Ridge), who reported to the Western Sea Frontier Direction Finder Plotting Room. The DF Station at Eureka operated as a separate station and joined the net when alerted. All direction finder stations were retained under Coast Guard jurisdiction at the end of the war.

Eureka was also a unit of the high frequency direction finder net and reported via keyed tone telegraph or teletype. The Western Sea Frontier High Frequency Net consisted of stations under the Coast Guard at Tillamook, Oregon; Eureka; Moffett Field; Castroville; Goleta; Santa Ana and San Diego.

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The activity of the Relay Room (called the Teletype Room until January 1945), constituted one of the most important functions of NPG - that of performing the mission of a primary relay center. Again the trend provides a story of technological advance in the equipment employed. This trend had been from manual printing to automatic printing. In 1939 there were six operators and a chief operator, all Civil Service teletypists, who had formerly been telegraph operators until teletypes replaced the old Morse telegraph equipment. The relay activity was originally located in the NPG radio room and consisted of a perforator connection with Washington, D.C., and page printer circuits to Mare Island Navy Yard, Postal Telegraph, Western Union and the Coast Guard.

There were four teletypewriters in 1939 and by December 1941, there were eight and an addition of three more civilians. Besides the four circuits, lines were added to San Diego, Seattle and TWX to the Naval Air Station, Alameda, and the Naval Supply Depot, Oakland. After December 1941, the increase in traffic necessitated the use of from eight to ten Navy enlisted men as teletypists. During the first two months of 1942 four more civilians were added. This growth in traffic was accompanied by a physical expansion as the relay section was moved to a locker room.

When the Japs attacked in December 1941, there were lines to NAS, Alameda; San Diego; Bainbridge; Western Union; SOPA; Postal Telegraph; Coast Guard; TWX; a single circuit to Receiving Ship and Treasure Island, and another to Navy Purchasing and Navy Material. During 1942, there occurred the natural increase in Naval personnel and the addition of more teletypewriters and circuits.

As of October 1941, the teletype and relay section was still located in a small single room but now had fiftythree persons and one officer. Approximately six thousand messages were handled in a day. There were a total of thirteen circuits, two were Navy owned packaged units and three were circuits of built-up perforators on home-made tables. By January 1945, the Relay Room was unchanged but traffic had increased to about nine thousand messages a day.

On 21 January 1945, the Relay Room was moved to a new and larger sound-proofed room. In addition, the first of three banks of former Postal Telegraph equipment was installed, increasing the total circuits to thirty. These units possessed many features which improved traffic handling. By then traffic was up to ten thousand messages a day and an on board count of fiftysix persons handled this traffic. The personnel turnover was heavy since only twentyseven of the former group were still on board.

In April 1945, another bulkhead was removed and the room enlarged. Two more ex-Postal Telegraph sending and receiving cabinets (banks) were added. This increased the circuits to thirtytwo. With sixtyfive persons the traffic load increased to fourteen thousand messages a day. After April, and before the German surrender, the total daily messages were sixteen thousand. The daily traffic handling continued to rise and by mid-August it reached an average of twentyfour thousand messages each twentyfour hours. The day before the Japanese surrender, the rate rose to twentyfive thousand messages. Prior to the surrender, there were fortythree circuits handled by seventy-eight persons.

The circuits in the Relay Room in September 1945 were increased to fortyseven, thirtynine of which were leased from the Pacific Telephone and Telegraph Company. The Relay Room then occupied a space equivalent to four rooms, with eightyone persons on duty and an officer on each watch.

In the last of May 1945, the first radio channel for tape relay was installed with Washington, D.C. On 24 June 1945, the first overseas NTX radio circuit with Radio Honolulu was inaugurated in the Relay Room.

A contract existed with Western Union to maintain the "banks" in the Relay Room. Naval personnel repaired the remainder of the teletypes and everything except the semi-automatic relays, while the Pacific Telephone and Telegraph Company took care of the leased material. The teletype repair shop included part of the third deck elevator approach space and this latter space was consigned to the Western Union and Pacific Telephone repair men.

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Prior to and during the first months of the war, messages to merchant ships were transmitted by commercial radio companies, viz, Globe Wireless, Mackay and RCAC. No accurate check could be made to determine whether the ships received the messages and in addition, the companies were vying among each other for the opportunity to transmit the messages for the Navy.

BAMS was started in January 1942 as a logical outgrowth of the WGBC system. BAMS was an organization designed for the broadcasting of messages and orders by radio to Allied merchant ships at sea. Its purpose was: (a) To provide a means of passing messages to ships at sea with a minimum of delay, (b) To provide regular and adequate service of broadcasting to merchant ships by radio in every port in the world, (c) To limit the number of stations broadcasting at any one time in any port of the world, thereby reducing the number of radio guards necessary and (d) To permit ships to keep a radio watch on 500 kHz for a maximum length of time.

This organization was divided throughout the world into zones and so planned that each area was covered by two high frequency or medium frequency stations which would broadcast to merchant ships at determined times on low and/or high frequencies. In addition to this, there was provided a number of medium powered stations which maintained a continuous watch on 500 kHz. There were three classes of stations: zone, area and coastal.

Radio NPG served as an area station, sending and receiving BAMS radio traffic to and from the BAMS Arranging Authority, Commander Western Sea Frontier, whose responsibility was to route traffic to the proper type station thus insuring that the vessel in question would receive the message. Station KFS in Palo Alto, leased by the Coast Guard from Mackay, acted as a BAMS coastal station. In a manner of speaking, the BAMS broadcasts was to merchant ships what the FOX broadcast is to Naval vessels.

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The West Coast MERCO Office was established in October 1942 as an activity of Commander Western Sea Frontier. MERCO's function was to receive, route and relay all arrival and departure messages covering the movement of all merchant ships in the Pacific Ocean area. At that time the West Coast MERCO was the only MERCO office in the Pacific. It sent and received movement reports to and from all Pacific commands. Subsequently MERCO offices were opened in Noumea and Pearl Harbor so that the West Coast MERCO could relay its Pacific Ocean traffic through those offices. Later the MERCO system of reporting ship movements expanded to include Naval auxiliaries and convoys.

At first the overseas traffic was communicated by commercial cable. As activity in the Pacific area accelerated and new ports were opened to handle shipping, the cable proved inadequate so MERCO traffic was then handled by Naval radio.

Traffic on the Pacific Coast was conveyed on Naval leased lines and TWX. With the inauguration of the NTX system locally and its extension to Commandant, Fourteen-th Naval District and Commandant, Seventeenth Naval District, it became possible for all MERCO traffic handled by West Coast MERCO to be sent and received via NTX.

The MERCO system of reporting ship movements had proved particularly efficient in expediting communication of vital shipping information to all cognizant commands. The special handling accorded this traffic by the MERCO system has relieved other communication offices of the burden of routing, servicing and controlling this large traffic volume.

During the period when MERCO traffic was handled by Naval radio, close coordination was maintained between MERCO and NPG (District Communication Office) as NPG handled all West Coast and trans-Pacific transmissions and reception of MERCO. In addition the District Communication Office made local delivery of the traffic to MERCO.

All encrypted MERCO traffic for Commander, Western Sea Frontier, was delivered by MERCO to the District Communication Office for decryption and routing.

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The industrial expansion of the Navy Yard at Mare Island encroached, during WWII, on the antenna area of the Naval Radio Station (T), Mare Island, to such an extent that future expansion without excessive expense for antenna installations became problematical. Accordingly, a project was initiated in March 1944, to move the high frequency radio station out of the Navy Yard. A site of 1,280 acres was selected near Dixon, California, and the project was approved by the Navy Department. An appropriation of $1,080,000 was granted for construction. This amount was later increased by $70,000 for a total of $1,150,000 to cover more elaborate antenna installations.

Construction of the personnel buildings began in March 1945. By late June 1945, it became evident that available funds were not sufficient to cover construction costs due to a drastic increase in the cost of labor and construction materials. Accordingly, at the direction of the Chief of the Bureau of Ships, construction was suspended until more funds were appropriated or until the scope of the station could be decreased to the point where available appropriations were sufficient.

It was estimated that an additional $2,000,000 would be required to complete the Dixon Station without a change in scope. Representatives of the District Communication Officer, Electronics Officer and Public Works Officer, Navy Yard Mare Island, and the contractor were ordered to Washington in July 1945 and made a determined effort to obtain this additional appropriation.

With the cessation of hostilities in August 1945, the industrial encroachment at Mare Island was curtailed and the immediate necessity of removing the radio station was largely alleviated. This completely changed the scope of the Dixon Station to one of an experimental and supplementary rather than a replacement station. Thus the personnel buildings were reduced to quarters to accommodate an Officer in Charge and 12 enlisted married men, and the site of the operating building was considerably reduced. With these reductions, it appeared possible to continue construction and remain within available funds. Revised plans were prepared and construction again started just prior to 1 July 1945.

Since then, Dixon has now (1965) grown to be the Navy's major transmitting station on the West Coast and further expansion is planned to nearly double the present size. In 1965, there were an Officer in Charge, two additional officers and 70 men with all of the necessary housing and facilities to accommodate them.

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Single side band radio transmitters were installed at Mare Island in 1945 for the Washington and Honolulu circuits. Similar transmitters were installed at Washington and at Honolulu. Each transmitter provided six teletype channels and one voice order channel for changing frequencies and other purposes in connection with operation of the circuit. The voice channel was used occasionally for a conference circuit between high Pacific naval commands.

Inauguration of the multi-channel radio teletype transmitter to Washington made it possible to abandon all but one landline circuit to Washington. That landline circuit was used only when the radio channels were disrupted by atmospheric disturbances such as sun spots.

Message traffic totals fell off after termination of hostilities of WWII, but increased again during the 1950-1953 Korean affair. The technological advances in communication equipments enabled NPG to assume the increased traffic load during that time with no appreciable difficulty.

Morse code circuits had all but disappeared. There were no code operators in the Federal Office Building communication center. All traffic was handled by teletype. The only radio circuits were with Honolulu and Washington. A few other channels to Okinawa and Adak were provided, by automatic radio relay, for other commands. Radio Photo on the top floor had radio circuits to Honolulu and Washington. Skaggs Island guarded the ship-shore and harbor circuits.

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In 1953, Mare Island was still the major Naval Radio Transmitting Station on the West Coast, and was remotely controlled by leased lines and VHF radio links from both the Naval Communication Station, San Francisco, and the Naval Radio Station (R), Skaggs Island, California. The transmitter station, at that time, had 50 high frequency and

and six low frequency transmitters with associated antenna farm as well as the necessary barracks for single men and quarters for the married men and their families.

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The need to disperse the communication complex and relocate the Radio Control Station became most apparent with the development of more highly destructive nuclear weapons. Preliminary planning and a survey of possible sites was begun in the early 1950s. Approval of Stockton as the site for development of the Communication Control Center was received in 1955.

Construction of the Communication Center Building, barracks and mess hall began in 1957. Occupancy and activation of the Automatic Switching Center, housed in the Communication Building, was accomplished in May 1959. The $4,000,000 Communication Station was in full swing in July 1960 after the complete transfer of its personnel and functions from San Francisco.

The headquarters component of the Communication Station was, in 1960, after many moves and periods of expansion through the years, finally situated on Rough and Ready Island, near Stockton, California. In addition to being the location of the Commanding Officer with his support and administrative staff, the component included the circuit control which tied the command together; the control location of the fleet broadcasts; the ship-shore control and the automatic switching center. This, in aggregrate, was the heart of the operation of the Communication Center. There were approximately 30 officers, 300 enlisted men and 300 civilians of the NAVCOMMSTA on Rough and Ready Island.

The island itself has a rather interesting history in that it was raised out of the tule swamps over the years commencing in 1852. The first increment was a relatively modest five acres diked and drained by an unsuccessful gold miner who had come down to the valley from the Sierra camp of Rough and Ready.

Through the years the island was expanded to the present 1300 acre size. It was a successful agriculture venture during this period and at one time the farm house (the present Quarters A) was considered one of the finest houses in the county.

The Navy acquired the island during World War II to provide a supply facility that could be reached by ocean going ships and yet was outside of the congestion of San Francisco Bay. The island was ideal for this purpose since it was served by three major railways and had an existing deep water channel.

The end of the Korean War saw a gradual decline in supply activity until the supply annex proper was closed in 1965. At that time NAVCOMMSTA SFRAN, which had been expanding since 1959, assumed control of the island.

The outlook for the headquarters component is one of continued growth to match that of the Communication Station as a whole. It appears reasonably certain that NAVCOMMSTA SFRAN (now NAVCOMMSTA STOCKTON) has finally planted lasting roots in the San Joaquin delta after a vagabond existence of 60 years.

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In 1961, the U. S. Naval Communication Station was operating as a major switching center for the nation's newest and fastest automatic teletypewriter communications system. Where the Navy network handled about nine million words daily, the Stockton center relayed about two million words every twentyfour hours. Naval installations in 103 cities from coast to coast were connected to the new system, which enhanced the Navy's combat readiness by vastly increasing the speed of relaying messages.

The 48,000 mile network interconnected 236 teletypewriter stations in 31 states. This network was provided to the Navy by the Long Lines Division of the American Telephone and Telegraph Company. Messages were routed over the system by a method much like that employed for dial telephones. Instead of dialing numbers, a teletypewriter station operator simply perforated a destination code at the beginning of a paper tape message. The tape was fed automatically into equipment which put the message on the circuit at a rate of 100 words per minute. It was then received in the Stockton switching center, which had the same function as a regular long-distance switching center for telephone calls. Without human attention, the message was relayed to another circuit and sent to its proper destination. The relaying equipment operated at a speed of 200 words per minute. This prevented messages from accumulating at the center and jamming traffic.

The Navy had four other switching centers located at Trenton, New Jersey; Cheltenham, Maryland; Norfolk, Virginia and San Diego, California. The new system was handling about 95 percent of the Navy's command and administrative traffic in the continental United States. In addition to serving 236 stations in the basic network, the system was connected with 85 other stations on a semi-automatic 5,000 mile network.

Gateway locations of the network on the east and west coasts provided links with Navy overseas radio circuits to ships at sea and distant Naval commands. Also, the network was compatible with other U. S. military communication systems, facilitating exchange of messages with them.

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A new Microwave Communication Control Link (CCL) Relay Station, located near the top of Mount Diablo, east of Oakland, California, was activated about 15 November, 1960, to provide transmitting and receiving remote control to all components of NAVCOMMSTA SFRAN, in addition to similar services being provided for the U. S. Naval Air Station, Alameda and the Naval Station at Treasure Island. This complex provided an effective and flexible communications control link entirely free of leased telephone control lines.

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The five 450 foot steel towers and the high powered low frequency transmitters were removed from the Mare Island Transmitting Station in 1961. There were still over sixty transmitters of various types in the main transmitter building, at least 75% of which were in use at any given time.

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The Federal Office Building component had gradually changed in magnitude and responsibility from the peak of being headquarters of NAVCOMMSTA SFRAN from 1936 to 1959 to a relatively placid status as a message center for Navy and Federal agencies in the building. It still maintained a minor radio capability for emergency purposes, however, its days of glory as a direct part of the fleet operational communications were a thing of the past.

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The Treasure Island component of NAVCOMMSTA SFRAN, in 1965, was a major message center which served approximately 50 naval commands located on the island. In addition to message center services, the center was directly involved in fleet tactical communications through terminating secondary ship-shore circuitry and provided direct support to Commander, Western Sea Frontier in carrying out his mission. The communication center was capable of handling all modes of communication, CW, teletype or voice. The

communication center had a secondary capability of providing locally controlled transmitters and receivers to meet emergency requirements of the Commandant, Twelfth Naval District or Commander Western Sea Frontier.

The outlook for the communication center at Treasure Island was one of continued growth as the major commands of the San Francisco Bay Area were gradually being relocated to the island.

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Since 1904, the Naval Communication Station, San Francisco, has grown from humble beginnings in a pigeon loft at the Mare Island Naval Shipyard to a multimillion dollar complex which includes seven components scattered throughout the San Francisco Bay Area. The Headquarters Component is located on Rough and Ready Island in the San Joaquin delta near Stockton, California, and is now known as the Naval Communication Station Stockton. Marking this pigeon loft as the beginning, NAVCOMMSTA STOCKTON is the oldest naval communication station in commission on the West Coast and its history is representative of naval communications since many innovations and techniques of naval communications through the years have been pioneered or developed here.

The mission of NAVCOMMSTA SFRAN during the first decade of its existence was to provide the then new Marconi wireless circuits to fill the Navy's requirements in the San Francisco bay area. The role of the Pacific Fleet during those years was one of showing the flag on the Asiatic Station and providing a training area and facilities on the West Coast of the United States for the fleet.

This is still the basic role of NAVCOMMSTA STOCKTON, although the capability and potential of the station is many fold greater than it was during those years. 1966 saw the introduction of the AUTODIN system (Automatic Digital Network) utilizing computers and satellites. Two microwave dishes, the larger 65 feet wide, are the eyes and ears of the communication station, the largest and busiest link in a set of five U. S. military communications stations in the world. Rows of Sperry-Univac computers and cryptography machines occupy a nearby building and are the brain of the system. Together with the help of 143 military and 93 civilian technicians and support personnel, they carry an average of 7.3 million messages each year between West Coast ships and stations. Sending, receiving and forwarding an average of 10,000 messages every twentyfour hours is the biggest role of the installation.

This is a far cry from the crude spark signal which crashed through the ether in the earliest days of Naval communications!

* * * * * * * * * * * * * * * * *

District Communication Officers - Twelfth Naval District
and
Commanding Officers - Naval Communication Station

San Francisco and Stockton, California

Name	Rank	Period	Location	Retired
MADDOX, Charles H.	Lt	Apr'16-Dec'17	Yerba Buena Island	Capt '46
GREAVES, C. Ford USNR	Lt	Apr'18-Jul'19	"	
McGAUGHEY, Scott D.	LCdr	Jun'19-Jun'21	"	Cdr '40
GATES, John W.	LCdr	Jul'21-Nov'23	YBI & Appraisers Bldg.	Capt'39
BOWDEN, John P.	LCdr	Jan'24-Nov'25	Appraisers Bldg. S.F.	LCdr'31
THOMAS, Armit C.	Lt	Nov'25-Apr'26	100 Harrison St., S.F.	Capt'47
CHADWICK, Joseph Howard	Lt	Jul'27-Sep'29	"	Cdr '45
ROSS, Thomas D.	Lt	Sep'29-Mar'31	"	LCdr'39
NOBLE, Christopher	Lt	Mar'31-May'33	"	Cdr '47
STRUBLE, Arthur D.	LCdr	Jun'33-May'35	100 Harrison & Fed Ofc Bldg	Adm '56
MELLING, Robert E.	LCdr	Apr'35-Mar'37	100 Harrison & Fed Ofc Bldg	RAdm'50
FLANAGAN, Henry C.	LCdr	Apr'37-Oct'40	Federal Office Bldg., S.F.	RAdm'46
VENSEL, Frank E. Jr	Cdr	Oct'40-Sep'43	"	Capt'47
FORSTER, Kenneth L.	Capt	Oct'43-Jun'45	"	Capt'52
ELLIOTT, Richard E.	Capt	Jun'45-Oct'47	"	Capt'55
CARMICHAEL, George K.	Capt	Oct'47-Jun'49	"	RAdm'59
RAY, Clarence C.	Capt	Jun'49-Dec'51	"	RAdm'55
BAILEY, William B.	Capt	Dec'51-Jun'53	"	RAdm'53
DOWLING, Andersen M.	LCdr	Jun'53-Sep'53	"	
McCOY, Melvyn H.	Capt	Sep'53-Sep'55	"	RAdm'57
WIER, John P. Jr	Cdr	Sep'55-Dec'55	"	Capt'64
ZEMMER, Harold M.	Capt	Dec'55-Mar'57	"	Capt'57
BERNICK, Lewis USNR	Cdr	Mar'57-Jun'57	"	Capt'68
SCHUYLER, Irving J.	Capt	Jun'57-Aug'59	"	Capt'62

Commanding Officers - (continued):

Name	Rank	Period	Location	Retired
HARRIS, Robert Bonnell	Cdr	Aug'59-Dec'59	Federal Office Bldg., S.F.	Cdr'61
CARLSON, Albert L.	Capt	Jan'60-Jun'62	Rough & Ready Island, Stockton	Capt'62
SHORT, James W.	Capt	Jun'62-Oct'64	"	Capt'72
SHOEMAKER, Robert USNR	Capt	Oct'64-Jun'66	"	Capt'66
LYONS, John Thomas	Capt	Jun'66-Aug'69	"	Capt'7?
TURNER, William W.	Capt	Aug'69-Aug'72	"	Capt'7?
MILLER, Kirk C.	Capt	Aug'72-Aug'74	"	Capt'7?
LYNCH, William H.	Capt	Aug'74-Aug'76	"	Capt'79
WIECKING, Kenneth D.	Capt	Aug'76-Aug'78	"	Capt'8?
YOSWAY, Philip F.	Capt	Aug'78-Aug'80	"	Capt'8?
ANDREWS, Bobie	Capt	Aug'80-Jul'82	"	
RICE, Lloyd K.	Capt	Jul'82-Aug'84	"	
JOHNSON, Kenneth A.	Capt	Aug'84		

Deceased

MEMBER Old Timer Communicators, Southern or Northern California, 1972 or earlier.

ADDRESS on hand in 1985.

NPG RADIO SAN FRANCISCO (CONTROL) -- 1916-1917
YERBA BUENA ISLAND SAN FRANCISCO

Name	R/R	Retired
†DODD, Edwin H	Capt	Capt'26
GRUBE, H J	RM2	
HARRIS, E L	RM1	
†KRUEGER, Edward J	CRM	Lt '43
†MADDOX, Charles H	Lt	Capt'46
MARTIN, Harry D	CRM	
OLIPHANT, "Benny"	RM2	
PETERSON, O O	CRM	
†PHELPS, Harold B	RM2	Lt '46
SCOTT, Oren H	RM1	

†Deceased.
MEMBER OTC SoCal and/or NorCal
1985 or earlier.

From a list provided by Phelps.

* * * * * * * * * * * * * * * *

COMPONENTS

1 – High voltage induction coil

2 – Mercury-jet rotary primary current interrupter

3 – "Variable inductance" – HF autotransformer, with seven Leyden jars inside – total capacitance – 0.014 uF

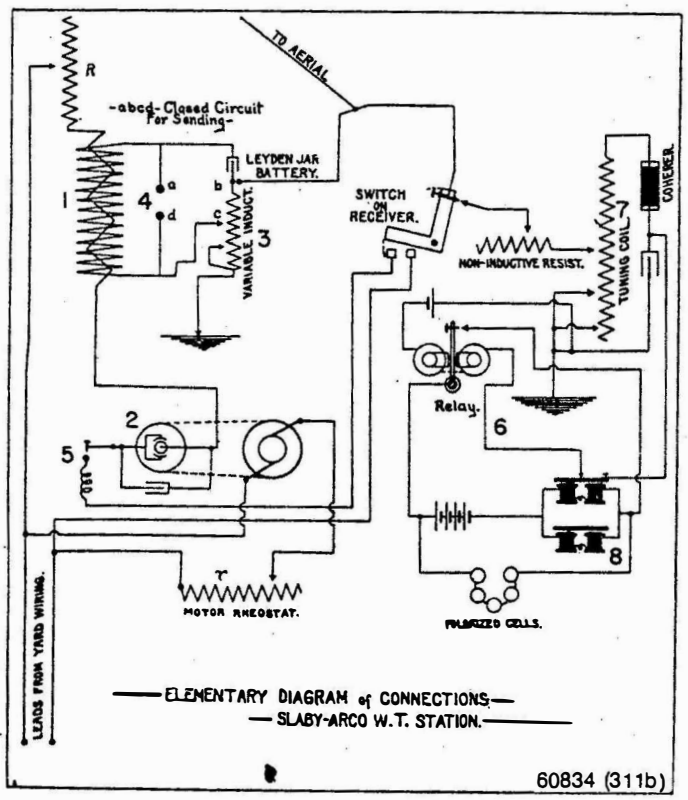
4 – Adjustable spark gap

5 – Transmitting key

6 – Receiver unit with an antenna switch, relays, coherer (glass tube 4 mm inner diameter filled with nickel-silver alloy oxidized filings – exhausted – electrodes 1 to 3 mm long)

7 – Receiver tuning coil

8 – Morse tape printer



NAVY'S FIRST RADIO EQUIPMENT

The U.S. Navy's first "wireless" (radio) equipment is shown here as installed on the USS PRAIRIE (1902). This equipment, called the Slaby-Arco system, was produced by the General Electric Company, Berlin. The "spark" transmitter had a power input of 1 kW and a range of 100 miles, and it operated at a wavelength of 200 to 400 meters (750 to 1500 kHz). The receiver used a coherer detector and a telegraph signal printer.

From "Evolution of Naval Radio-Electronics and Contributions of the Naval Research Laboratory" by Louis A. Gebhard 1979.

U. S. Naval Radio Station, Eureka (NPW) 1922
(L to R: Van Wiegan RM, Knight RM, Parry RM, James CRM)

U. S. Naval Radio Station, Eureka (NPW) 1922
(L to R: R. Parry RM, Veltman RM, Ray Brightman RM,
Schmidt Yeo, H. B. Constantine RM)

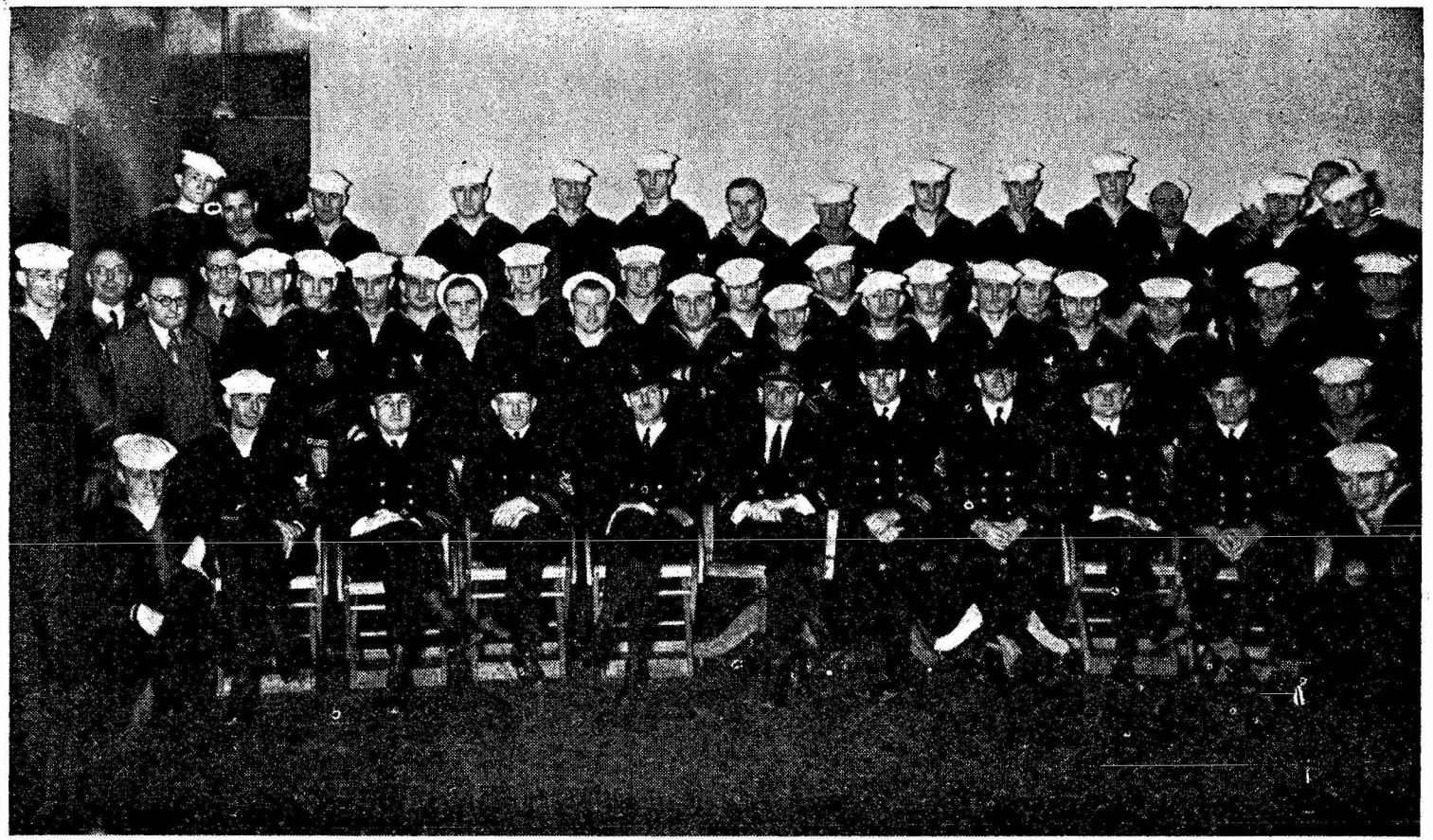
Pictures by
Ernest P. Briggs

NPG RADIO SAN FRANCISCO (CONTROL) -- Dec 1928
100 HARRISON STREET SAN FRANCISCO CALIFORNIA

RMS Cl#	Name	R/R	Retired
	ADAMS, L O	RM3	
SD4	ALEXANDER, Fred	RM1	
14	†ANSAK, Joseph Jr	RM1	Ltjg'50
17	AUGSTER, Robert J	RM1	Lt '53
	†BRADLEY, Donald H	CRE	LCdr'46
23	CARTER, Robert J	RM3	Cdr '56
	†CASSELL, Stanley G	RM3	CWO2'54
	CRANFORD, C	CRM	
	DOTSON, E N	RM1	
	FISK, W	Y2	
	GAZZE, Sylvius	Ens	Capt'57
	GISH, Victor S	CRM	CWO2'43
	GREGORY, M R	Y1	
	HARRISON, B	RM2	
	HOLDAKOWSKI, O L	CRM	
SD6	HORSLEY, Grant E	RM1	LCdr'53
	HUNTING, William A	RM1	
	JONES, Thomas Paul	RM2	
	†KATZENBERGER, Raymond S	CRM	Lt '48
	†KIEPLER, John T	CRM	Lt '46
	KNICKERBOCKER, Wm L	Ens	RAdm'63
22	†KNUDSEN, Henry T	RM1	Lt '53
13	LeBEL, J G	RM1	
	†McPHERSON, J B	RM1	
SD4	MIDDLEKAUFF, L	RM2	
	†MILAN, Gerald T	Y2	Ltjg'5?
	MILLICAN, George M	RM2	
	†MOHLER, Jack R	RM1	
	†MOREHEAD, Donald G	RM1	
	NEWTON, George	RM2	
SD4	†PALMER, Glenn E	RM1	
1	†PEDEN, S Ray	CRM	
	†QUATTLEBAUM, Winston I	Ens	Ltjg'33
	RABORN, Garland W	RM2	
	†ROSS, James R	CRM	CWO2'45
	ROTH, E P	RM3	
11	†RYAN, Philip H	CRM	CWO2'48
13	SIMPSON, Glenn H	RM1	Ltjg'53
	SPAVOR, Joseph W	Y1	Lt '52
	†TAYLOR, John M	Ens	VAdm'67
	TROTT, John W	RM3	Cdr '54
	†VANNOY, Elvin N	CRM	Lt '51
	VOLLRATH, G W	RM3	
15	†WALLACE, Glynn D	RM1	Ltjg'52
	WESTCOTT, J H	RM2	
	WEYAND, R J	CRM	

† Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.

From a Xmas card donated to the OTC archives by Horsley. Bellevue & San Diego class numbers, if known, added for cross reference. Any errors in first names are those made during research.



NPG RADIO SAN FRANCISCO (CONTROL) - Dec 1929. See complete list of personnel on opposite page (APPENDIX B-5). Readers are requested to help identify the persons pictured here. Please do not mark the pages. Send your ideas to George B. Todd or John W. Trott.

BACK ROW				MIDDLE ROWS				FRONT ROW	
1	Cotteen	9	Charles	1	Wallace	13	Burton	1	Lagle
2	Yette	10	Hackman	2		14		2	Gott
3	Roberts?	11	Trott	3	Cline	15		3	
4		12		4		16		4	
5		13	(hidden)	5		17		5	
6		14		6		18	Frost	6	Bradley
7		15	Naugle	7		19	Knudsen	7	
8		16	McPherson	8	Perreault	20	Ansak	8	Briggs
				9	Clough	21	Milan	9	
				10	Becker	22		10	
				11	Robertson	23	Potts (S1c)	11	
				12	Beaver	24		12	

NPG RADIO SAN FRANCISCO (CONTROL) -- Dec 1929

RMS Cl#	Name	R/R	Retired
SD4	ALEXANDER, Fred	RM1	
27	†ALLEN, William E	RM1	ALC '??
14	†ANSAK, Joseph Jr	RM1	Ltjg'50
SD8	BEAVER, John T	RM1	RMC '45
17	†BECKER, Joseph M	RM1	CWO2'52
29	BOND, Charles H	RM2	ETC '53
	†BRADLEY, Donald H	CRE	LCdr'46
	BRIGGS, Ernest P	CRM	Lt '48
	†BROWN, Clifford A	CY	LCdr'46
23	BURTON, R F	RM1	
	CHARLES, Dale J	RM2	Lt '51
29	CLOUGH, Harold E G	RM1	CWO2'53
	†COTTEEN, Walter F	RM2	RMC '55
	EDWARDS, W J	RM2	
SD7	†FOSTER, James R	RM1	Ltjg'50
15	†FROST, Paul L	RM1	LCdr'53
	GLASSCOCK, W H	RM2	
	GOTT, Earl M	RM1	
	†GREEN, Wallace V	RM2	RMC '5?
	GRIFFITHS, J C	RM1	
	HABERLIN, E W	Y1	
	†HACKMAN, Milton J	RM2	CWO2'52
	HENNINGER, Robert J	RM2	RMC '
	HOLDAKOWSKI, O L	CRM	
SD6	HORSLEY, Grant E	RM1	LCdr'53
11-43	†HUNTER, Donald C	RM2	Lt '56
	HUNTING, William A	RM1	
	KETCHAM, G H	CRM	
22	†KNUDSEN, Henry T	RM1	Lt '53
16	LAGLE, Robert D	RM1	Cdr '56
23	†LAHYM, Clifford W	RM1	RMC '??
	LEYSON, F	EM2	
	†McPHERSON, J B	RM1	
	†MILAN, Gerald T	Y2	Ltjg'5?
	†MORGAN, John O	RM1	RMC '??
27	†NAUGLE, John W	RM2	†CRM POW
	NORWOOD, H E	Y1	
SD8	†OLSON, Carl W	RM1	CWO2'51
SD6	PERREAULT, Edgar L	RM1	WO1 '45
	PITTMAN, J M	CRM	
	POTTS, N L	S1	
	RHOADS, C E	CRM	
	ROBERTS, G C	RM2	
	ROBERTSON, L H	RM2	
	†ROSS, Thomas D	Lt	LCdr'39
	†SKIEVASKI, Felix	RM1	†CRM WW2
	SMITH, C W	CRM	
	SPAVOR, Joseph W	Y1	Lt '52
SD4	†STEVENS, Abram M	CRM	CWO2'50
	TEVIS, J S	CY	
	TROTT, John W	RM2	Cdr '54
15	†WALLACE, Glynn D	RM1	Ltjg'52
SD7	†YETTE, Gilbert H	RM1	RM1 '40

Wire Room:
CLINE, George J
KRENKE, A F
MANNING, F E
MARKS, John W
PETERSON, R O
†SIMPSON, Walter S
WILLIAMSON, W E

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.

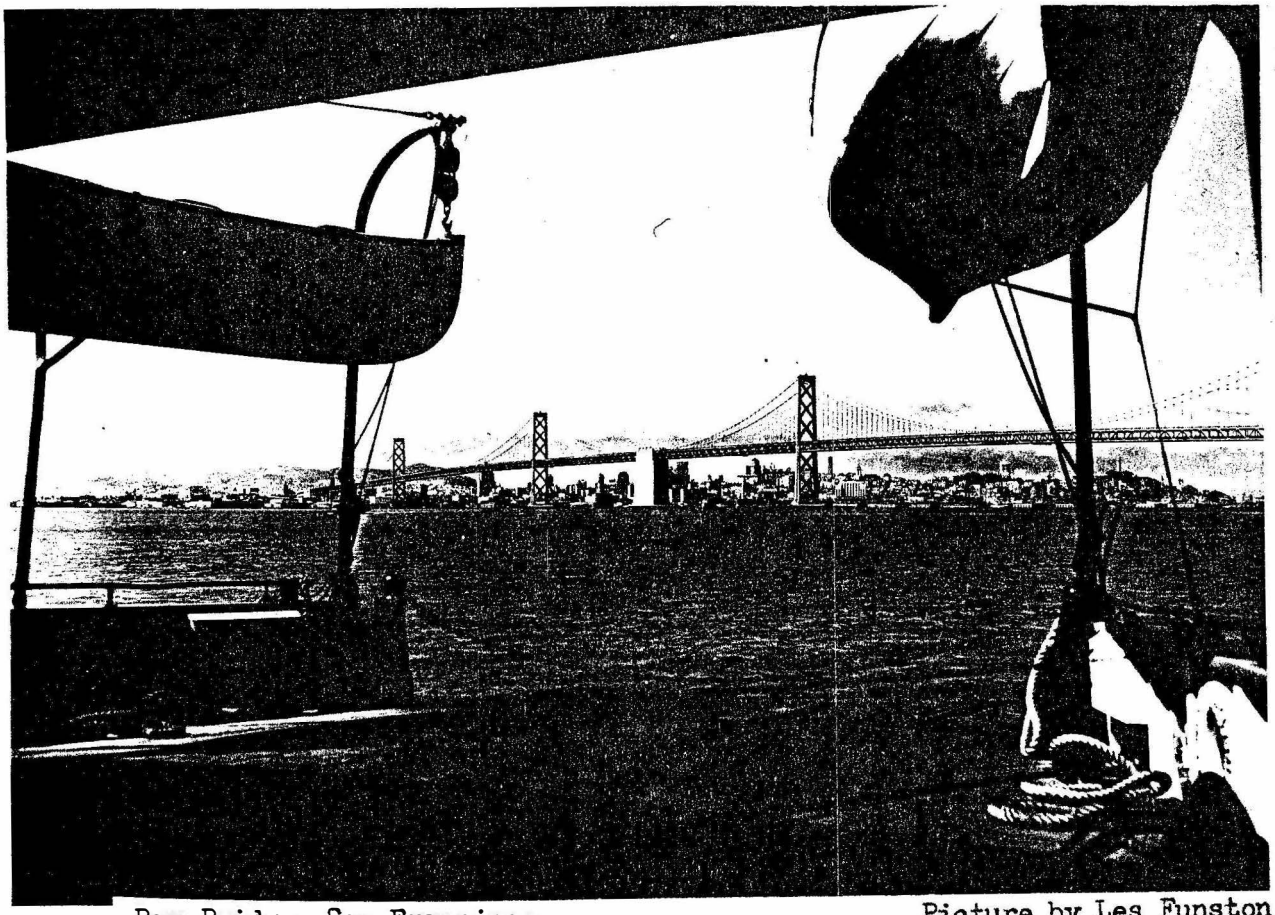
From copy in OTC archives of Xmas card with picture belonging to Abernathy. San Diego & Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during research.

NPG RADIO STATION MARE ISLAND — Dec 1929

RMS Cl#	Name	R/R	Retired
19	BRETHERTON, Van F	RM1	
	†DOUGLAS, Theodore C	RM1	CWO2'47
	EDSON, Willard N	RM2	
	ELLIOTT, Alton E	SC3	CSC '
	†HAYES, Lawrence T	RM2	CWO2'55
	†KATZENBERGER, Raymond S	CRM	Lt '48
SD 5	†MAYS, Charles E	RM1	CWO2'49
	McCANNA, Robert E	RM2	WO1 '46
W 5	†McKELVEY, Carlton A	CRE	LCdr'47
	NAPIER, William W	CEM	CWO2'46
	RABORN, Garland W	RM2	
SD 9	SNYDER, Marvin C	RM1	CWO2'54
	WILKINSON, Rupert	RM1	
16	WILMOT, George C	RM1	LCdr'51
SD 5	†WOLF, Lawrence W	CRM	Lt '47
15	YOUNT, Shelby M	RM1	CWO2'45

†Deceased.
MEMBER OTC SoCal and/or NorCal 1976 or earlier.
ADDRESS on hand in 1976.

From a Xmas card donated to the OTC archives by Marlo Abernathy. San Diego, Bellevue and WORES class numbers, if known, added for cross reference.



Bay Bridge, San Francisco

Picture by Les Funston

NPG RADIO SAN FRANCISCO (CONTROL) -- Dec 1930

RMS Cl#	Name	R/R	Retired
	†ALEXANDER, Jesse J	CRE	Lt '39
SD9	†ARCHAMBEAULT, Joseph C	RM1	Lt '50
22	BARRETT, Sidney H	RM2	Lt '53
	†BLADES, George W	CRM	CRM '??
	BLOWERS, J R	RM2	
29	BOND, Charles H	RM2	ETC '53
SD7	†BRIGHT, Glen F	CRM	RMC '??
16	†BROWN, Chester E	RM1	RMC '??
23	BUCKLEY, Owen B	RM2	WO1 '53
W17	†CHANCE, Emmett W	RM1	CWO4'57
	†COIL, Edmonston E	Lt	LCdr'43
	†COTTEEN, Walter F	RM2	RMC '55
	†CULP, Ross S	Capt	Capt'40
	DAW, Herbert H	RM1	
SD7	†FOSTER, Ja s R	RM1	Ltjg'50
	FUQUA, Samuel G	Ltjg	RAdm'53
	GOTT, Earl M	RM1	
	†GREEN, Wallace V	RM2	RMC '5?
	GRIFFITHS, J C	RM1	
	HABERLIN, E W	Y1	
	HENNINGER, Robert J	RM2	RMC '
	†HIGHLEYMAN, Richard	LCdr	LCdr'38
	†HINCHEY, Russell L	RM1	LCdr'48
	HOLE, M H	Y2	
11-43	†HUNTER, Donald C	RM2	Lt '56
	KEHOE, Leon J	CY	Ltjg'45
	†KNICKERBOCKER, HermannP	Lt	Capt'50
	†KRAMER, Oloeces	CRM	
	LANDIS, John T	RM1	CWO2'46
30	LEWIS, Aubrey E	RM2	Cdr '56
	†LINTNER, Harold W	CRM	Lt '48
	LONG, F K	CRM	
	†MACGOWAN, Charles A	LCdr	RAdm'43
	MARBOURG, R L	RM2	
	†MORGAN, John O	RM1	RMC '??

RMS Cl#	Name	R/R	Retired
SD5	†NORTHCUTT, William C	CRM	CWO2'40
	NORWOOD, H E	Y1	
SD8	†OLSON, Carl W	RM1	CWO2'51
SD6	PERREAULT, Edgar L	RM1	WO1 '45
	PITTMAN, J M	CRM	
	RANDALL, W H	RM3	
	ROBERTS, G C	RM2	
	†ROSS, Thomas D	LCdr	LCdr'39
	†SKIEVASKI, Felix	RM1	†CRM WW2
	SMITH, C W	CRM	
	SPAVOR, Joseph W	Y1	Lt '52
19	†STASTNY, Emil	RM1	RMC '45
	†STEINBERG, Leonard B	RM1	RMC '??
	STEINER, Joseph A	RM1	
	STRICKLEY, Guy H	CY	CWO2'46
	THOMAS, Myron E	Lt	Capt'52
26	†TINSMAN, Clair L	RM2	CWO2'53
SD9	TODD, George B	RM1	Lt '52
15	†WALLACE, Glynn D	RM1	Ltjg'52
	†WALSH, F V	CRM	
28,30	†WALTERS, Carl	RM1	Lt '51
	WELLS, L B	RM2	
SD6	†WELSCH, Elmer M	CRM	Lt '50
16	WILMOT, George C	RM1	LCdr'51
SD7	†YETTE, Gilbert H	RM1	RM1 '40
	YOUNG, R	Y1	

Wire Rooms:
CLINE, George J
KRENKE, A F
MANNING, F E
MARKS, John W
PETERSON, R O
†SIMPSON, Walter S
WILLIAMSON, W E

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.

From copy in OTC archives of Xmas card belonging to Mansard. San Diego, Bellevue & WORES class numbers, if known, added for cross reference. Civilian clerks & secretary omitted. Any errors in first names are those made during research.

NLG RDF STATION Pt. REYES — Dec 1931

RMS Cl#	Name	Rate	Retired
	BERRY, R	RM2	
	DWARESKI, P J	RM2	
	HILBORN, R W	CRM	
	HOCKETT, Harold H	RM1	LCdr'53
	KUCHERA, J	SC1	
26	†PURL, John H	RM2	Lt '53

†Deceased.
MEMBER OTC SoCal 1978 or earlier.

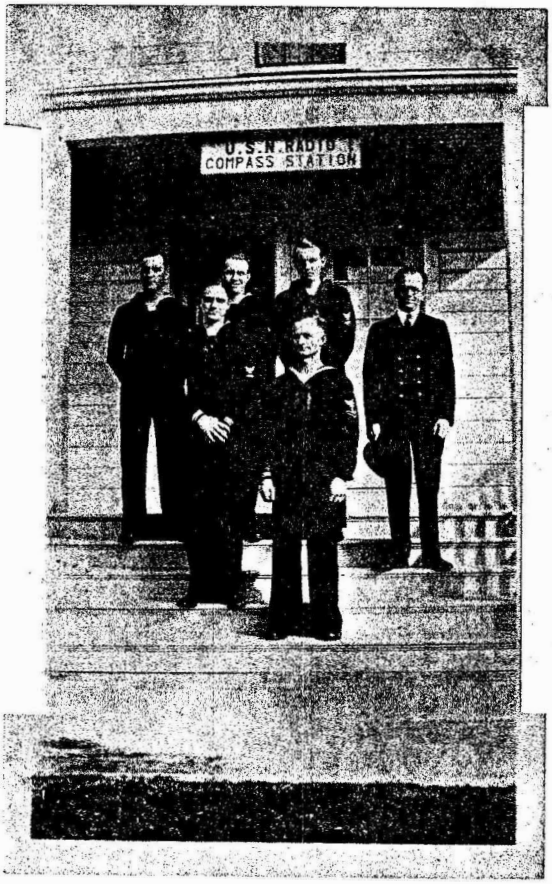
From a Xmas card donated to the OTC archives by Stoddard. Bellevue class numbers, if known, added for cross reference.

NYW RDF STATION POINT ST. GEORGE -- Mar 1930 to Aug 1932

RMS Cl#	Name	Rate	Retired
23	ANDERSON, Martin L	RM2	Lt '57
1,W13	†BARTKO, John J	RM1	Cdr '57
	BRIGGS, Ernest P	CRM	Lt '48
	†McCORMICK, Edward J	RM1	Lt '46
	MORTENSON,	RM2	
22	†INGONER, Joseph W	RM2	Lt '53
	STOVALL, J C	RM2	
21,33	†TITTLE, Earl W	RM1	CWO2'51
SD7	†WEBSTER, William L W	CRM	LCdr'49

†Deceased.
MEMBER OTC SoCal and/or NorCal 1984 or earlier.

From names recalled by Anderson, covering his tour of duty. Closest Xmas card list is 1933. San Diego, Bellevue & WORES class numbers, if known, added for cross reference. Any errors in first names are those made during research.



L to R

1. Mortensen — top row
2. McCarty — top row
3. Anderson — top row
4. Tittle — front row
5. Ship's Cook — front row
6. Briggs - CRM in Charge.

Photo by Ernest P. Briggs

NPG RADIO SAN FRANCISCO (CONTROL) -- Dec 1931
100 HARRISON STREET SAN FRANCISCO CALIFORNIA

RMS Cl#	Name	R/R	Retired
	†ALEXANDER, Jesse J	CRE	Lt '39
	ANDERSON, Lester N	Y1	LCdr'56
SD9	†ARCHAMBEAULT, Joseph C	RM1	Lt '50
	BAHRS, Edward J	CRM	RMC '??
	BELLERBY, Russell J	Ltjg	RAdm'55
	†BLADES, George W	CRM	RMC '??
	BLOWERS, J R	RM2	
19	†BOARMAN, Charles R	RM2	CWO2'47
	†BREWINGTON, Carl W	LCdr	Cdr '42
	BRIDGES, B W	S1	
SD7	†BRIGHT, Glen Franklin	CRM	RMC '??
W17	†CHANCE, Emmett W	RM1	CWO4'57
	CLIFFORD, R P	RM2	
	or		
	CLIFFORD, Thomas P	RM2	CWO2'57
SD9	†COBER, Allen J	RM1	RMC '??
	†COIL, Edmonston E	Lt	LCdr'43
	†CULP, Ross S	Capt	Capt'40
	DAGGETT, G R	Y1	
	†FARR, Ellis H	RM1	
21	FORREST, Arthur D	RM1	
	FUQUA, Samuel G	Lt	RAdm'53
	HINCHEY, Grant F	RM1	
	†HINCHEY, Russell L	RM1	LCdr'48
	KEHOE, Leon J	CY	Ltjg'45
	†KRAMER, Oloeces	CRM	
	LESTER, Royal	Y2	Lt '52
	†LOWRY, William I	CRM	Lt '51
	†LUCUS, William R	RM2	RMC '??
	†McCORMICK, Edward J	RM1	Lt '46
	†McCUTCHEN, John C	Lt	Capt'54
	MIDDLETON, W W	RM2	
	MILLER, Theodore M	Y1	CWO2'49
33	MISEMER, Ernest L	RM1	CWO2'54
	MOZINGO, Vernon I	EM1	CWO2'53

RMS Cl#	Name	R/R	Retired
	NOBLE, Christopher	Lt	Cdr '47
SD5	†NORTHCUTT, William C	CRM	CWO2'40
	†O'HERN, John P	RM2	RMC '??
32	OLSON, Archie L	RM2	CWO4'58
12	†PORTER, Clarence A	RM1	Lt '46
	ROBERTS, G C	RM2	
	SCHNEIDER, E F	RM2	
SD4,14	SCHULTZ, R	CRM	
SD10	SIMPSON, Harry L	CRM	
	†SIMPSON, Rodger W	Lt	RAdm'51
26	†SMITH, Howard Laverne	RM2	Lt '57
19	†STASTNY, Emil	RM1	RMC '45
20	STRACK, Frank Jr	RM2	CWO2'51
	STRICKLEY, Guy H	CY	CWO2'46
22	SWOFFORD, Harold W	RM1	(1)
	SWAFFORD, Wm Harold V	(1)	CWO3'54
SD9	TODD, George B	RM1	Lt '52
	†WALSH, F V	CRM	
28,30	WALTERS, Carl	RM1	Lt '51
	WELLS, L B	RM2	
SD6	†WELSCH, Elmer M	CRM	Lt '50
	†WOODWORTH, James E	RM2	WO1 '52
28	†YAGER, Joseph Toth	RM1	RMC '??
	YOUNG, R	Y1	
SD7	†ZERBE, Howard E	CRM	Lt '??

Wire Room

CLINE, George J
KRENKE, A F
MANNING, F E
MARKS, John W
PETERSON, R O
†SIMPSON, Walter S "Cy"
WILLIAMSON, W E

†Deceased
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.
(1) Swofford changed to Swafford.

From a Xmas card donated to the OTC archives by Dave Brown. If known, Bellevue, San Diego and WORES class numbers are shown for cross reference. Any errors in first names are those made during research.

NPW RADIO & DF STATION EUREKA -- Fall 1932
TABLE BLUFF -- NEAR EUREKA CALIFORNIA

RMS Cl#	Name	Rate	Retired
17	†BECKER, Joseph M	RM1	CWO2'52
25	†BROWN, Luther D	RM2	CWO2'53
	CONOVER, J K	RM2	
32	GEWERTZ, Manning	RM2	Cdr '56
	JONES, O F	SC3	
16	LAGLE, Robert D	RM1	Cdr '56
18	†LAWRENCE, Floyd G	RM1	CWO2'50
29	†McMARTIN, Francis J	RM2	Ltjg'55
	NELSON, Claud L	RM2	Ltjg'57
22	†NOONER, Joseph W	RM2	Lt '53
	†WYLIE, Carroll A	CRM	

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.

From a snapshot belonging to Gewertz and recall by Lawrence. Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during research.

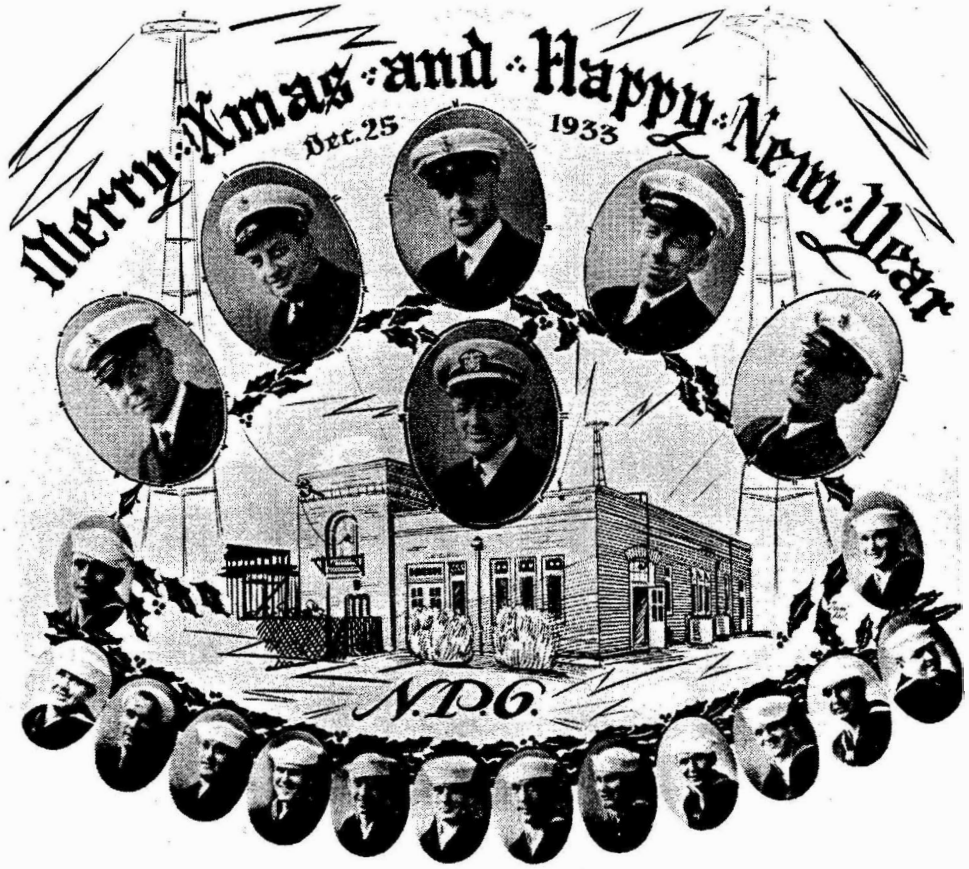
NPW Gang — Fall 1932
Top: Jones Lawrence Nooner
Front: Conover Brown Nelson Gewertz

NPG HIGH-POWER MARE ISLAND -- Dec 1933
MARE ISLAND NAVY YARD VALLEJO

RMS Cl#	Name	R/R	Retired
W5	ANDERSON, James W	RE	LCdr'50
13	†BARNES, James E	RM1	RMC '4?
	BARNHILL, Paul E	RM2	LCdr'51
	BLISS, William H Jr	RM2	CWO2'56
	†BRYAN, William D Jr	RM1	CWO2'4?
	CLEMENT, R H	CEM	
	FRADY, William H	CRM	
SD1	†FRIEND, Roy	CRM	CWO2'46
	GAFFNEY, E M	RM2	
	†GREENWELL, Arthur M	CRM	CWO2'4?
15	†GREENWOOD, Walter E	RM1	CWO2'51
32	MANSARD, Robert E	RM2	Cdr '58
13	†McDONALD, Francis J	RM1	CWO2'52
	McGRATH, Milton J	RM1	RMC '
	†MIKESELL, Hubert B	RM1	CWO2'53
	MILLER, F E	SC2	
	NICHOLAS, George A	F1	CWO2'56
14	POHL, James L	RM1	
9	RASMUSSEN, G O	RM1	
	RECKSIEK, William H	CRE	LCdr'46
	WEINERT, P R	RM1	
SD8	†WOODY, William C	CRM	CWO2'43

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.

From a copy in the OTC archives of a Xmas card, with picture, belonging to Metz. San Diego, Bellevue and WORES class numbers, if known, added for cross reference. Any errors in first names are those made during research.



Top row:
Friend CRM
Clement CEM
Greenwell CRM
Frady CRM
Woody CRM
Center:
Recksiek CRE
Bottom:
Barnhill RM2
Bryan RM1
McGrath RM1
Rasmussen RM1
Bliss RM2
Mansard RM2
Weinert RM1
Mikesell RM1
Nicholas F1
Gaffney RM2
Greenwood RM1
Pohl RM1
Miller SC2
McDonald RM1

See complete list OTC archives

NPW RADIO & DF STATION EUREKA — Dec 1933

RMS Cl#	Name	Rate	Retired
	CLARKE, R L	RM1	
	GRIFFIN, E L	SC3	
27	HOLZENBERG, Eugene V	RM2	CWO2'57
13	HOUSH, Thomas J	RM1	Cdr '56
30	†LIVINGSTON, Leland A	RM2	CWO2'52
	NELSON, Claud L	RM2	Ltjg'57
24	†PANDZIK, George R	RM2	Cdr '58
28	PURNELL, Daniel D	RM2	Ltjg'57
	†REINHARDT, Shuford M	CRM	CWO2'47
16	†WEEDEN, Homer D	RM1	Lt '47

†Deceased.
MEMBER OTC SoCal and/or NorCal 1974 or earlier.
ADDRESS on hand in 1974.

From a photocopy in the OTC archives of a Xmas card belonging to Gewertz. Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during research in 1974.

NYW RDF STATION POINT ST. GEORGE — Dec 1933

RMS Cl#	Name	Rate	Retired
	AUSTIN, B T	RM2	
	DANGELO, E	SC2	
	FRAZIER, A K	RM2	
32	GEWERTZ, Manning	RM2	Cdr '56
24	LITTRELL, D F	RM1	
	†STEWART, Duane F	CRM	RMC '??

MEMBER OTC SoCal and/or NorCal 1974 or earlier.

From a photocopy in the OTC archives of a Xmas card belonging to Gewertz. Bellevue class numbers, if known, added for cross reference.

FEDERAL OFFICE BUILDING CIVIC CENTER SAN FRANCISCO

NPG RADIO SAN FRANCISCO (CONTROL) -- Dec 1936

See separate page for Mare Island

RMS Cl#	Name	R/R	Retired
34	†ALBORN, Andrew J	RM2	RMC '??
	CASSITY, Ola W	RM1	RMC '??
	†CONLON, Michael J	Lt	LCdr'43
	CROWELL, Melvin J	RM2	RMC '
	†DAY, Eugene C	RM2	CWO2'49
	DOWLING, Thomas F	RM2	
	DOYLE, E G	RM2	
	†ELLIOTT, Boyce F	RM2	RMC '??
	†ELLIS, Raymond E	RM2	CWO3'52
	†GARMSTON, John J	CRM	Lt '52
	GIAMBATTISTA, Frank D	Lt	RAdm'58
	†GOODWIN, Frank E	RM2	LCdr'56
	GORDY, Tom W	RM2	Lt '57
	GUIDRY, G	RM2	
SD8	†GUTERMANN, Ernest H	CRM	Lt '51
	†HANSEN, Eiler C	Y1	Lt '54
	†HARVILL, James R	CRM	RMC '39
	HEAD, Frank B		
	†HUDSON, Homer B	Lt	Capt'53
	HUGHES, R L	RM1	
	HUGHES, R L	Y2	
	JONES, Howell Harrington	RM1	CWO2'50
	KELLY, Ralph T	CRM	Lt '51
30	†KITCHENS, Bernard R	RM1	
	LAVOY, Clement P	RM2	LCdr'59
EM27	LEE, Curtis M	RM2	CWO3'57
	†LILLARD, Reese W	CRM	LCdr'??
	†MACIOLEK, John	RM2	LCdr'56
	MAIRE, C T	CRM	
	MARZER, T	Y1	
	McCORMICK, James R	Lt	RAdm'57
	†McKELVEY, Carlton A	CRE	LCdr'47
	†MELGAARD, John L	Lt	RAdm'55
	MELLING, Robert E	LCdr	RAdm'50
	MILLS, Arthur L	RM2	CWO2'53
	MITCHELL, Walton C	RM2	RMC '
	NISSLEY, W W	RM1	
	PALACIOUS, Ernest G	EM1	CWO2'49
31	†PASSANISI, Joseph	RM2	WO1 '57
	PATTEN, Stanley F	LCdr	RAdm'47
	PHELPS, William J	Y2	LCdr'58
	†PURVES, George W	RM2	
W24	RIGHTMYER, Jackson M	RM2	Cdr '60
	†RISER, William E	RM1	RMC '??
	ROBERTSON, L H	RM2	
	ROBINSON, J C	Y2	
	†ROGERS, Ellsworth F	RM2	CWO2'57
	SCHILLING, J U	CY	
	†SCHNEIDER, Nullet F	Lt	Cdr '43
	†SHIPP, Earl R	Capt	Capt'41
32	†SMITH, Harold V	RM1	CWO3'52
	SMITH, Marshall Lawr.	Ltjg	Cdr '43
	SOTAK, John W	RM1	Cdr '60
SD3	STEINER, Max	CRM	Lt '49
	STENBACK, Urho	CRM	LCdr'50
	STEPHENSON, Rowland G	RM2	CWO2'59
9	†SZABLA, A Joseph	CRM	RMC '??
	TARDOWSKY, Gustie J	RM2	RMC '48
	THOMAS, John J	CRM	Lt '49
	†WHITE, Robert F	RM2	Lt '52
	WILLIAMS, Raymond J	CY	Lt '48
SD6	†WOEBER, John C	CRM	Lt '47

Telegraphers:

CLINE, George J
FRANKS, Charles E
MANNING, F E
MARKS, John W
PETERSON, R O
†PHELPS, Harold B Lt '46
†SIMPSON, Walter S "Cy"

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earl er.
ADDRESS on hand in 1985.

From copy in OTC archives of Xmas card belonging to Phelps. Secretary and clerks omitted here. San Diego, Bellevue, WORES & Electronics Maintenance class numbers, if known, added for cross reference. Any errors in first names are those made during research.

NPG RADIO SAN FRANCISCO (CONTROL) - FEDERAL OFFICE BUILDING, SAN FRANCISCO, CALIFORNIA - DEC 1936.
(See APPENDIX B-13 for complete archives list. See APPENDIX B-15 for photo identifications)

NPG RADIO SAN FRANCISCO (CONTROL) — Dec 1936

Below are listed tentative identifications of persons pictured in the photo on opposite page APPENDIX B-14. Readers are requested to help identify additional persons. See complete archives list of personnel attached APPENDIX B-13. Please do not mark the pages. Send your ideas to George B. Todd or John W. Trott.

FRONT ROW

1. Thomas, Douglas N. CRE
2. Melling, Robert E. LCDR
3. Shipp, Earl R. CAPT
4. Hudson, Homer B. LT
5. Rice, Arthur, Radio Engineer

SECOND ROW

1. Hamilton
2. Woeber, John C. CRM
3. Steiner, Max CRM
4. Kelly, Ralph T. CRM
5. Harvill, James R. CRM
6. Szabla, A. Joseph CRM
7. Lillard, Reese W.
8. Thomas, John J. CRM

THIRD ROW

1.
2. Robertson, L. H. RM2
3. Sotak, John W. RM1
4. Maciolek, John RM2
5.
6. Goodwin, Frank E. RM2
7. Hughes, R. L. Y2
8.

FOURTH ROW

1. Head, Frank B
2. Stephenson, Rowland G. RM2
3.
4. Hansen, Eiler C. Y1
5.
6.
7.
8.
9. Dempsey,
10. Elliott, Boyce F. RM2

FIFTH ROW

1.
2. Passinisi, Joseph RM2
3. Seaman,
4. Alborn, Andrew J. RM2
5. Lee, Curtis M. RM2
6. Crowell, Melvin J. RM2
7. Gordy, Tom W. RM2
8. White, Robert F. RM2
9. Tardowsky, Gustie J. RM2
10.
11. Mitchell, Walton C. RM2

SIXTH ROW

1. Harrington (USMC)
2. Judd (USMC)
3. Manning, F. E. Telegrapher
4. Franks, Charles E. Telegrapher
5. Cline, George J. Telegrapher
6. Simpson, Walter S. "Cy" Telegrapher
7. Bonsolid (USMC)
8. Bell (USMC)

NPG RADIO STATION MARE ISLAND — Dec 1936
High Power and Diversity
See separate page for San Francisco (Control)

RMS Cl#	Name	R/R	Retired
15	†COWARD, James L	RM1	CWO2'50
19	†CRABTREE, William R	CRM	Lt '48
	†FREEBURG, Charles F	RM1	RMC '??
	HAMPTON, H E	RM1	
	HERR, F P	CEM	
	JONES, Albion P	RM1	ETC '47
	†LAVELLE, William R	CRE	11-16-39 CRE
	MARBOURG, R L	RM1	
	MATHIS, G M	RM2	
SD5	†MAYS, Charles E	RM1	CWO2'49
20	†McDONALD, Francis O	RM1	Cdr '59
	†MORRISSEY, Lyell E	CRM	Ltjg'45
	MULLEN, E J	RM1	
32	MURR, Clifford	RM2	CWO2'54
	†NEERGAARD, Alphin C	RM2	CWO2'57
17	OLSEN, Ralph C	CRM	CWO2'52
	OLSON, George E	RM2	Lt '56
	†RAMBO, Roscoe E	RM2	4-12-42 ARM1
	REID, C F or REED, C F	CRM	
	SMITH, Arthur	RM2	CWO4'59
	†TRACY, Walter C	CRM	CWO2'47
32	WALKER, Charles Henry	RM2	Cdr '57
	WELLS, D C	SC2	
	WILDEY, Arthur D	RM1	Lt '53

†Deceased.
MEMBER OTC SoCal and/or NorCal 1980 or earlier.
ADDRESS on hand in 1978.

From a copy in the OTC archives of a Xmas card belonging to H. B. Phelps. San Diego and Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during research.

NPW RADIO & DF STATION EUREKA -- Dec 1936
TABLE BLUFF - - NEAR EUREKA CALIFORNIA

RMS Cl#	Name	Rate	Retired
	BROWN, H R	RM2	
	BROWN, Roy E	RM2	Lt '59
	†CONROY, Timothy V	CRM	LCdr'49
	†FLACK, J Frank	RM2	
	ISDAL, Conrad R	RM1	RMC '
28	McANN, James L	RM1	Cdr '58
	MORROW, Melvin D	RM1	CWO2'52
	PAQUETTE, R V	SC2	
	†PRINE, Joseph W	RM2	
33	†WANGSNES, Erling	RM2	Lt '53

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.

From a Xmas card donated to the OTC archives by Stoddard, and a copy from McAnn. Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during research.

NPG RADIO SAN FRANCISCO (CONTROL) — Dec 1937
FEDERAL OFFICE BUILDING CIVIC CENTER SAN FRANCISCO

RMS Cl#	Name	R/R	Retired
	ANDERSON, E H	RM3	
	†AVERY, Fred B	Lt	Capt'46
5	†BOLEY, George E	CRM	CWO2'50
	†BROWN, Charles E	RM1	LCdr'49
	BROWN, Roy E	RM2	Lt '59
	†BUCY, William P	RM1	RMC '??
23	BURTON, R F	RM1	
	CAMPBELL, D J	EM2	
	†DEMPSEY, James W	RM3	LCdr'59
	†DOLECEK, Edward E (2)	LCdr	Capt'47
	DOWLING, Thomas F	RM2	
30	†DUNSON, Bernarr A	RM1	†10-8-44 Ltjg
	†ELLIOTT, Boyce F	RM2	RMC '??
	†EUBANKS, Robt Erie	Y2	Ltjg'59
	†FLANAGAN, Henry C	LCdr	RAdm'46
	FRASER, Gilbert A	RM1	LCdr'59
22	†GARINER, Mark	RM1	RMC '??
25	†HARDCASTLE, William	RM1	Lt '54
	HEAD, F B	Y2	
	HENNINGER, Robert J	RM1	RMC '??
	HUGHES, R L	RM1	
23	†LAHYM, Clifford W	RM1	RMC '??
	LAVOY, Clement P	RM1	LCdr'59
EM27	LEE, Curtis M	RM2	CWO3'57
	LEMBECK, Walter H	RM3	
	†LESNIEWSKI, Leo	Y1	CWO2'57
15	†LEWIS, Virgil R	CRM	RMC '??
	†LILLARD, Reese W	CRM	LCdr'??
	†MacGREGOR, Malcolm D	Lt	Cdr '47
	†MACIOLEK, Michael	RM2	LCdr'56
33	MITCHELL, Ralph	RM2	CWO4'58
15	†MORRIS, Leo W	CRM	RMC '50
	MULLEN, E J	RM1	

RMS Cl#	Name	R/R	Retired
	NICHOLSON, F B	RM2	
	ODELL, Rollin W	Y2	Lt '59
	†OSTRANDER, Richard J	CRE	Lt '42
SD6	†OVERTURF, Harold H	CRM	CWO2'52
	PARKER, G F	RM2	
	PATTEN_, Stanley F	LCdr	RAdm'47
	PHELPS, William J	Y2	LCdr'58
	PHILLIPS, Walter D	CY	WO1 '42
	REID, C F	RM2	
W24	RIGHTMYER, Jackson M	RM2	Cdr '60
	SCHILLING, J U	CY	
	SEEMAN, Thomas H	RM2	RMC '48
	†SHIPP, Earl R	Capt	Capt'41
	†SMITH, Irving B	Lt	LCdr'41
	SOTAK, John W	RM1	Cdr '60
SD3	STEINER, Max	CRM	Lt '49
	STEPHENSON, Rowland G	RM2	CWO2'59
	TARDOWSKY, Gustie John	RM2	RMC '48
21,33	†TITTLE, Earle W	RM1	CWO2'51
	WILDEY, Arthur D	RM1	Lt '53
SD6	†WOEBER, John C	CRM	Lt '47
	†WOLCOTT, Theodore	Lt	LCdr'47

Wire Room Telegraphers

CLINE, George J
FRANKS, Charles E
MANNING, F E
MARKS, John W
PETERSON, R O
†PHELPS, Harold B — Lt '46
†SIMPSON, Walter S "Cy"

†Deceased.
MEMBER OTC SoCal and/or Nor Cal 1985 or earlier.
ADDRESS on hand in 1985.
(2) Designated Naval Aviator.

From a copy in the OTC archives of a Xmas card belonging to "Skinny" Phelps. Clerks and secretary omitted. Bellevue, San Diego, WORES and Electronic Maintenance class numbers added for cross reference. Any errors in first names are those made during research.

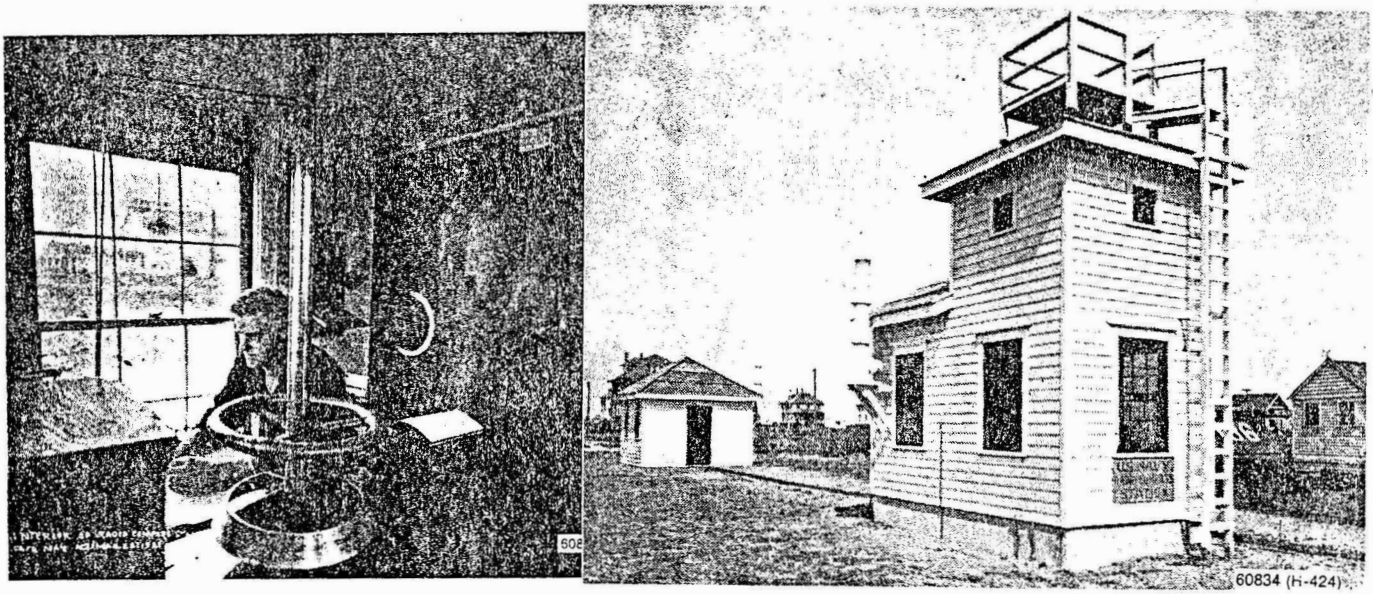
NPW RADIO & DF STATION EUREKA -- Dec 1937
TABLE BLUFF -- NEAR EUREKA CALIFORNIA

RMS Cl#	Name	Rate	Retired
	†BERNOT, Theodore	RM3	CWO4'58
24	CONNOLLY, Alexander J	RM1	CWO3'55
	†CONROY, Timothy V	CRM	LCdr'49
	COSTLEY, D V	SC2	
	†FLACK, J Frank	RM2	
	MORROW, Melvin D	RM1	CWO2'54
	†PRINE, Joseph W	RM1	
	SKARDA, Elmer J	RM2	CWO3'55
33	†WANGSNES, Erling	RM2	Lt '53
	YOUNG, C A	RM3	

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.

From a copy in the OTC archives of a Xmas card belonging to Dempsey, USMC. Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during research.

* * * * * * * * * * * * * * * *



RADIO DIRECTION FINDER STATION, CAPE MAY, NEW JERSEY, 1921

This station was typical of the Navy's medium-frequency coastal radio direction-finder system, established between 1918 and 1923 with a total of 46 stations along the Atlantic, Gulf, and Pacific coasts. Later, the system was extended to include South America and portions of the Pacific Ocean. It became "indispensable to the Navy and world shipping" and continued in service during World War II for navigation and enemy emission intercept. The loop was mounted in the top of the structure. NRL made many contributions to increase the effectiveness of this system.

From "Evolution of Naval Radio-Electronics and Contributions of the Naval Research Laboratory" by Louis A. Gebhard, 1979.

NPG RADIO SAN FRANCISCO (CONTROL) -- Dec 1938
FEDERAL OFFICE BUILDING CIVIC CENTER SAN FRANCISCO

RMS Cl#	Name	R/R	Retired
16	†AINSWORTH, Maurice	CRM	CWO2 '48
	ALVORD, Eugene H	RM2	CWO2 '59
	BANACH, Theodore S	Y2	
33	BARTKO, Paul J	RM1	Cdr '61
	BINGHAM, Edward M	Ltjg	Cdr '43
	BIRO, Louis M Jr	RM2	
19	†BOARMAN, Charles R	RM1	CWO2 '47
5	†BOLEY, George E	CRM	CWO2 '50
	†BROWNELL, Stuart E	RM2	RMC '53
23	BURTON, R F	RM1	
	CAMPBELL, D J	EM1	
	CARLSON, Stanley R	Y2	
5	†CORNMAN, Charles F	CRM	RMC '??
	DODSON, T O B	RM2	
	†DOLOCEK, Edward E (2)	LCdr	Capt '47
	†DOUGLAS, Theodore C	CRM	CWO2 '47
	†EUBANKS, Robert E	Y2	Ltjg '59
	EWING, Charles M	Y2	CWO2 '52
	FANCHER, Ben H	RM1	RMC '??
	†FITTS, William W	Ltjg	†Capt '57
	†FLANAGAN, Henry C	LCdr	RAdm '46
22	†GARINER, Mark C	RM1	RMC '??
EM30	GARRISON, William N	RM1	CWO4 '61
EM31	†GOULD, Roscoe O	RM2	CWO2 '59
	HATCHEL, Cecil B	RM1	RMC '47
	HEILMAN, William D	RM2	RMC '??
	HENNINGER, Robert J	RM1	RMC '??
SD7	†HERPIN, Robert S	RM1	Lt '53
	HOGAN, Lee	RM2	Lt '57
33	†KEEFER, William C	RM2	CWO4 '57
	KEEGAN, F E	CY	
	†LANDRO, Lloyd	RM2	WO1 '54
	LEHMBECK, Walter H	RM2	
15	†LEWIS, Virgil R	CRM	RMC '??
	LOHMAN, Hugh P	RM2	

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.
(2) Designated Naval Aviator.

RMS Cl#	Name	R/R	Retired
14	†MELSBACH, Frank L	CRM	ALC '52
33	MITCHELL, Ralph	RM2	CWO4 '58
	MOORE, Harry T	CRM	LCdr '53
	†MORGAN, John O "Pop"	RM1	RMC '??
	MORRIS, A J	RM1	
15	†MORRIS, Leo W	CRM	RMC '50
	†MYERS, Horace	Ltjg	Capt '57
	NORMAN, John A	RM2	
	ODELL, Rollin W	Y2	Lt '59
	OLIVER, William T H	RM2	CWO4 '59
	OSTRANDER, Harold H	CRM	CWO2 '52
	PHILLIPS, Walter D	CY	WO1 '42
23	†RICHARDSON, Edward J	RM1	CWO2 '52
W24	RIGHTMYER, Jackson M	RM2	Cdr '60
	†RUBLE, Wilbur J	Cdr	Capt '47
	†SMITH, IrvingB	Lt	LCdr '41
	†SMITH, Julius Elbridge	Ltjg	Capt '56
	†STOUT, Desmond W	RM2	LCdr '58
	TODD, T O	S1	
	TURJA, Richard H	RM1	LCdr '58
	WALKER, George	Lt	Cdr '43
	WOOD, J L	RM1	
	WOODWORTH, James E	RM1	WO1 '52
	YOUENS, W H	Y2	

Wire Room Telegraphers

CLINE, George J
FRANKS, Charles E
MANNING, F E
MARKS, John W
PETERSON, R O
†PHELPS, Harold B — Lt '46
†SIMPSON, Walter S "Cy"

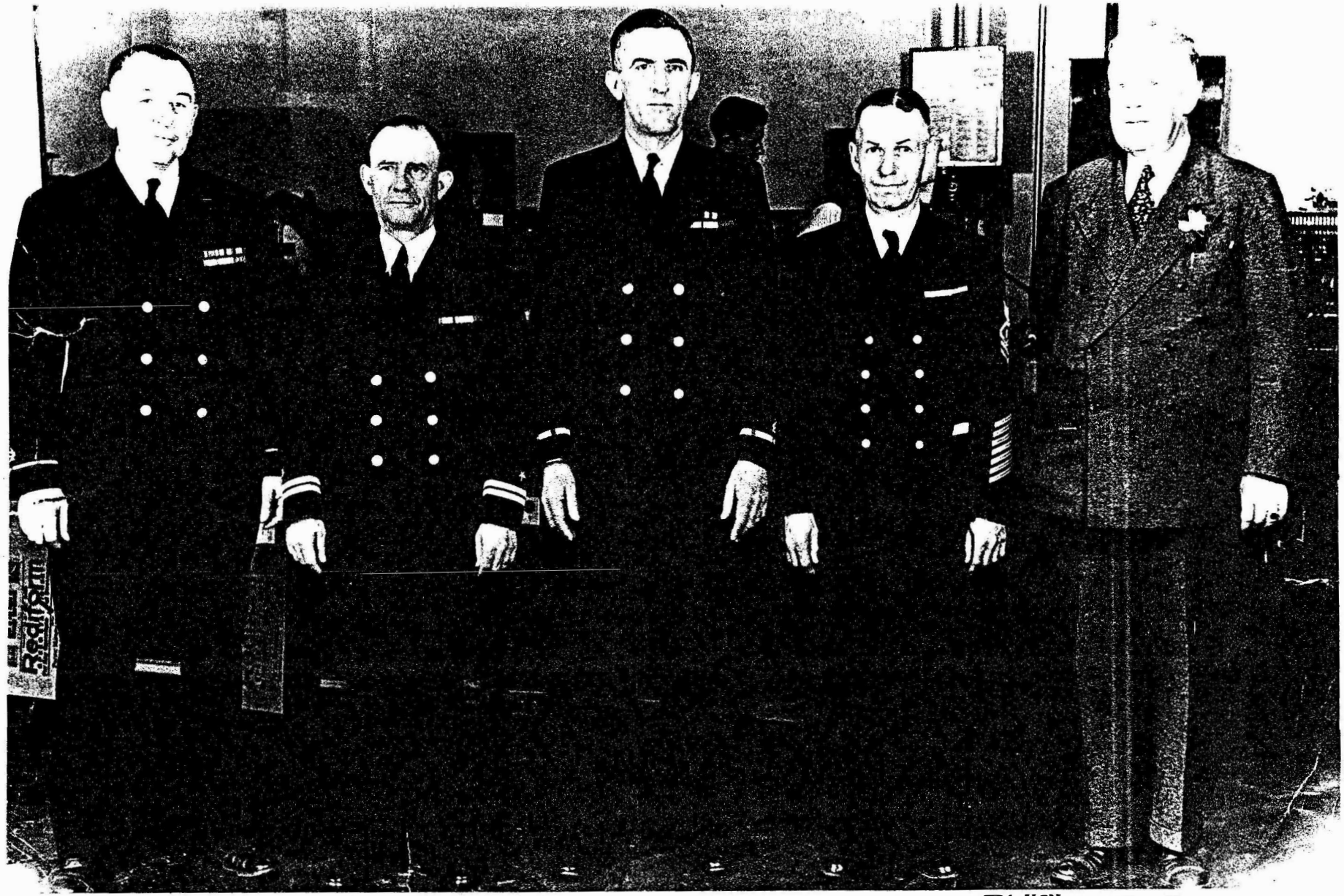
From a copy of a Xmas card in the OTC archives belonging to Harold B. "Skinny" Phelps. Names of senior clerk and secretary omitted. San Diego, Bellevue, WORES and Electronics Maintenance class numbers, if known, added for cross reference. Any errors in first names are those made during research.

NPG RADIO SAN FRANCISCO (CONTROL) & 12th NavDist HEADQUARTERS — Dec 1940
FEDERAL OFFICE BUILDING CIVIC CENTER SAN FRANCISCO

RMS Cl#	Name	R/R	Retired
	ADAMS, Arthur C	Lt	Capt'59
	ALVORD, Eugene H	RM1	CWO2'59
	AXFORD, Lynn R	CRM	
	BALL, George F	RM2	CWO3'58
	BANACH, Theodore S	Y1	
33	BARTKO, Paul J	RM1	Cdr '61
	BINGHAM, Edward M	Ltjg	Cdr '43
	BIRO, Louis M Jr	RM1	
19	BOARMAN, Charles R	RM1	CWO2'47
5	BOLEY, George E	CRM	CWO2'50
	BROWN, Virgil L	RM3	
	CADDY, Arthur W	RM1	Lt '56
	CARLSON, Stanley R	Y1	
	CHARLSON, John A Jr	Ltjg	Cdr '43
	CLASSMAN, Delwin W	Ltjg	Cdr '58
5	CORNMAN, Charles F	CRM	RMC '??
	COTAL, Charles L	RM2	
	COWART, Walter G	CY	Lt '47
	CRANFORD, Clifton	CRM	
	FANCHER, Ben H	RM1	RMC '
	FELLOM, James B USMC	PVT	
SD1	FRIEND, Roy	CRM	CWO2'46
	FULLER, John H	RM2	LCdr'62
22	GARINER, Mark C	RM1	
	GARRETT, Dean C	Y2	Ltjg'65
EM30	GARRISON, William N	RM1	CWO4'61
	GENSEL, Delissa C	RM1	WO1 '53
EM31	GOULD, Roscoe O	RM1	CWO2'59
27	HACKMAN, Milton J	RM1	CWO2'52
	HARVILL, James R	CRM	RMC '39
	HATCHEL, Cecil B	RM1	RMC '47
	HEILMAN, William D	RM1	RMC '
	HENNINGER, Robert J	RM1	RMC '
	JOHNSON, Charles E	RM1	
33	KEEFER, William C	RM1	CWO4'57
	KINMAN, Herbert S	RM1	WO1 '61
	KOEHN, Robert A	RM1	CWO4'56
	KOHLMEYER, Henry A	CEM	WO1 '41
	LANDRO, Lloyd	RM1	WO1 '54
	LAWRENCE, George W	Y2	
	LITTMANN, Robert A	CRE	
	LOHMAN, Hugh P	RM2	
	MANN, Frederick C	RM2	
	McCARTHY, Frederic W	Y1	
	McLIN, Jesse E	RM1	RMC '??
	MELGAARD, John L	LCdr	RAdm'55
	MILLER, Robert J	RM1	
33	MITCHELL, Ralph	RM1	CWO4'58
	MOORE, Harry T	CRM	LCdr'53
	MORGAN, John O "Pop"	RM1	RMC '??
15	MORRIS, Leo W	CRM	RMC '50
	MUNTER, Wilford	Lt	Cdr '57
	NESBETT, Buell A	Ens	Cdr '54
	OLIVER, William T H	RM1	CWO4'59
	OSTRANDER, Richard J	CRE	Lt '42
	PECKENPAUGH, Edward M	Ltjg	Cdr '61
	PHILLIPS, Walter D	CY	WO1 '42
	RAUH, Albert R	Y3	
23	RICHARDSON, Edward J	RM1	CWO2'52
	RICKEY, Paul E	Y1	LCdr'61
	RIBBELING, Lloyd A USMC	PFC	
	ROBERTS, William	RM3	
	SAMUELS, Solomon	CRM	
	SERGEANT, Russell C	Ltjg	Capt'57
	SLATER, John L	Ltjg	
	SMITH, Marshall Lawrence	Ltjg	Cdr'43
	SPINDLER, George	RM2	
SD5	STACY, Harold J	CRM	WO1 '45
34	STEVENS, John A	RM1	LCdr'60
	STEWART, Thomas L USMC	PFC	
	STORER, Max C	RM1	
	STOUT, Desmond W	RM1	LCdr'58
	SUGG, Proctor A	Ltjg	Capt'53
	TURJA, Richard H	RM1	LCdr'58
	VENSEL, Frank E Jr	Cdr	Capt'47
	WARDLOW, Harold V	Ltjg	Cdr '59
	WEIN, Albert	RM1	ETC '53
SD6	WELSCH, Elmer W	CRM	Lt '50
	WILLIAMS, Norman USMC	PVT	
	WORTHINGTON, Walter C	RM1	
	WULF, James T	RM1	LCdr'57

Telegraphers: BATEY, Harry C CLINE, George F
FRANKS Charles MARKS, John W
SIMPSON, Walter S "Cy"
SOOMAN, Ferris THOMPSON, R G

From a Xmas card donated to the OTC archives by Welsch. Three civilian names omitted. San Diego, Bellevue and Electronic Maintenance class numbers, if known, added for cross reference. Any errors in first names are those made during research.



Raymond Ireland McGee
Radio Electrician USN

R. J. Ostrander LT USN
Officer in Charge

Harold B. Phelps CRE USN
Asst. Officer in Charge

Kohlmeyer CEM USN
Repair Shop

W. S. Simpson
Chief Telegrapher

U. S. Naval Radio Station NPG
Federal Office Building

San Francisco, California
1942 or 1943

NPG RADIO SAN FRANCISCO (CONTROL) ___ 1945

Top row: Smith Shockley McMartin Steele Doritty Walling Irish Bradham

2nd: Schneider Gewertz Porter Thorne Edmunds Klouck Steiner

Front: Venerri Smith Welling Ehredt Jones

NPG RADIO SAN FRANCISCO (CONTROL) — ??? 1945

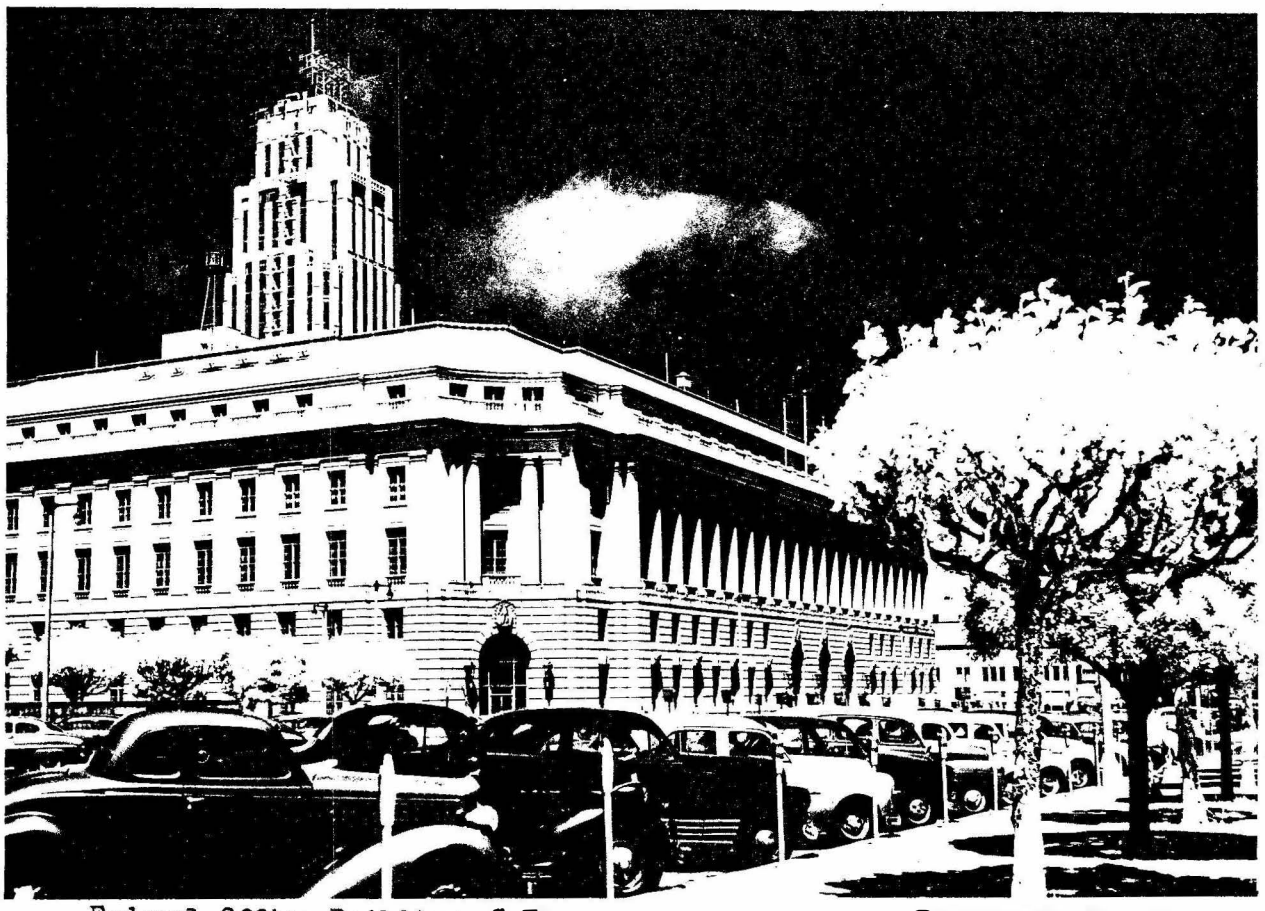
RMC Cl#	Name	Rank	Retired
	BRADHAM, Leroy F	CRE	CWO2'61
	DORITTY, Raymond E	Ltjg	Ltjg'58
25	EDMUNDS, Oscar N	Lt	LCdr'56
	EHREDT, Ruth	Ens	
32	GEWERTZ, Manning	Lt	Cdr '56
	IRISH, Donald W	CRE	CWO2'57
	JONES, Robert E Jr	CRE	
32	KLOUCK, Charles H	Lt	LCdr'55
29	‡McMARTIN, Francis J	Ltjg	Ltjg'55

RMS Cl#	Name	Rank	Retired
12	‡PORTER, Clarence A	Lt	Lt '46
	‡SCHNEIDER, Henry	CRE	CWO2'50
	SHOCKLEY, Lyndol C	CRE	CWO2'47
	‡SMITH, James William	Lt	Cdr '55
	SMITH, Loretta M	Ltjg	
	STEELE, Robert H	Ltjg	LCdr'57
SD3	STEINER, Max	Lt	Lt '49
34	THORNE, Alfred H	Lt	Cdr '59
	VENERRI, Frank	CRE	CWO2'58
	‡WALLING, Walter W	RE	CWO4'59
	WELLING, Harriet	Ltjg	

‡Deceased.
MEMBER OTC SoCal and/or NorCal 1972 or earlier.
ADDRESS on hand in 1972.

From names recorded on reverse of a picture belonging to Thorne. San Diego & Bellevue class numbers, if known, added for cross reference.

See photo on opposite page APPENDIX B-22



Federal Office Building, S.F.

Picture by Les Funston

NPG RADIO SAN FRANCISCO (CONTROL) — Dec 1946
First Class & Up only; omitting most civilians
See separate pages for Mare Island & Skaggs Island

RMS Cl#	Name	R/R	Retired
	ADAMS, Odette S	Lt	
	ANDERSON, J D	CRM	
	ANDREWS, R M	CRM	
	APPLER, Mary E	Lt	
	AUGUSTUS, R M	CEM	
	†BARRINGTON, Raymond M	CRM	CWO2'59
	BATES, J D	CRM	
	BRAND, Joseph N	RM1	Lt '69
	BRYLES, C J	CRM	
	CADDY, Arthur W	Ltjg	Lt '56
	CARR, E F	CRM	
	CARSON, H R	RM1	
	CARTER, Ralph J	CRM	CTC '
	CAVERLY, Floyd M	CETM	CWO3'61
	CAVINESS, C R	CRM	
	CAYA, G A	RM1	
	CLINE, George J	Civ	
	CLOUGH, G F	RM1	
	COATES, R C	Y1	
	COGAN, M S	RM1	
	COUNCIL, Dorothy I	LCdr	
	CRICHTON, Ellen G	Ltjg	
	CROMER, A F	RM1	
	DAWDYIAK, E M S	Y1	
	DORITTY, Raymond E	Ltjg	Ltjg'58
	DROBISH, J D	Y1	
	ELLIOTT, Richard E	Capt	Capt'55
	FALCONER, J H	CRM	
	FANSHER, Virgil E	RM1	CWO2'62
	GAZAWAY, E I	RM1	
	GOLDTHWAITE, C A	CRM	
	GORMAN, J E	RM1	
	GRESHAM, J R	RM1	
	GRIBBLE, D	RM1	
	GRIFFIN, P P	Y1	
	HARRISON, B G	RM1	
	HAYES, G F	T1	
	HAYES, N E	T1	
	HENNINGER, Robert J	Civ	RMC '
	HINMAN, J C	RM1	
	HOLT, D G	T1	
	HOOVER, John S	CRM	Cdr '71
	HORNER, Thomas L	LCdr	Capt'72
	HUNT, F F	RM1	
	IRISH, Donald W	CRE	CWO2'57
	JONES, Robert E	Civ	CivS'
	JOY, E E	CRM	
	KEHOE, Eleanor F	Lt	
	KOHLMEYER, Henry A	CEM	WO1 '41
	LAWRENCE, E P	RM1	
	LOCKE, Elizabeth	Ltjg	
	LODOLO, A A	RM1	
	MALICK, Sam R Jr	RE	CWO4'59
34	McLANE, Albert R	Lt	LCdr'56
	McQUEEN, Russell O	CRM	
	MONTGOMERY, F B	CRM	
	MORRIS, Robert E	RM1	
	NORVELLE, A E	CRM	
	OFFICER, Wallace B Jr	Ens	Cdr '68
	OWRE, Adrienne F	Lt	
	REH, Theodore J	CRM	CWO3'59
	RITCHIE, Margaret C	LCdr	
	ROBINSON, J C	CY	
	RODGERS, Virginia M	Lt	
	ROETHLER, B H	CRM	
	ROUSCH, R D	RM1	
	RUSSELL, J R	CRM	
11	†RYAN, Philip H Jr	Civ	CWO2'48
	SANDBERG, Vera L	Ltjg	
29	†SCHRAMM, Marshall G	Ltjg	Ltjg'57
	SCHULTZ, Wilbur D	RM1	RMC '
	†SHIELDS, Charles I	Cdr	Capt'61
	SIBERT, L S	RM1	
	†SIMPSON, Walter Scott	Civ	CivS'??
	SKAHILL, J J	RM1	
	SLAYTON, Nancy A	Lt	Lt '68
	SMITH, Loretta M	Ltjg	
	†SNOW, Jack D	CRM	RMC '
	STEELE, Robert H	Ltjg	LCdr'57
	SUMRALL, M I	Ltjg	
	SWANSON, W T	CRM	
	TANNATT, R C	RM1	
	TENNILLE, H	Lt	
	†VOLKMAN, William J	LCdr	LCdr'47
	WALSH, V J	RM1	
	WARREN, G C	RM1	
	WESTERMAN, G F	RM1	
	WIGGINS, Cathryn G	Ltjg	
	WILLIAMS, H H	RM1	
16	WILMOT, George C	LCdr	LCdr'51
	WOOLLEY, John A	RM1	CWO2'62

†Deceased.
MEMBER OTC SoCal and/or NorCal 1972 or earlier.
ADDRESS on hand in 1978.

From a copy in the OTC archives of a Xmas card belonging to Schramm. Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during continuing research.

NPG RADIO TRANSMITTER STATION MARE ISLAND — Dec 1946
See separate pages for San Francisco (Control) and Skaggs Island

RMS Cl#	Name	R/R	Retired
	BAXTER, J J	CRM	
	BECKER, Alvin L	Capt	Capt'54
	†BROWNELL, Stuart E	CRM	RMC '53
	BULMAN, R B	RM1	
	COYLE, R T	CRM	
	DAVIS, W	ETM1	
	†DOMILSKA, Emilius S	CRM	RMC '??
	EELLS, Floyd M	CRM	RMC '??
	EVANS, R R	CRM	
	FORD, E	RM2	
EM31	†GOULD, Roscoe O	RE	CWO2'59
	GREEN, R V	RM2	
	HAHN, E	EM1	
	HARRIS, W B	CRM	
	HAWKINS, G W	RM1	
	HELANDER, R L	RM3	
	HULL, J W	RM1	
	JULIAN, C E	AssoEngr	
	KEYSER, K J	CRM	
	KITCHIN, R W	CRM	
	MARTIN, W B	RM2	
SD5	†MAYS, Charles E	CRE	CWO2'49
	MULLIGAN, V M	CRM	
	PARKER, Denison A	Ltjg	LCdr'59
	PATCH, Harry W Jr	CRM	Lt '66
	PETRIN, S F	CRM	
	POLK, E W	CRM	
	ROBBINS, C	RM3	
	RUECKER, C H	ETM2	
	RUSSELL, W F	RM1	
	SAMS, J D	SC2	
	SIMONS, R A	SK2	
	WISE, J R	RM1	

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.

From a copy in the OTC archives of a Xmas card belonging to Schramm. San Diego and Electronic Maintenance class numbers, if known, added for cross reference. Any errors in first names are those made during research.

NPG MASTER RECEIVING STATION SKAGGS ISLAND — Dec 1946
See separate pages for San Francisco (Control) and Mare Island

RMS Cl#	Name	R/R	Retired
	ADAMS, D C	USMC Pvt	
	BARBER, G L	Cox	
	BARKER, J L	RM1	
	BERNDSEN, B J	MoMM1	
	BOWERS, H C	CRM	
	BROCK, Marlin K	CRM	RMC '
	CANNON, C N	StM1	
	CARLSON, F A	CRM	
	CHASE, E M	CRM	
	CHRAPKOWSKI, G E	SC3	
	CLAUSEN, Bernard F	CETM	CWO4'60
	†COLLIER, Gilbert V	CRE	CWO3'57
	COLLINS, Russell W	RM1	
	CORNELIUS, Philip W	RM1	
	CREED, R G	CRM	
	DANIELS, C N	CRM	
	DELAGNES, Rene G	RE	
	DOTSON, R C	Ck1	
	EATON, W W	CRM	
	FRANK, J Jr	RM1	
	FULLER, J D	RM1	
	FULTON, R L	RM2	
	GARDNER, J M	CRM	
	GARRETT, C E	CRM	
	GATES, E H	CRM	
	GILL, M P	CRM	
18	†GOODWIN, Keith E	Lt	LCdr'53
	GOODYEAR, L B	RM2	
	GORDON, D E	RM1	
	GRIEVE, D W	MM2	
	HABERMAN, D B	RM2	
	HACKEY, L E	RM3	
	HAGELIN, F A	CRM	
	HANSEN, R	SC1	
	HARRIS, Kenneth L	CRM	RMC '??
	HAWKINS, J D	StM1	
	HENKEL, O B	PhM2	
	†HOCK, Peter N	CRM	CWO2'54
	HOLLIS, M F	S1	
	HOOPER, Harold E	CRM	
	HUDSON, P R	ETM1	
	IDLOR, K P	CRM	
	JAKWAY, D L	CRM	
	JAMES, E B Jr	RM1	
4,42	JOHNSON, Louis E	CRM	LCdr'65
	KAUFMAN, M A	RM2	
	KEEFER, D N	RM1	
	KRIST, L F	RM1	

RMS Cl#	Name	R/R	Retired
	†LAWSON, Roy E	CRE	WO1 '47
	LEWIS, E E	CRM	
	LINCOLN, W D	CRM	
	LITTLE, R E	Y1	
	MATTHEY, J E	RM2	
	McCONNELL, Howard E	RE	CWO4'67
	McINTYRE, Donald E	USMC PFC	
	McNeil, L	RM2	
	MONROE, S T	RM3	
	MONTAGUE, E J	S1	
	MORGAN, B A	CRM	
	MYERS, A	USMC PFC	
	NEELY, M J	S1	
	NEUROTH, D R	CY	
	NOACK, George J	Cdr	Cdr '62
	OVERTON, L W	CPhM	
	OWEN, R E	RM2	
	PEARSON, C W	Y2	
30	†PETERSON, Melvin F	Lt	Cdr '53
	PIKE, John W	CRM	
	PURVIANCE, W C	RM1	
	RAMSEY, C E	RM2	
	RIST, F E	RM3	
32	ROYER, Meddie J	Ltjg	Ltjg'58
	SCHLENTZ, C G	USMC 1SGT	
	SCHUMAKER, J P	RM2	
	SHELWICK, L D	SC3	
	SIEBELS, A L	RM2	
	SIMMONS, D M	OM1	
	SIMONS, G	PhM1	
	†SIMPSON, Robert L	Lt	LCdr'61
	SQUIRES, Alva E	CRM	CTC '??
	STERN, J J	CCS	
	SWENSON, J D	PhM2	
	TASSET, W J	USMC Pvt	
	TODD, I L	RM1	
	TOPINKA, R H	RM1	
	UNTERBERGER, Owen	RM1	Lt '67
	VIGH, Louis F Jr	RE	CWO3'62
	WARD, W B	RM1	
	WATERHOUSE, D R	RM1	
	WINTERS, J I	CEM	
	WYATT, D C	CRM	
	YOUNG, William C	CRE	CWO4'63

From a copy in the OTC archives of a Xmas card belonging to Schramm. Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during research.

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.

FEDERAL OFFICE BUILDING CIVIC CENTER SAN FRANCISCO
NPG RADIO SAN FRANCISCO (ComCen, Headquarters) -- Dec 1951
Chiefs & up only; omitting most civilians
See separate page for Dixon, Mare Island, Skaggs Island

RMS Cl#	Name	R/R	Retired
	ADAM, Irma B	*Lt	
	ANDREWS, R M	Civ	
	BAILEY, William B (Reported Dec)	Capt	RAdm'53
	BARRETT, C H	RMC	
	BASSARIK, C A	RMC	
	BERNSON, Robert M	Ltjg	Lt '66
	BOLEY, Morris V	Ltjg	Lt '63
29	†BORDEN, Clifford L	LCdr	LCdr'54
	BREWER, Dorothy Z	*Lt	
	BUCK, W H	TEC	
	CALDWELL, Margaret	*Ens	
	CAMPEN, Palmer G	Lt	
	†CARROLL, Carlton C	Civ	CWO2'56
	CLARK, F G	RMC	
	CLARK, W A	RMC	
	COLWELL, Delbert E	Lt	
	COMWELL, Patricia G	*LCdr	LCdr'60
	DOBSON, Barbara J	*Ltjg	LCdr'70
	DURRANT, G D	TEC	
32	†FALLON, Thomas J	RMC	CWO2'53
	FANRBOAM, I R	Lt	
	FANSHER, Virgil E	TEC	CWO2'62
	FUNSTON, Leslie L	CRE	CW03'60
	GEARHART, C B	CTC	
	GUMBERT, H J	CSC	
30	HALPIN, John B (Reported Jan 1952)	LCdr	Cdr '57
	HENNINGER, Robert J	Civ	RMC '
	HUNT, F F	RMC	
	HURST, Robert H	Lt	Lt '66
	IRISH, Donald W	Civ	CWO2'57
	JONES, Robert E	Civ	CivS'
	KADEL, Joseph B Jr	LCdr	Capt'66
	LEVY, N	*Ens	
	MARTIN, F B	RMC	
	MASON, C A	YNC	
	MILLER, R L	*Ltjg	
	MOE, James H	Lt	LCdr'62
	MONTREZZA, Susie	*lt	
	NORDIN, Hillewy H	*Ens	
	OLSON, Joseph B	Lt	Lt '65
	RAY, Clarence C (Detached Dec)	Capt	RAdm'55
	ROESNER, E R	Lt	
	RUTHERFORD, Catherine L	*Ens	Ltjg'70
	SAWYER, Archie R	LCdr	LCdr'57
	SCHRENDNITZ, M	RMC	
	SMITH, Helen H	*Lt	
	SMITH, Mary L	*Lt	
	SMITH, Michel F	*Ens	Lt '66
	STACKPOOLE, Virginia A	*Ltjg	
	STAICER, J F	ETC	
	STRIEGEL, C V	RMC	
33	†THOMPSON, Gerald R	Lt	Cdr '55
	THORNTON, Warren E	Lt	
SD9	TODD, George B	RMC	Lt '52
	TUCKER, Edwardean A (Detached prior Xmas card)	LCdr	Cdr '61
	ULRICH, J M	RMC	
	WALKER, N M	TEC	
	WALTER, Martha E	*Lt	
	WINTERS, Harold M	Lt	LCdr'59
	WISE, Sherwood E	Lt	Lt '64
	YOUNG, Paul L	Ltjg	Lt '66

†Deceased. *WAVE
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.

From a Xmas card donated to the OTC archives by Henninger. San Diego & Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during continuing research. WAVE ID by Todd and from Registers.

NPG RADIO STATIONS DIXON, MARE ISLAND, SKAGGS ISLAND — Dec 1951
Chiefs and up only; omitting all civilians
See separate page for San Francisco

RMS Cl#	Name	R/R	Retired
	ADAMS, O E H	RMC	
	ATWOOD, R P	CTC	
	†BAKER, William R Jr	CTC	CTC '??
	BALL, George F	CRE	CWO3'58
	BENSON, Harry Lee	Ens	LCdr'68
	BRESCH, Berton E	CTC	Lt '73
	BRICK, A M	MMC	
	BURNS, W K	Lt	
	CALLAWAY, D G	CTC	
	†CARRINGTON, Clifford N	CTC	CTC '??
	CARTER, Ralph J	CTC	CTC '??
	CASSELS, K	RMC	
	CLEVELAND, William A	RE	Lt '66
	†COLLIER, Gilbert V	CRE	CWO3'57
	COYKENDALL, Leo J	CSC	WO1 '65
	CREED, R G	CTC	
	CROZIER, Robert A	ETC	LCdr'69
	DAVIDSON, Lois	CTC	Lt '66
	DAVIS, R M	MMC	
	†DOMILSKA, Emilius S	RMC	RMC '??
	ELLIS, Lovic L	CTC	
	ENGEBRETSON, E E	Lt	
	FARMER, D E	CTC	
	FEUSAHERNS, C L	CTC	
	FITZGERALD, M J	CTC	
14,43	†FLESHMAN, Russell W	Lt	LCdr'57
	FOURQUREAN, J T	CTC	
	FREEBURG, C F	CTC	
	GATES, E H	CTC	
	GILLESPIE, Donald R	Lt	Capt'72
18	†GOODWIN, Keith E	LCdr	LCdr'53
	HAMBY, H F	CTC	
	†HAMMOND, Donald R	CRE	CWO2'55
	HINKE, M C	MEC	
	HOFFMAN, O G	ETC	
	HUDDLESTON, D P	CTC	
	HUDSON, P R	CTC	
29	HYDE, Donald L	LCdr	LCdr'57
	JENSEN, Carl A	Lt	LCdr'56
	JOHNSON, J M	RE	
	JOHNSON, James C	CRE	CWO4'58
	†JONES, Boardman B	CTC	CTC '??
	KATZENBERGER, Richard S	CTC	Lt '70
	KITTREDGE, T D	RMC	
	KUFFEL, N D	CTC	

RMS Cl#	Name	R/R	Retired
	LANGE, L E	RMC	
	LARSON, W E	ETC	
	LEE, W C	CTC	
	LEHMAN, John S	Cdr	Capt'65
	†LOWER, Albert E	RMC	RMC '47
	MARTIN, J S	Lt	
	McDOWELL, D E	RMC	
	McINVALE, W L	CTC	
	McLEAN, N H	CTC	
	McNEIL, Leo H J	Lt	Cdr '58
	†MIKESELL, Hubert B	CRE	CWO2'53
	MILLER, D R	CTC	
	†MILLMAN, Chester J	CTC	CTC '??
	MITCHELL, T W	CTC	
	MURPHY, C K	CTC	
	NALL, Frank C	Lt	LCdr'58
	NEWMAN, R E	RMC	
	NORMAN, Johnny A	CTC	
	OSTERMAN, Joseph F	RE	CWO3'64
	PERKINS, James J	CRE	CWO4'60
	PIERSON, C C	CTC	
	POTOLICCHIO, Rodney A	Lt	Capt'69
	PRATER, W H	CTC	
21	PROPSTER, Charles H	Lt	LCdr'53
	RAY, Ervin P Jr	Lt	Cdr '65
	REX, W	ETC	
	RICE, Robert P	CTC	LCdr'71
	RICHARDS, W J	CTC	
32	ROYER, Meddie J	CTC	Ltjg'58
	SKRIVANION, A M	CTC	
	SMITH, J B	RMC	
	STEWART, Earl W	RE	LCdr'70
	STEWART, W H	ETC	
	STRATTON, Robert M	ETC	WO1 '61
	VanZANDT, T L	CTC	
	VERNON, Lee H	Lt	LCdr'54
	WEBER, Cleland A	Lt	
	WELLS, B L Jr	CTC	
	WELLS, E H	RMC	
	WHITE, J H	CTC	
	WHITE, William C	LCdr	Cdr '68
	WILLIAMS, Joseph B	Lt	LCdr'58
	WOODWORTH, Robt P (CEC)	Ens	Cdr '66
	WORTMAN, George E	CTC	LCdr'69
	WYMBARK, D L	ETC	

†Deceased.
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.

From a Xmas card donated to the OTC archives by Henninger. Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during continuing research.

COMMUNICATION CENTER, TREASURE ISLAND -- Dec 1951
Chiefs & Up Only; Omitting Most Civilians

Name	R/R	Retired
BOYLE, G W	TEC	
BROSIUS, F C	YNC	
BROWN, Roy E	RMC	Lt '59
CUSHING, C J	QMC	
DROSKI, Stanley T	Ltjg	LCdr'69
ELBERY, Claire A	*Ens	
FAIR, J C	TEC	
FOSTER, Janet	*Lt	LCdr'66
GEWERTZ, Manning	LCdr	Cdr '56
HATCHEL, Cecil B	RMC	RMC '47
HOLLAND, Marjorie C	*Lt	Lt '61
JOHNSON, Grant I	LCdr	Cdr '69
JORGENSEN, Cecil M	Ltjg	
MARTINSON, H L	RMC	
MUSCIO, Robert D	Lt	LCdr'65
PUGH, C J	QMC	
ROBINSON, Paul A	Ltjg	
ROSENE, Willard G	Ltjg	
ROZENDAHL, William H	Lt	Lt '57
SHEYA, George P.	Lt	Cdr '63
SLAVEN, Edmond K	Lt	LCdr'58
TRAPP, J B	TEC	
WEINSTOCK, Morris	Cdr	Cdr '53
WILSON, Francis R	Lt	Lt '53
ZUEHLKE, J S	CivS	

†Deceased. *WAVE.
MEMBER OTC SoCal 1985 or later.

From copy in OTC archives of Xmas card belonging to Gewertz. Any errors in first names are those made during research.

FEDERAL OFFICE BUILDING CIVIC CENTER SAN FRANCISCO

12th NavDist Com Cen, Com Sta, Crypto Cen, Tape Relay -- Dec 1952
Chiefs and up only; omitting most civilians

RMS Cl#	Name	R/R	Retired
	ANDREWS, R M	Civ	
	BAILEY, William B	Capt	RAdm'53
	BASSARIK, C A	RMC	
	BITTROLF, Margaret F	*Ens	
	BROSSY, Charlotte	*Ens	
	CAMPEN, Palmer G	Lt	
	CAYA, G A	RMC	
	CLARK, F G	RMC	
	COLWELL, Delbert E	Civ	
	CONWELL, Patricia G	*LCdr	LCdr'60
	DOWLING, Anderson M	LCdr	
	FOX, C R	RMC	
	FUNSTON, Leslie L	CRE	CWO3'60
30	HALPIN, John B	LCdr	Cdr '57
	HENNINGER, Robert J	Civ	RMC '
	IRISH, Donald W	Civ	CWO2'57
	JONES, Robert E	Civ	CivS'
	LEDWITH, R E	CTC	
	LEVY, N	*Ens	
	MARTIN, F B	RMC	
	MASON, C A	YNC	
	MAYO, M	Ens	
	MILLER, R L	*Ltjg	
	MOE, James H	Lt	LCdr'62
	MORSE, James H	Ens	
	NORDIN, Hillewy Helena	*Ens	
	OLSON, Joseph B	Lt	Lt '65
	OSTERMAN, Joseph F	RE	CWO3'64
	PALCHER, C J	TEC	
	PERKINS, Thomas H	Lt	LCdr'59
	ROMANI, Madlyn K	*Ens	
	RUTHERFORD, Catherine L	*Ens	Ltjg'70
	SAWYER, Archie R	LCdr	LCdr'57
	STACKPOOLE, Virginia A	*Ltjg	
	STAICER, J F	ETC	
	STEELE, Donald D	Civ	
	SUMMERS, Doris E	*Ens	
	THOMPSON, Loudoun L	Ens	
	THORNTON, Warren E	Lt	
	TRAVERS, K C	Ens	
	VanVICAR, V E	ETC	
	WALKER, N M	TEC	
	WALSH, Rosemarie C	*Ens	Cdr '72
	WALTER, Martha E	*Lt	
31	WILLIAMS, Marion D	Lt	LCdr'58
	WISE, Sherwood E	Lt	Lt '64
	YANCEY, J V	TEC	
	YOUNG, Paul L	Lt	Lt '66

†Deceased. *Female
MEMBER OTC SoCal and/or NorCal 1985 or earlier.
ADDRESS on hand in 1985.

From a Xmas card donated to the OTC archives by Funston (via D. L. Hyde in 1982). Bellevue class numbers, if known, added for cross reference. Any errors in first names are those made during research.

District Communication Office staff, 12th Naval District, 1952. Left to right: LT Thompson, message center; LCDR Dowling, Executive Officer; CAPT Bailey, DCO; Don Irish (back) frequencies; LCDR Halpin CINC NPG; Don Steele,

342

Captain W. B. Bailey, USN, DCO 12th Naval District, presenting retirement papers to George B. Todd, CRM USN, November 1952.

U.S. Naval Communication Station
San Francisco

1953

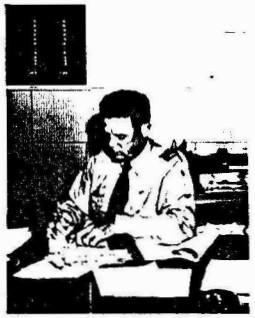
CAPT H M McCOY
COMMANDING OFFICER

LCDR J B HALPIN
EXECUTIVE OFFICER

LT Q E BARBER
ADMIN ASSISTANT

LTJG R G WALSH
PERSONNEL OFFICER

LTJG R K MOYE
CUSTODIAN



LCDR L E FLYNN
COMMUNICATIONS OFFICER

LTJG J M VOLLMER
PUBLIC WORKS OFFICER

LT L J FARMER
SPECIAL EQUIPMENT OFFICER

LT K C GRESOWSKI
TRAFFIC & CIRCUIT OFFICER

LTJG W L PERRY
ASST TRAFFIC & CIRCUIT OFFICER

LTJG V A BRADFORD
CRYPTO SECURITY OFFICER

LTJG K D KULLMAR
PLANS OFFICER

LTJG L L THOMPSON
MESSAGE CENTER OFFICER

LTJG H S MILLER
RADIO PHOTO OFFICER

CHRELE E E CRAWFORD
ELECTRONICS OFFICER

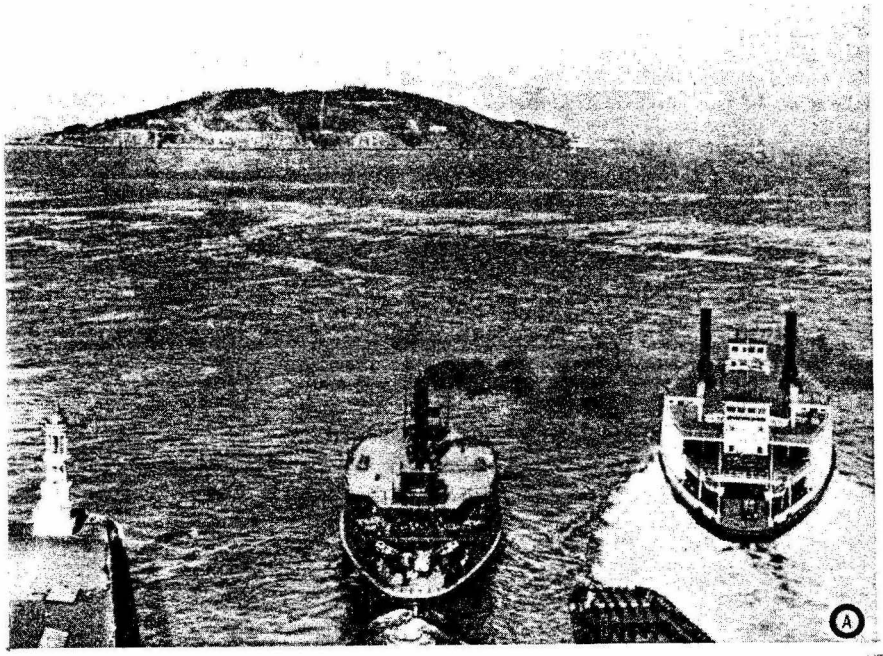
LTJG M A NELSON
CWO

ENS J R STEELEY
CWO

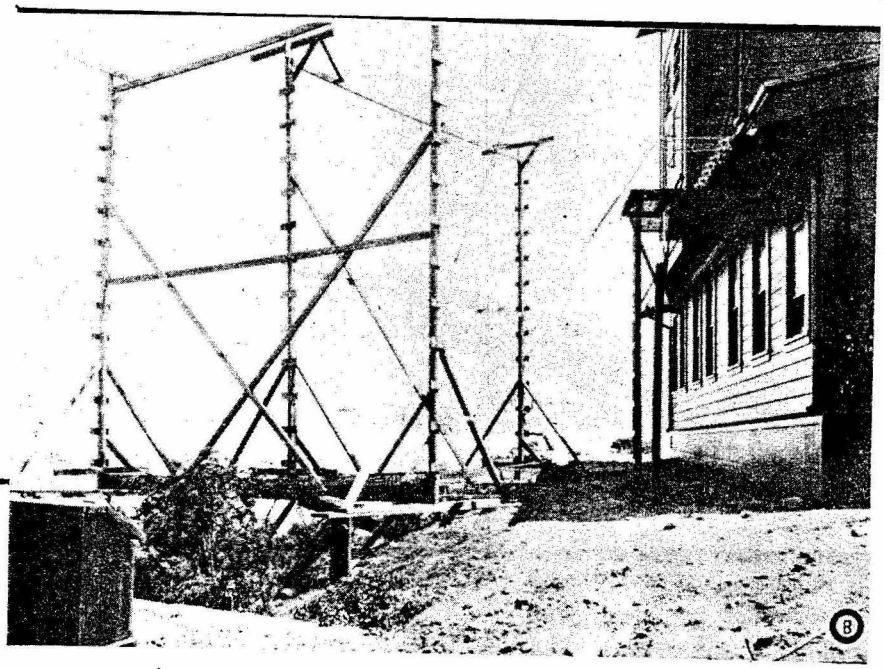
LTJG J KOONS
CWO

LTJG S J HILL
CWO

LTJG P E KILEY
CWO



Yerba Buena Island (Goat Hill) in San Francisco Bay. View east from S.F. Ferry Building Tower. The Island had a lighthouse in white area at south end to guide boats clear during Frisco's fog.



U. S. Naval Radio Station "NPG" on Yerba Buena Island, San Francisco. Barrage loop antennas, beamed on the "Great Circle Route" to NPM & NPO.

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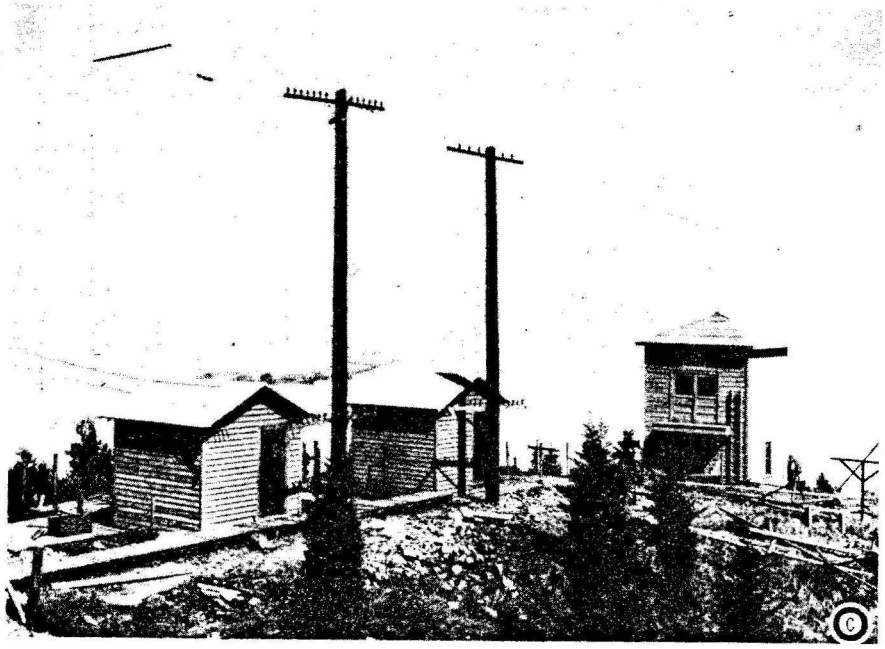
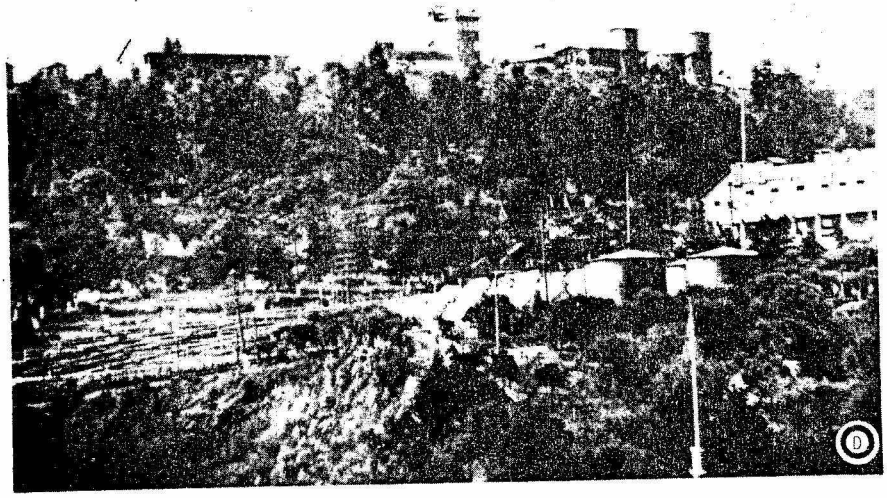
Photos from Marlo G. Abernathy collection. Originally Published in Society of Wireless Pioneers "SPARKS JOURNAL."

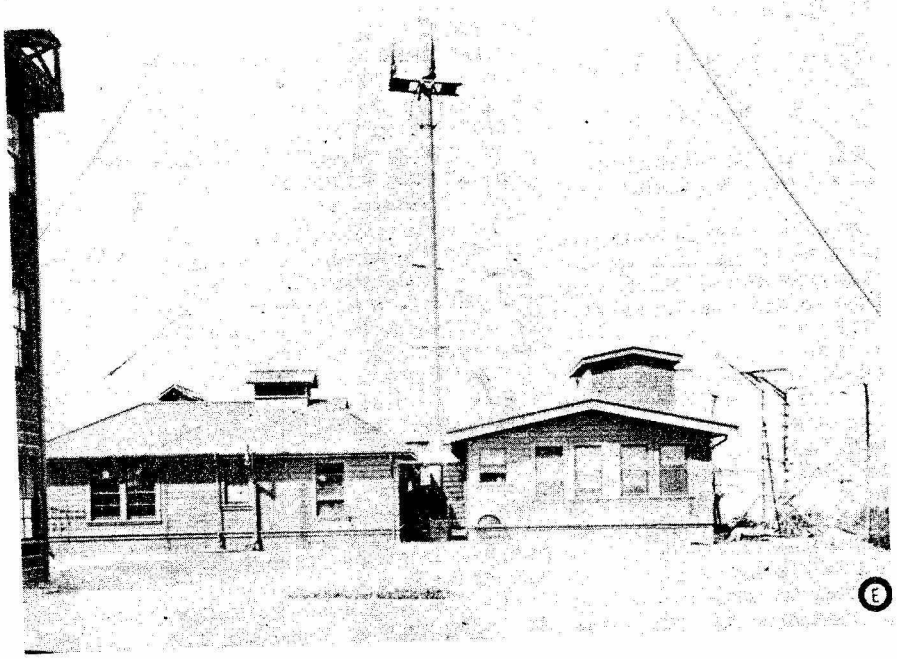


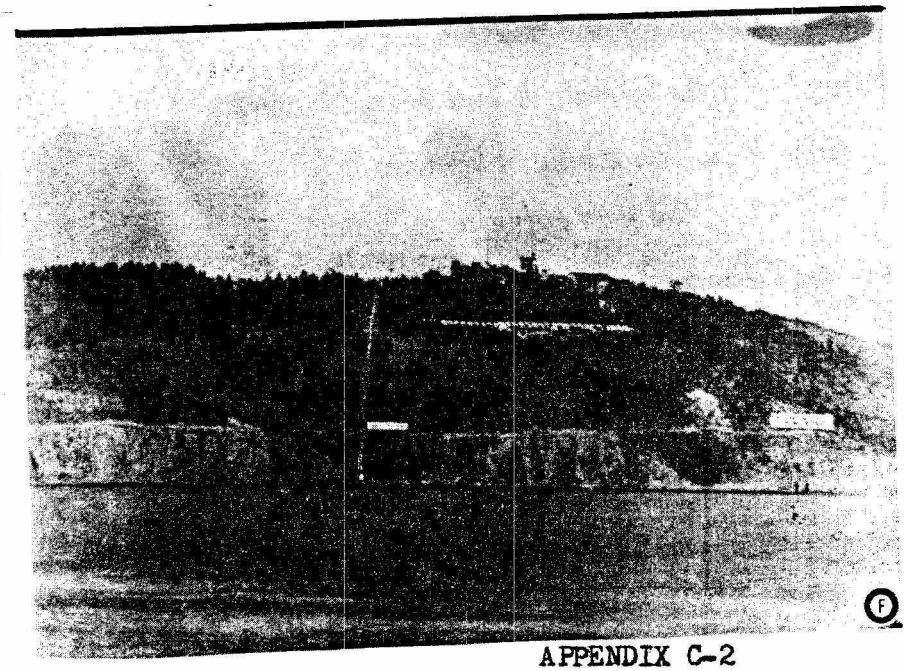
Buildings from L to R: Telephone receiver - transmitter; shortwave transmitter; radio direction finder building.



Area at lower left edge (now the east mouth of the Bay Bridge Tunnel) was a tent area but later converted to a "grinder" - (drill field). Tower in dead center was atop the barracks building - used as a signal tower. Telephoto from east hilltop.

Barracks and mess hall on left. Center buildings: offices of OinC, DCO, PCO, workshops and officers' recreation and sleeping rooms. Right hand building: main operating areas. (Penthouse shields view of Kolster RDF antenna mechanism re-wound for use with barrage antennas.)





View from Ferry Building via 8 diopter telephoto lens. Tents on hillside were part of "boot camp." Streak up center of island is communication and 12 KV power cables.

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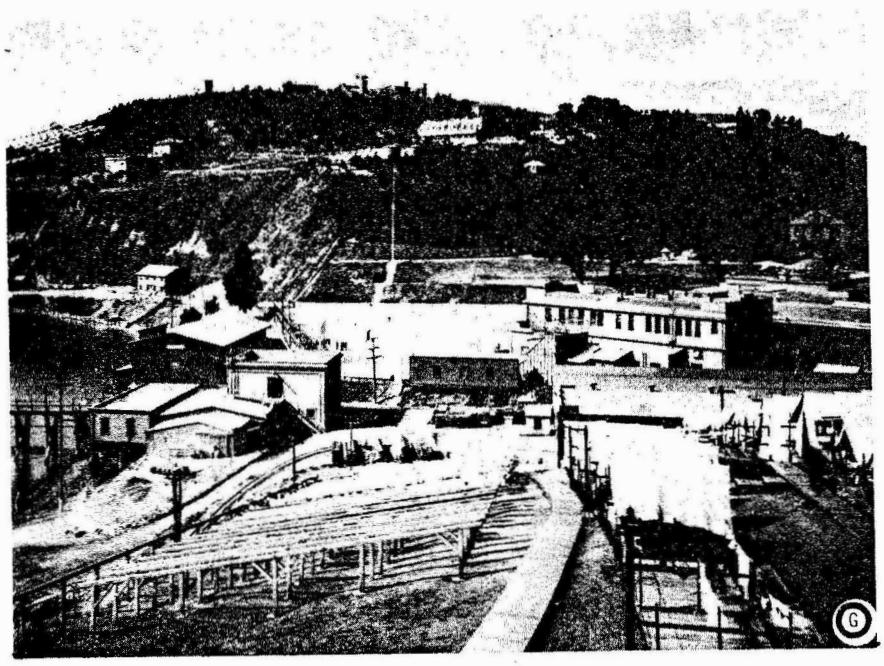
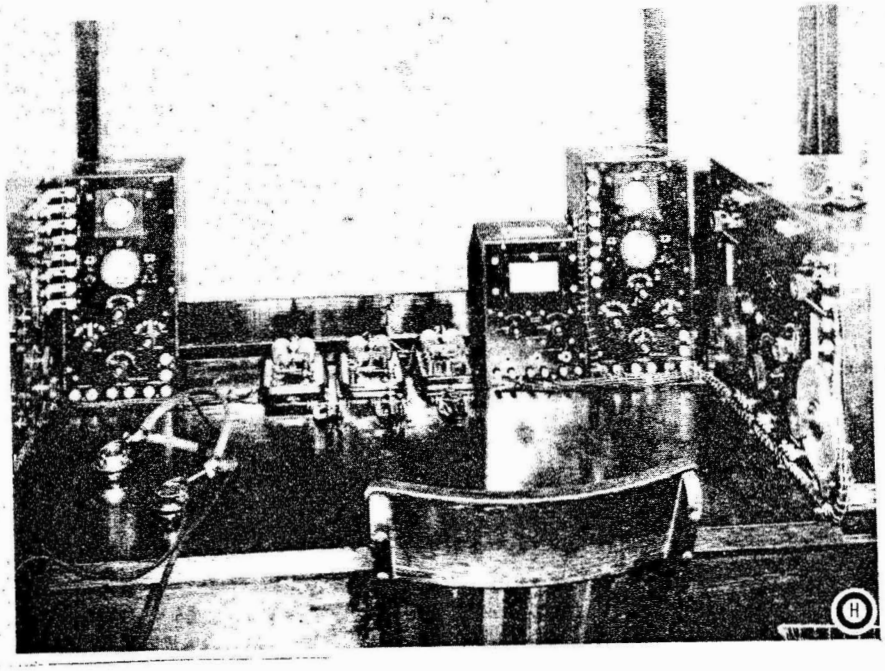
Photos from Marlo G. Abernathy collection, originally published by Society of Wireless Pioneers "SPARKS JOURNAL" 1978



Goat Island - view to west from East Hill. Radio station crowns high spot. Tents halfway down hill were in quarantine training area. Foreground shows "seaman guard" area where men awaited transfer. Training Station was moved to San Diego 23 June 1923.



Naval Radio Station,
Yerba Buena Island.
Booth "C" - used mostly for NPL and NPC circuits.

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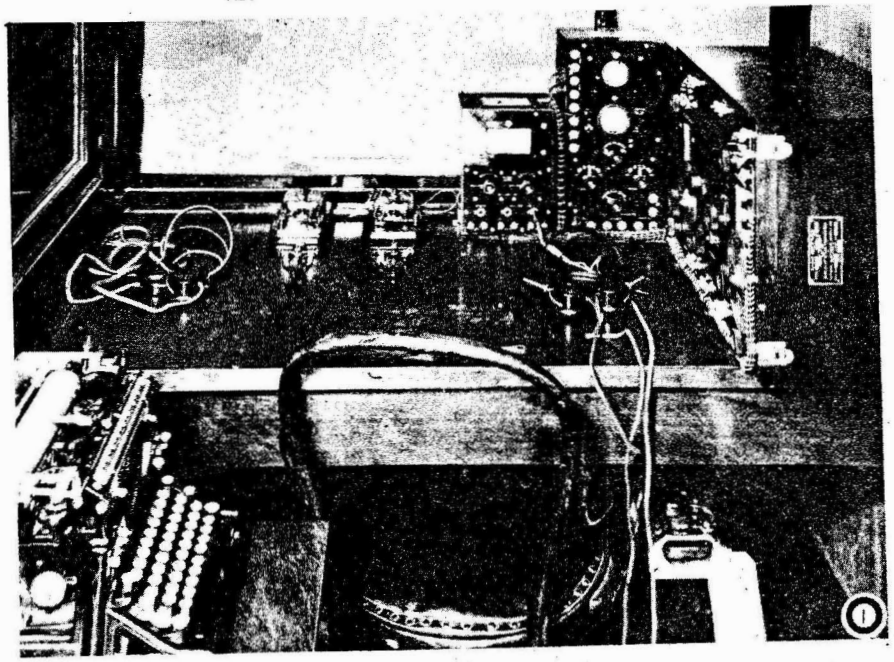
Photos from collection of Marlo G. Abernathy



Receiving booth #6: SE 143 receiver, detector box and 2-stage AF amplifier, Good old #5 Underwood and two (2) pairs of Baldwin headphones, but no back on chair!

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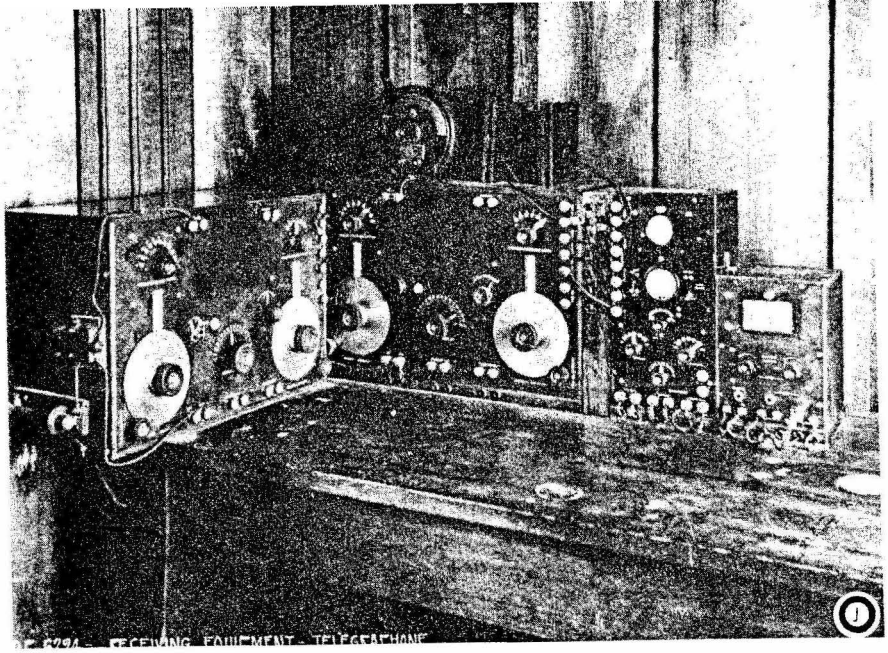
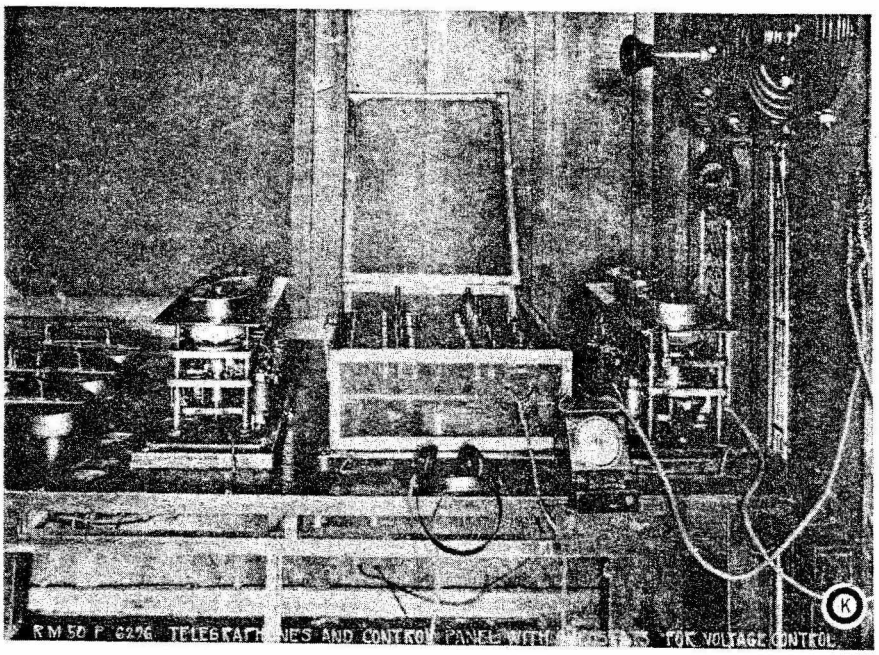
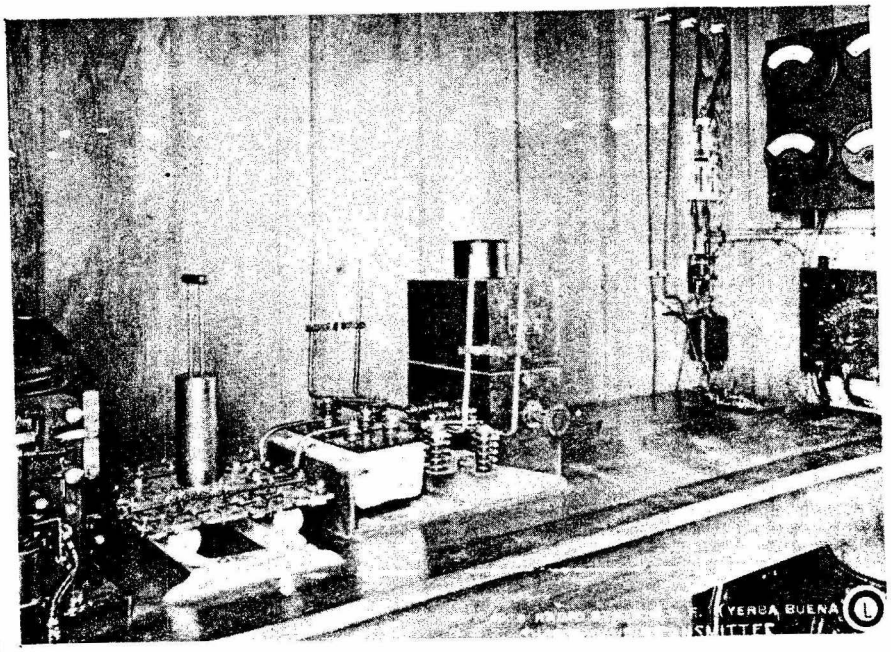
Photos originally published by Society of Wireless Pioneers "SPARKS JOURNAL" 1978.



Telegraphone Receiver and Poulsen wire recorder for copying NPO or NPM at high speed during clear air and transcribing later at lower speed. Condenser & loops on top of SE 143 plus coils in spare SE 143 used to load the receiver with detector box and audio box down to NPO and NPM VLF frequencies. Signals were fed to magnetizing coils in wire recorders. One could be recording while the other was playing back. The fine wire was pulled onto a reel and pushed off a blank reel. If wire broke one had wire by the mile all over the place - thus the double-screen covered switch bank for protection.



Short wave transmitter unit installed at a very early date. How short and for what service, Mr. Abernathy does not have the record. Can an Old Timer Communicator come up with the details?



Photos from collection of Marlo G. Abernathy, published in Society of Wireless Pioneers "SPARKS JOURNAL" 1978

Kailua Hawaii
18 June 1978

Dear AB:

In the latest "Sparks Bulletin" are your pix of NPG. Item L, Short Wave Transmitter. I was never at NPG but on the USS Idaho in 1919-1920, we had a "Short Wave" transmitter called an Intra-Fleet set, for use just between ships in a fleet. It looked like the picture in the bulletin. Short wave, was 126 meters on that rig. No doubt they installed the rig at NPG to communicate with the fleet when anchored in the bay.

It was about ¼kw as I recall. It had a 12,500 volt transformer which nearly finished me one day when a striker pressed the key as I was adjusting the inductor. Those vertical hairpins with the shorting bar was the variable inductance. The box to the right of the inductors was an enclosed straight spark gap, adjusted by the knob out the end of the box. The box was soundproof and had a ceramic nozzle with three pukas which blew directly into the spark gap.

This pix shows two boxes, one on top of the other. Ours had only the lower box.

We probably will be in your area, some time after the middle of July. Will give you a fone call if the number we have is right.

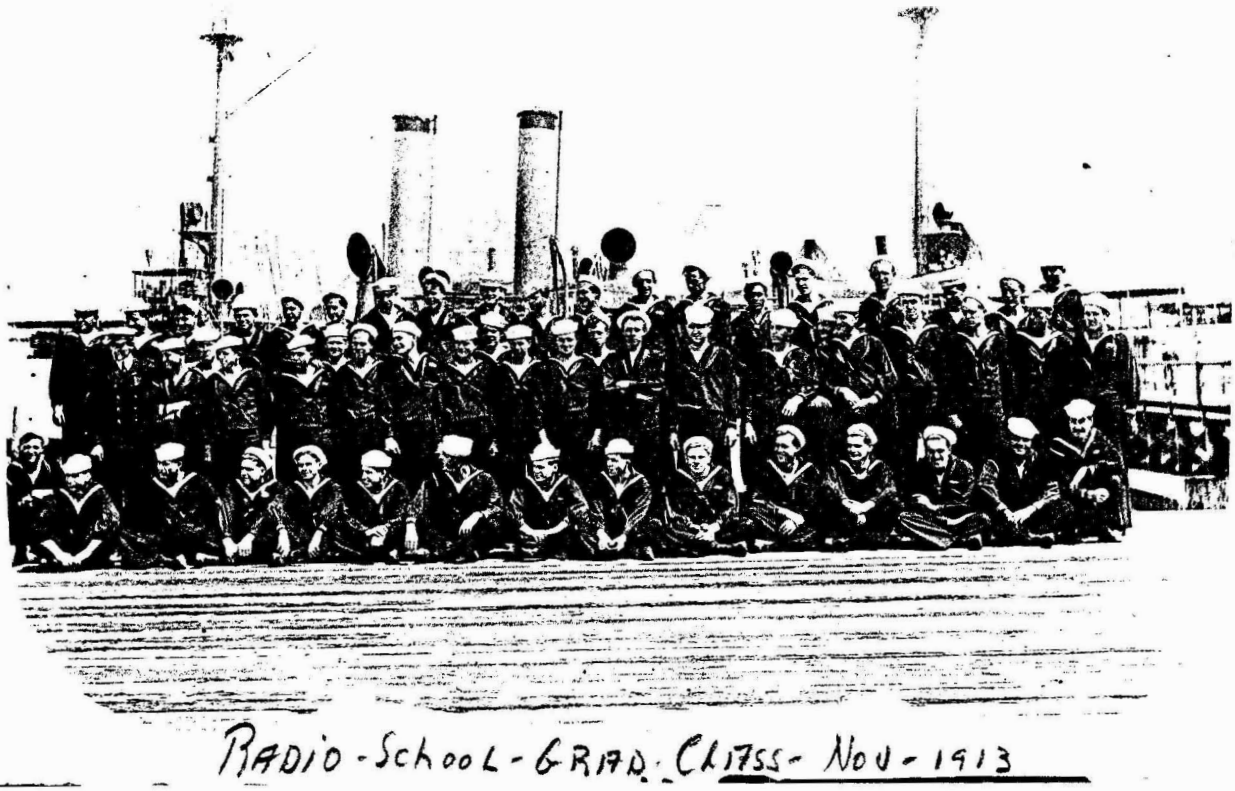
Verna joins me in Aloha to you and Bernice.

73

Warren

The above letter written by G. Warren Clark, Capt. USNR (Ret) to Marlo G. Abernathy CRE USN (Ret) in 1978, was located in 1986. It describes the "short wave transmitter" pictured in Appendix C-4 to the 12th Naval District radio history.

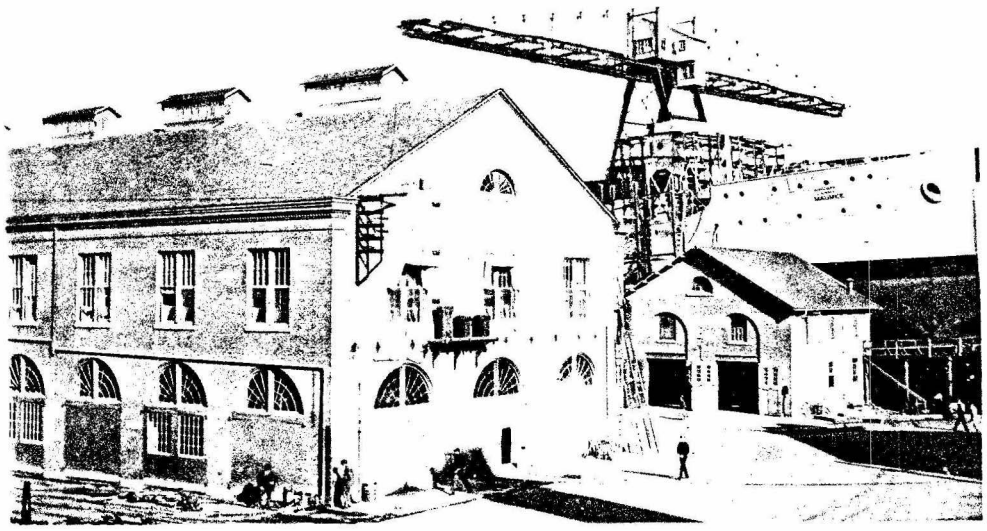
The pigeon cote. The first "radio shack" on the Pacific Coast at Mare Island, California, 1904.
Picture from "Sidewheelers to Nuclear Power" by Sue Lemmon and E. D. Wichels, page 174.



Radio School Graduating Class - Mare Island Navy Yard - November 1913.
George Graves, Chief Electrician (Radio), Instructor, standing at left.

Electrical Class - Mare Island Navy Yard - April 1914.
Chief Electrician McElvey, Instructor.

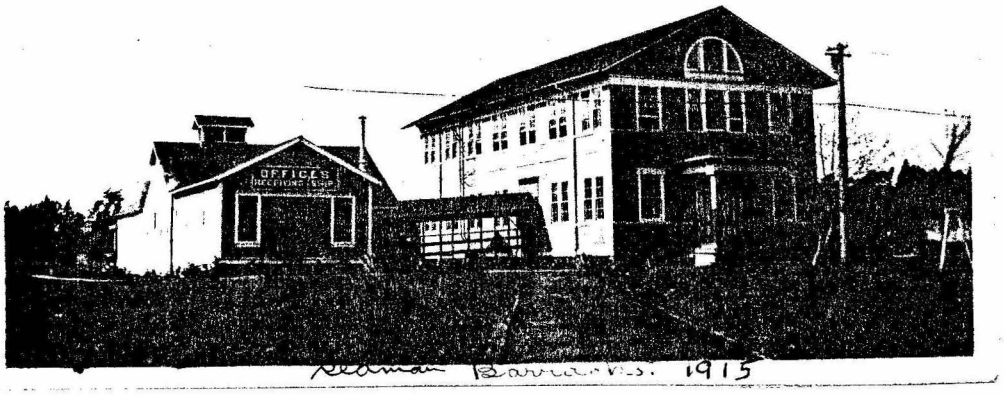
Photos from Harold B. Phelps collection



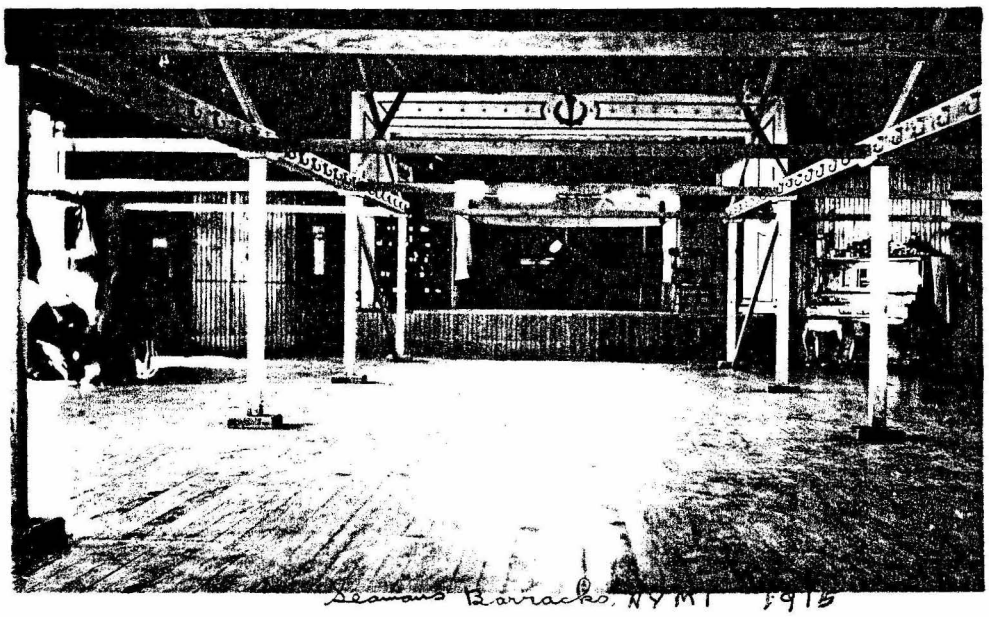
Navy Yard Mare Island, California. The Navy's electrician (radio) school was located in this building in 1914. The students were quartered in the seamans barracks.

Some of the electricians (radio) school students at NYMI 1915. JUSTIS is the man getting the haircut!

Pictures from collection of
Harold B. Phelps LT USN RET

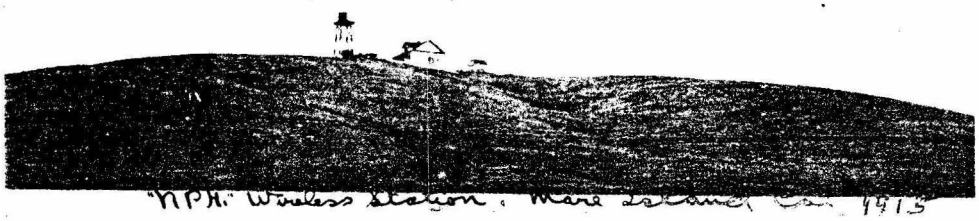


In November 1914, students at the electrician (radio) school at NYMI were quartered on the USS SOUTH DAKOTA, a 4 stack heavy cruiser in the reserve fleet. In December 1914 the students were moved to the seamans barracks, next to the Receiving Ship Offices, pictured here.

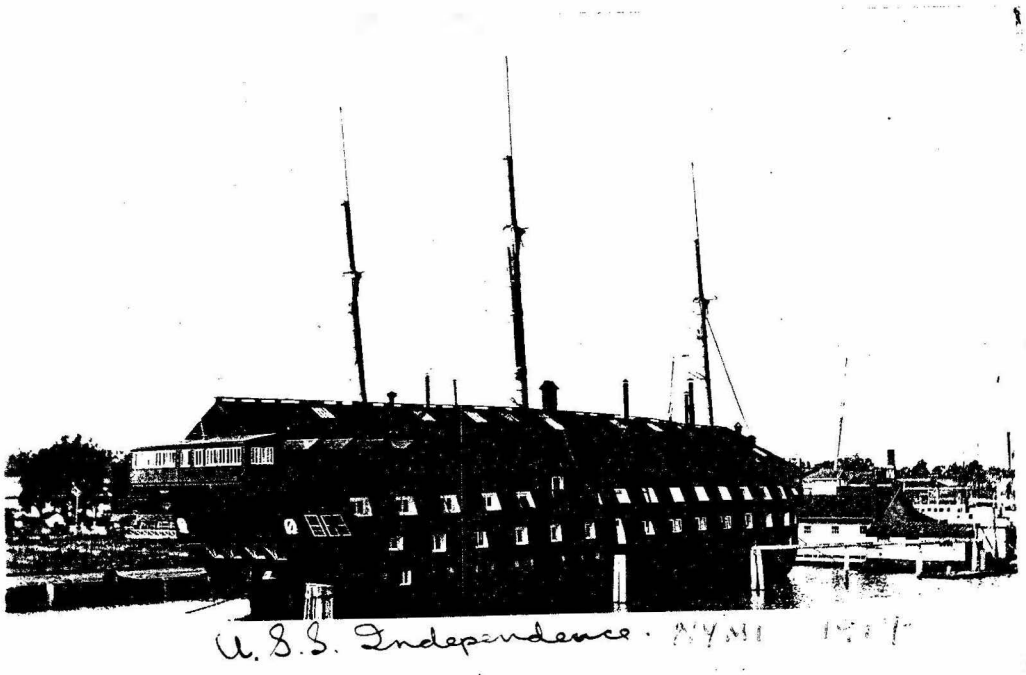


Interior view of seamans barracks, NYMI, 1915.
Note the hammock hooks on the beams!

Pictures from collection of
Harold B. Phelps LT USN RET

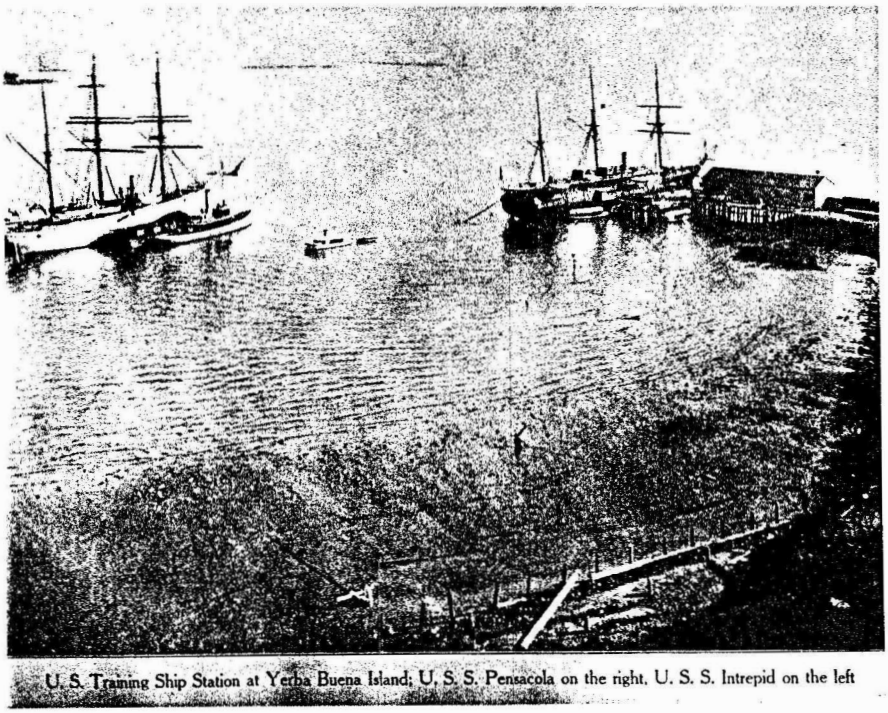


"NPH" The Navy's main Pacific Coast wireless station in 1915. Located on a hill above the Mare Island Navy Yard. It had a 5 KW spark and a 30 KW arc transmitter. The call sign "NPH" was later transferred to the radio station at Hilo, Hawaii, after "NPG" at Yerba Buena Island started keying the Mare Island transmitters by remote control.



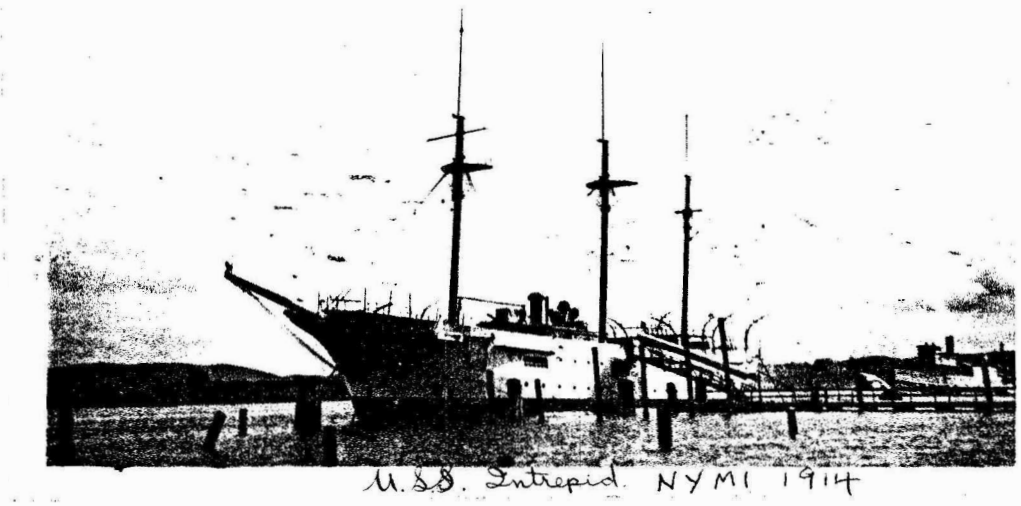
USS INDEPENDENCE, NYMI, 1914. The Navy radio school was located here in 1913 - 1914.

Pictures from collection
of Harold B. Phelps LT USN RET



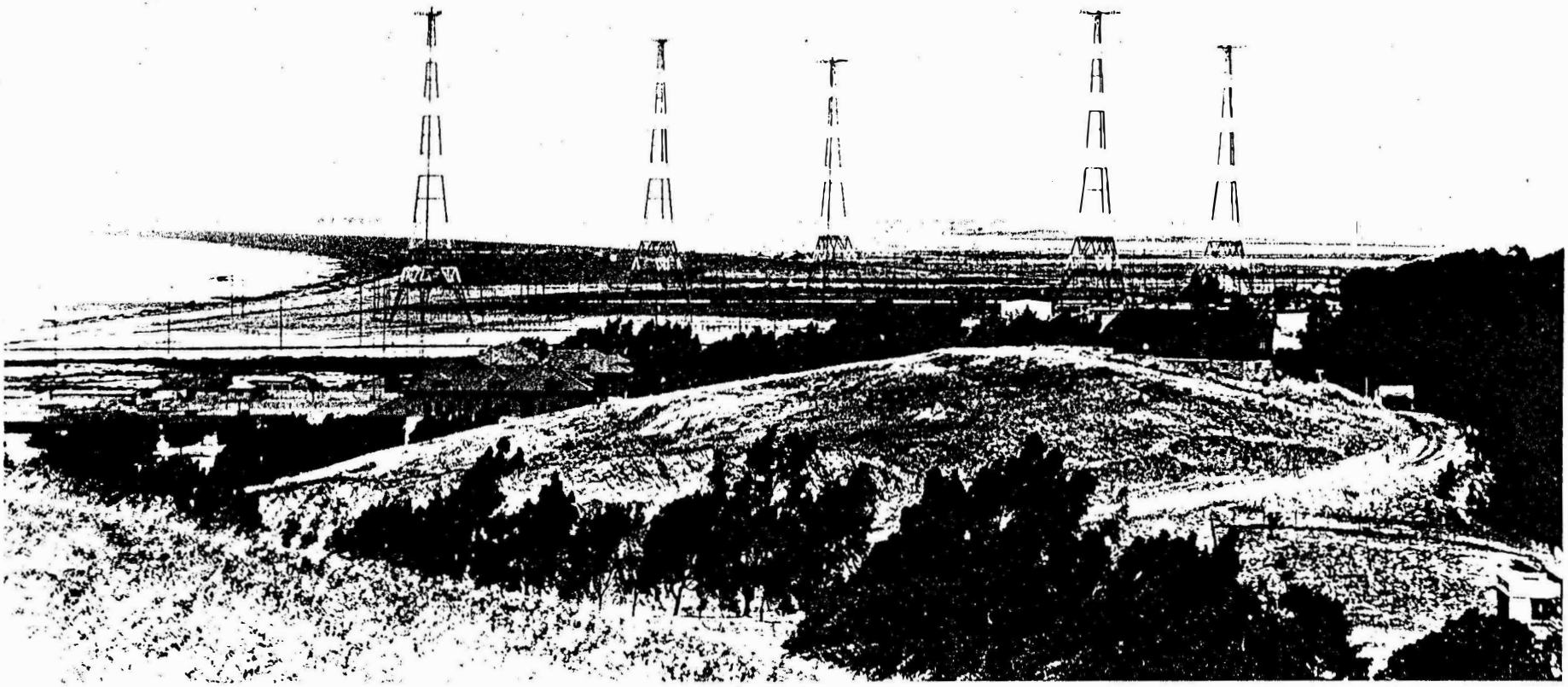
U. S. Training Ship Station at Yerba Buena Island; U. S. S. Pensacola on the right, U. S. S. Intrepid on the left

U. S. Navy Training Ships at Yerba Buena Island (Goat Island) in San Francisco Bay. USS PENSACOLA on the right. USS INTREPID on the left. USS PENSACOLA was burned in 1912 for the copper sheathing on her hull.



USS INTREPID at Navy Yard Mare Island, 1914.

Pictures from collection of
Harold B. Phelps LT USN RET



Early Communications • At one time pigeons were used as messengers between Mare Island and naval activities at Yerba Buena Island. The pigeon cote, pictured here in 1902, stood atop the hill on Fifth Street, near the site of the present Yard Dispensary.

In 1904 the pigeon cote was moved to the hill back of the Commissioned Officers' Mess—but without the pigeons—and converted to the first wireless station—or "radio shack"—on the Pacific Coast. Here, in May of that year, the first radio message transmitted in the Pacific was sent to the hospital ship *Solace* as she steamed out the Golden Gate. Contact was lost at 75 miles.

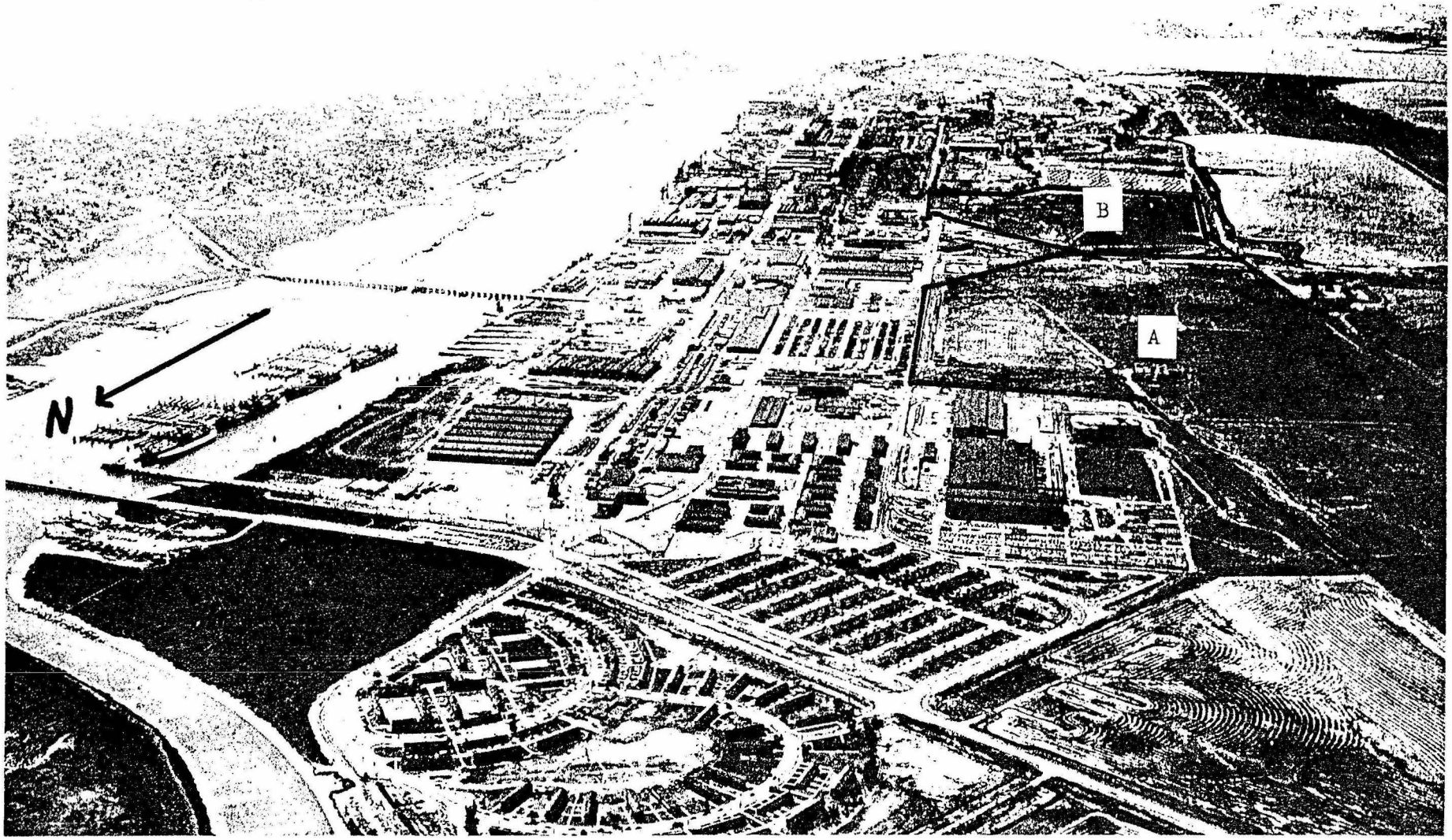
The tall towers of the Mare Island station, a landmark for ships coming up the Bay, went up later.

By 1915 Mare Island had built all of the radio stations which spanned the Pacific Coast from Point Loma at San Diego to the Pribilof Rocks in the Bering Sea. The ships *Buffalo, Nero, Saturn,* and other ships carried the materials required for these installations. The guiding genius in this was George Hanscom, whose grandfather came to Mare Island in 1853.

In 1915 the Mare Island team built the Lafayette Station at Bordeaux, France, for the French. Next it went to Siberia to build the first station erected in Vladivostok.

The rigger supervisor for all these stations was Mare Island's Joseph Ryall. Others who helped introduce "wireless telegraphy" to the Navy were George K. O'Hara, Bob Stuart, and Lieutenant Commander George C. Sweet.

U. S. Naval Radio Station (T) Mare Island, California. Low Frequency Towers with High Frequency fields in background. From "Sidewheelers to Nuclear Power" by Sue Lemmon and E. D. Wichels, page 175.



Picture from "Sidewheelers to Nuclear Power" by Sue Lemmon and E. D. Wichels, Page 155.

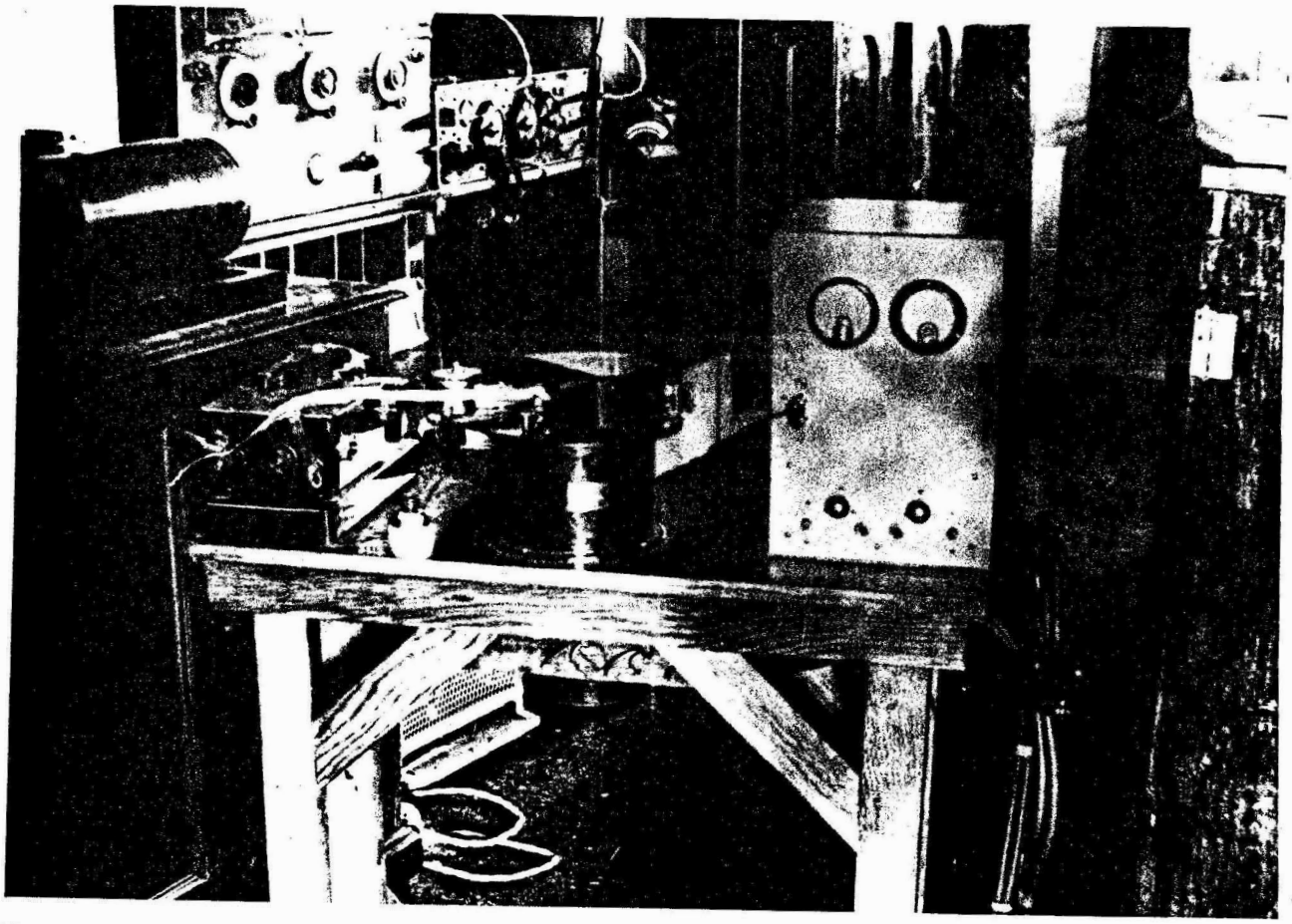
From 1922 to 1925, Mare Island was the site of an air station, or what the local papers referred to as such. It was unpaved and unlighted; any air traffic was a rare event. Photographers stayed away from it so carefully that no decent picture of it exists.

Some of the early carriers that came here, such as *Langley* and *Aroostook,* had no place to "park" their small planes while the ship was undergoing overhauls. It was hoped that the small field could be expanded, but such hopes faded in 1937, when Alameda was selected as the site for a naval air base.

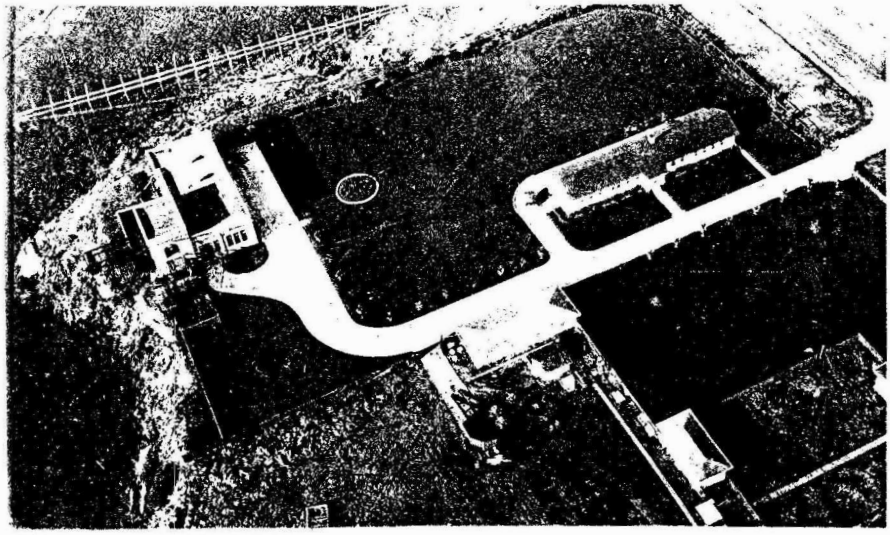
U. S. Naval Radio Station (T), Mare Island.

A. High Frequency transmitter building 505 and its antenna field.

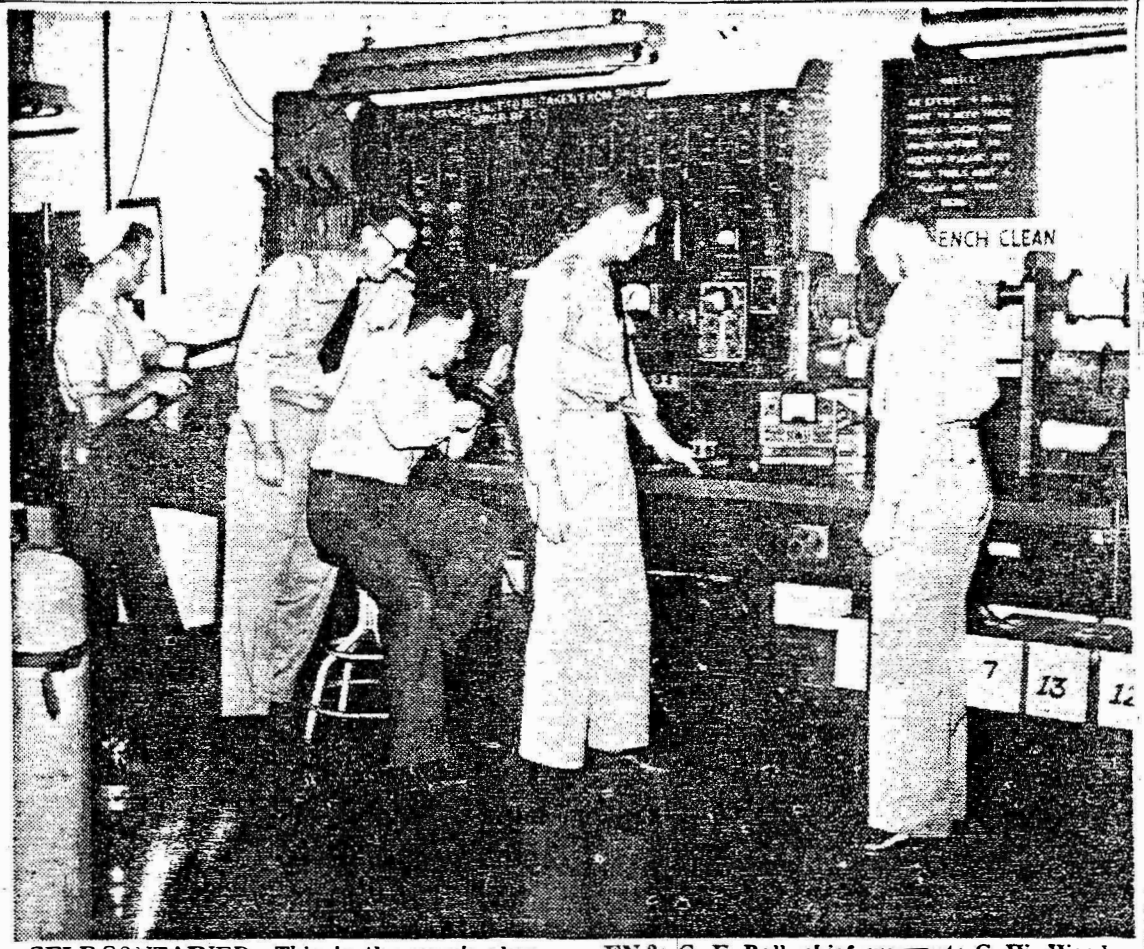
B. Low Frequency transmitter building, 400' towers and housing area.



Time and Diversity Receiving Station, Mare Island, California, 1932. Located on the "Hill" site of the original 1904 wireless station. Pictured are: tape puller, inker, keyer table, chronograph, RF amplifiers, RS-1 receivers, time clocks and frequency meter room. Picture from Marlo G. Abernathy collection.



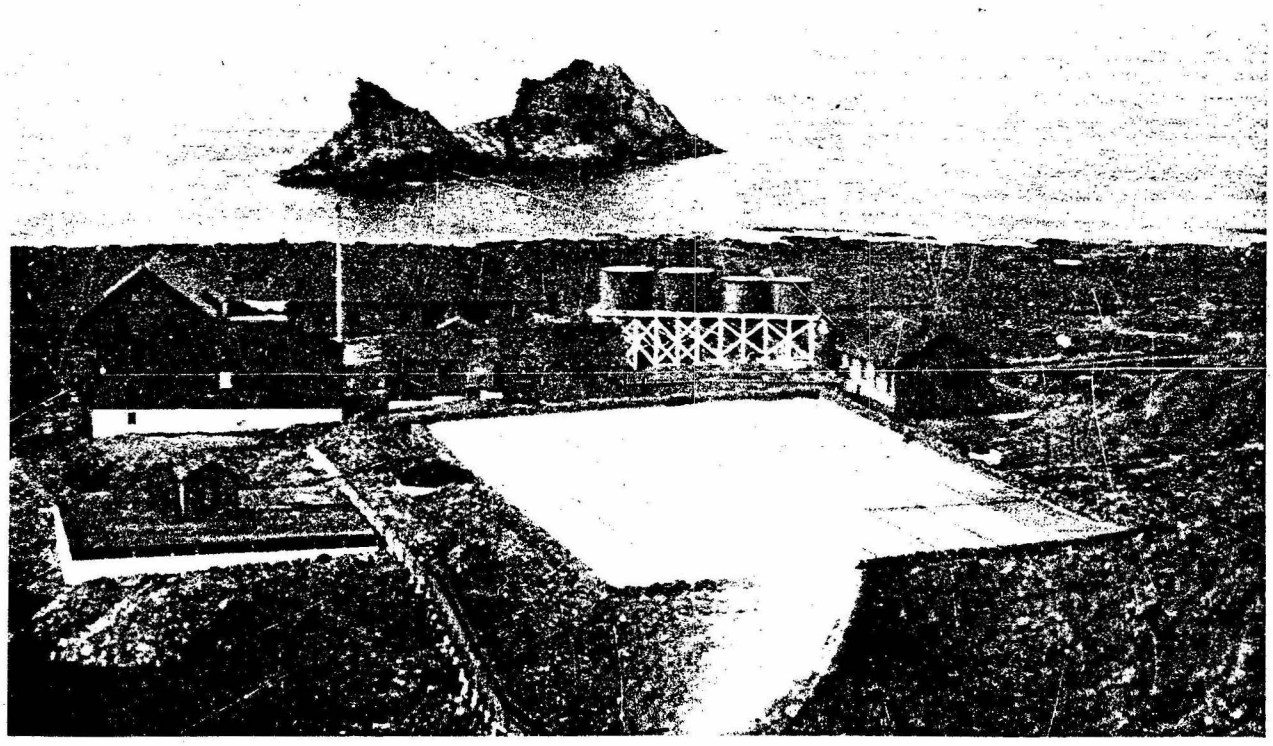
View of "HIPOWER" transmitter station at Mare Island, taken from the top of one of the 450' steel towers, Sept. 1925. Transmitter building on left; single men's barracks upper right; married quarters center; O-in-C quarters bottom right. Picture by R. L. "Red" Abbott.



SELF-CONTAINED—This is the repair shop of the low frequency radio station which is one of the arteries of communications for 12th Naval District. There is no repair job that cannot be handled by this crew in their own shop. (Left to right) R. J. Jackson, EN-2; G. F. Ball, chief warrant; C. W. Wood, electronics technician-1; M. A. Card, chief electronics technician and Lt. Lee H. Vernon. The latter has served in electronics for 21 years and Chief Ball has 24 years of electronics experience. (18373)

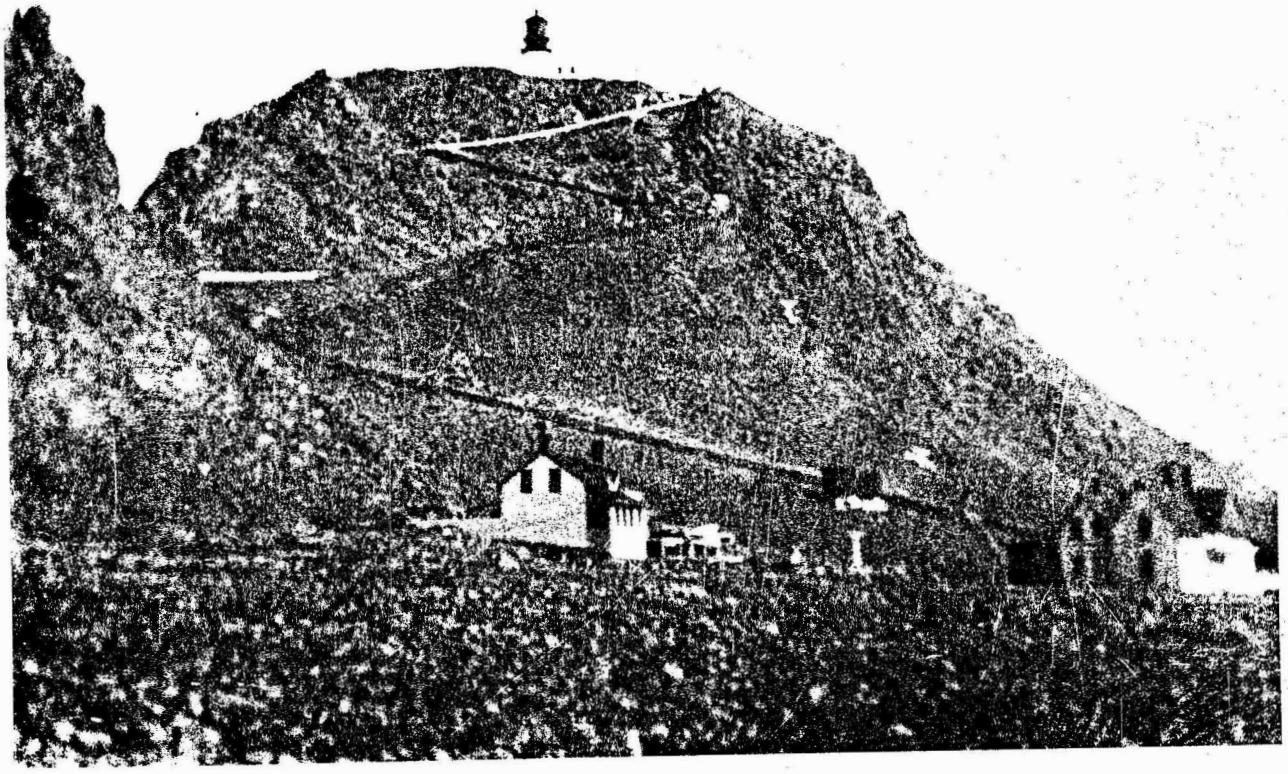
Navy Yard, Mare Island, Sept. 1925, picture taken from top of one of the 450' radio towers by R. L. Abbott

U. S. Naval Radio Station, Farallon Islands (NPI) 1920. View of operators' quarters. The adjacent building housed the Radioman-in-Charge & family.



View of NPI quarters; water tanks; paved area to collect rain water which was stored in underground cistern at left foreground. Island very rocky.

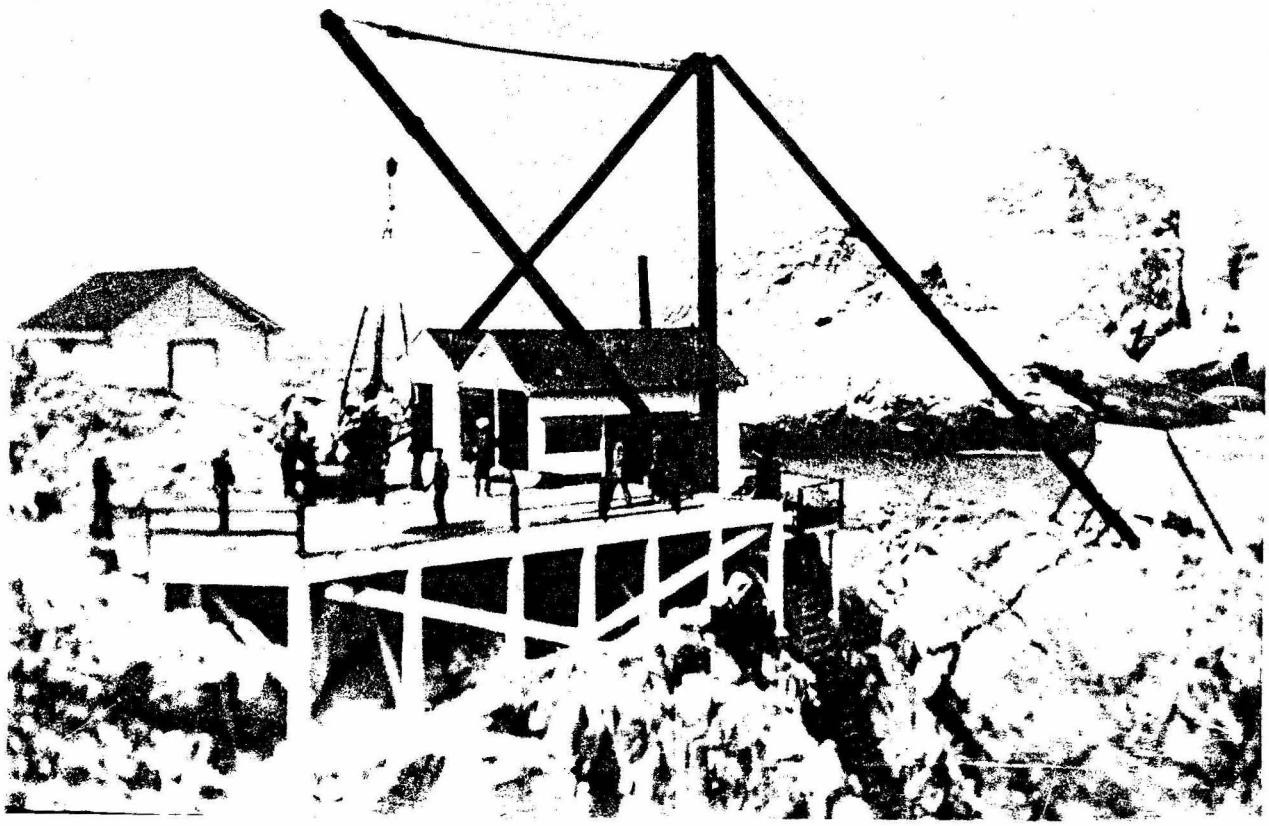
Pictures by
Clarence W. Mulligan



Lighthouse and tender's quarters. Note rails for hand-hold and guide in climbing to the light in dense fog at night.

Saddle Rock, Farallon Islands taken from main island. Nesting place for seagulls. Many sea lions and California seals frequent Saddle Rock Island.

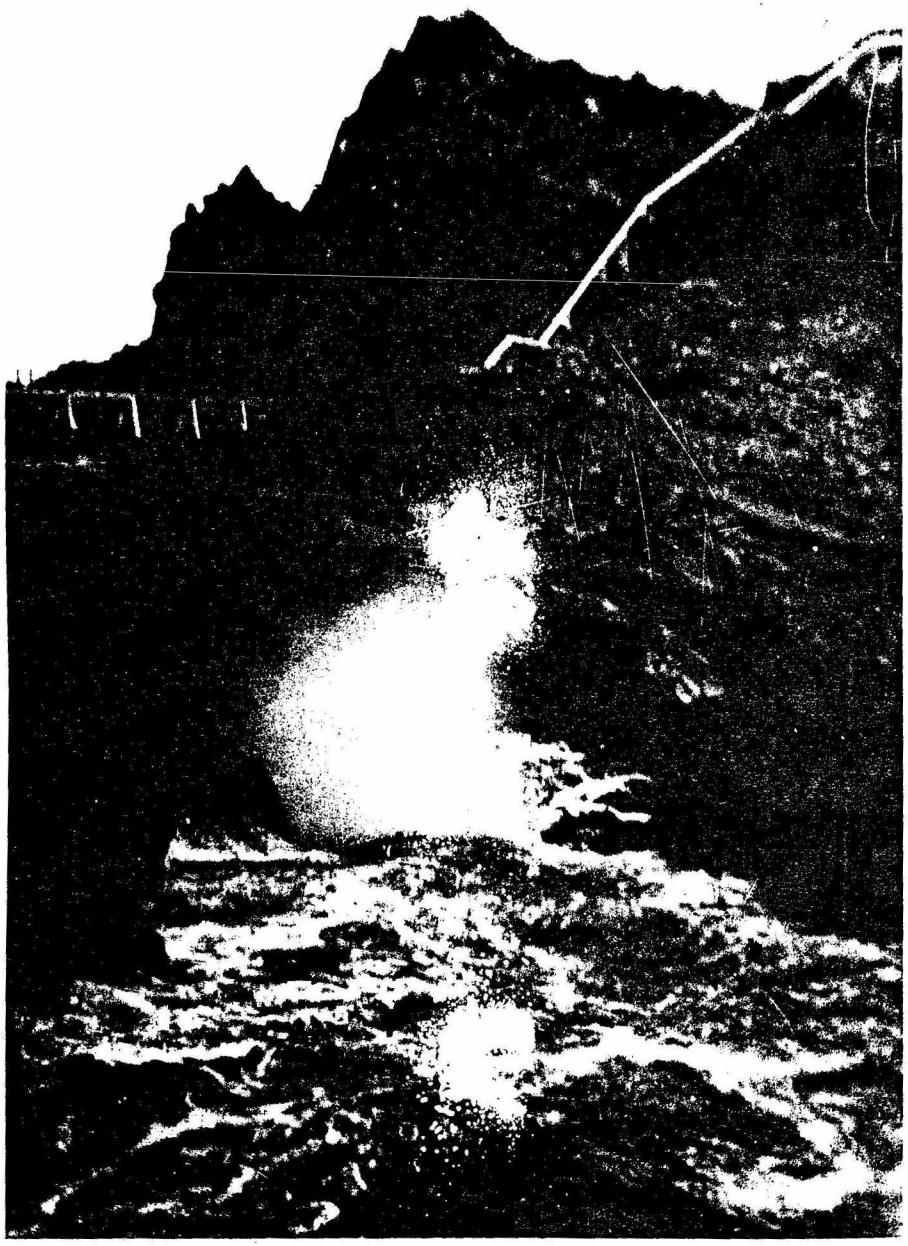
Pictures by
Clarence W. Mulligan



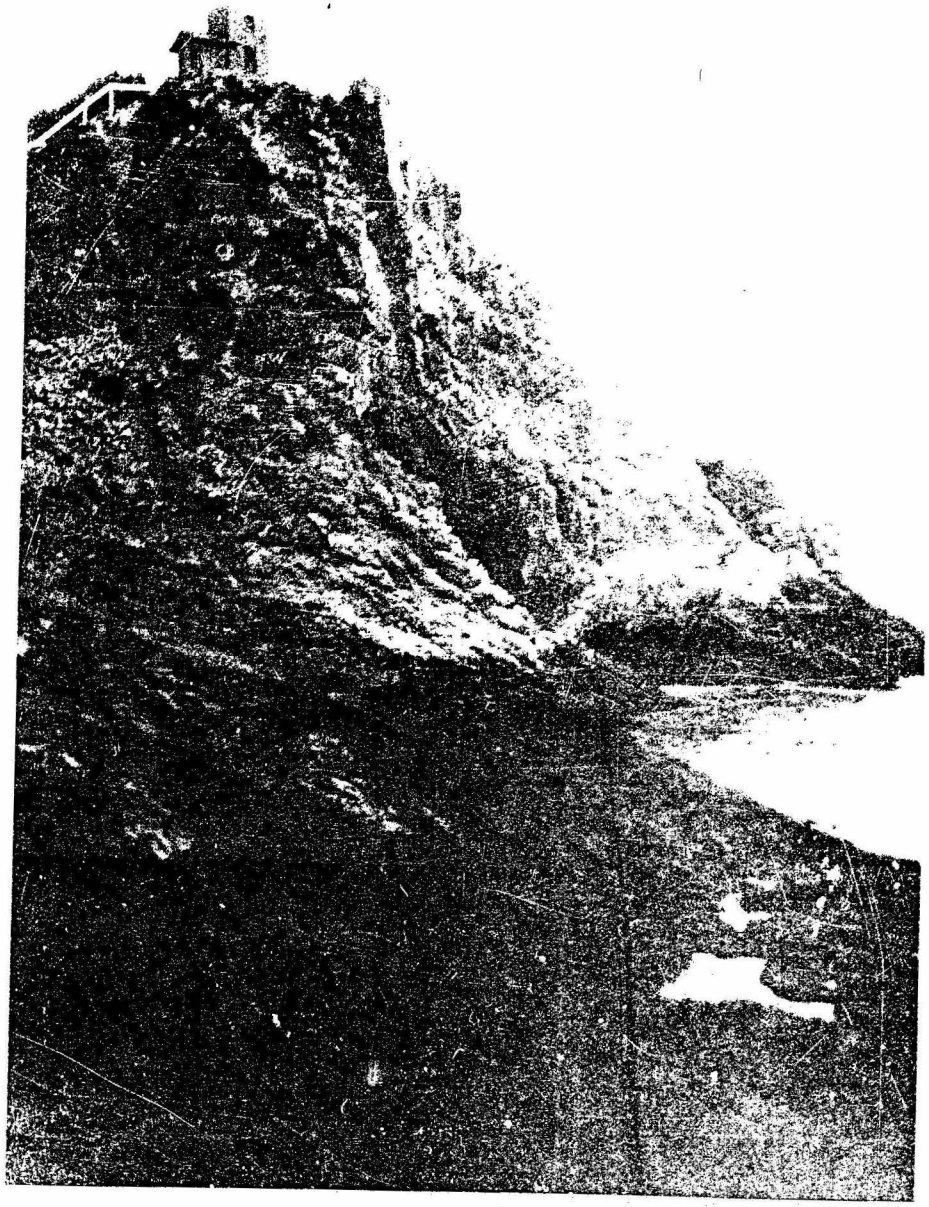
Loading dock, Farallon Islands, 1920. L.H. tender made trip every 14 days from SF. Man powered winch used to hoist supplies in cargo net. All hands not on watch helped unload tender including L.H. keepers & Navy personnel.

Another view of the loading dock at Farallon Islands, 1920.

Pictures by
Clarence W. Mulligan

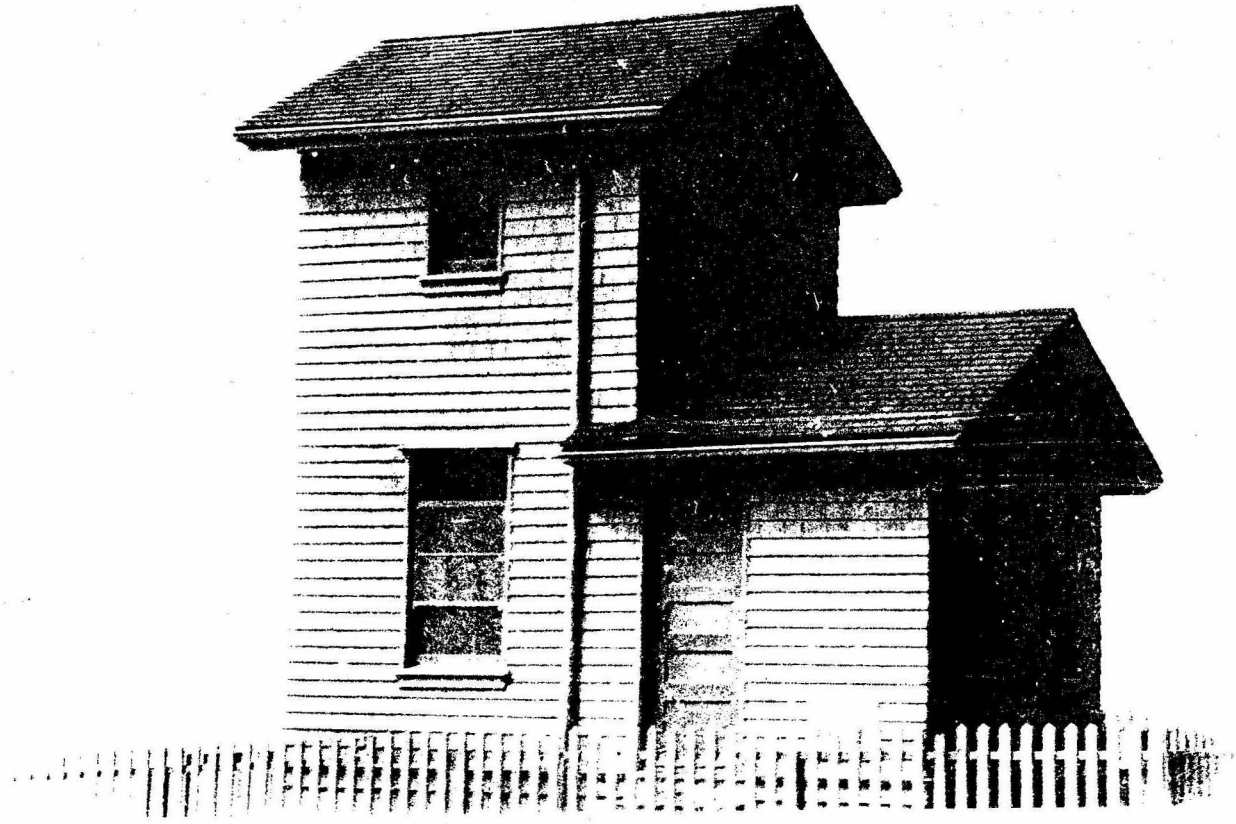


Walkway leading up to the radio compass (direction finder) building on top of the hill, Farallon NPI 1920.



Radio compass building, Farallon Islands, NPI, 1920. ½ KW Fessenden spark transmitter in main building below, near quarters. Transmitter runs off bank of lead acid batteries.

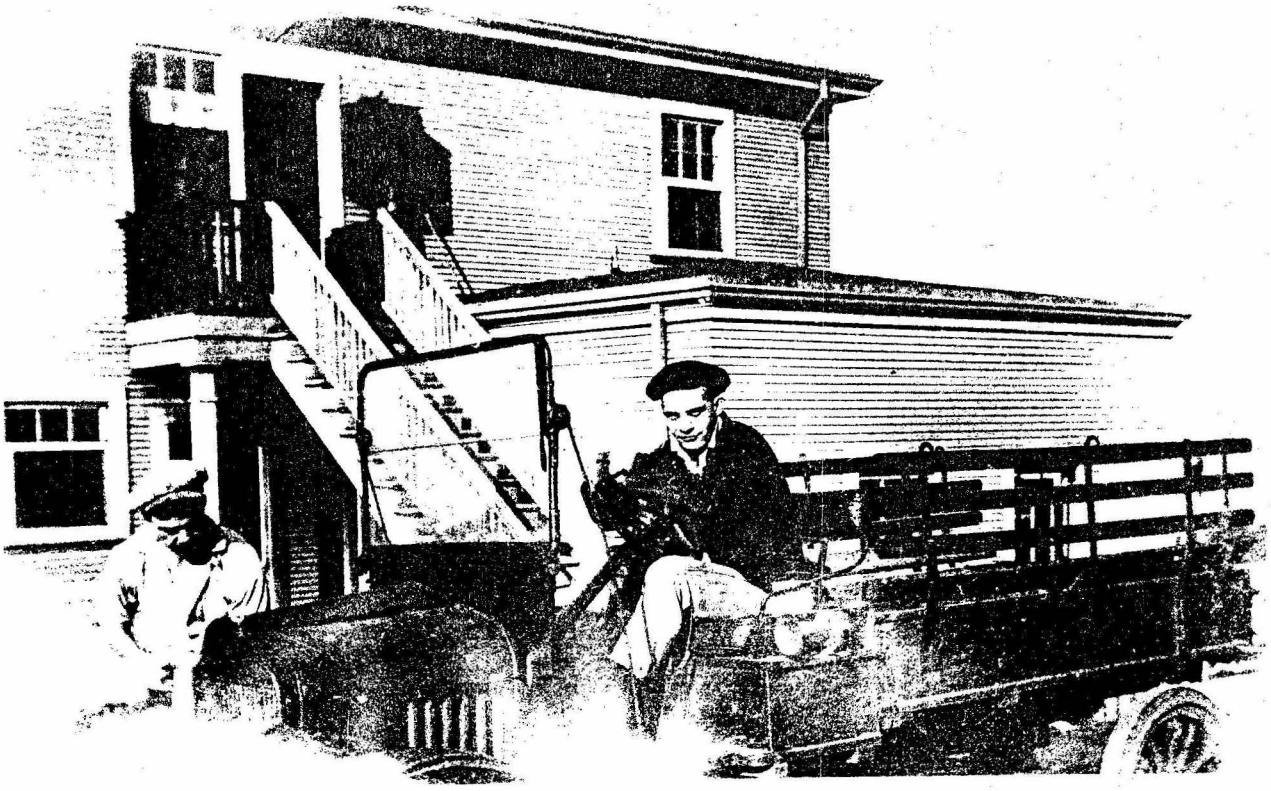
Pictures by Clarence W. Mulligan



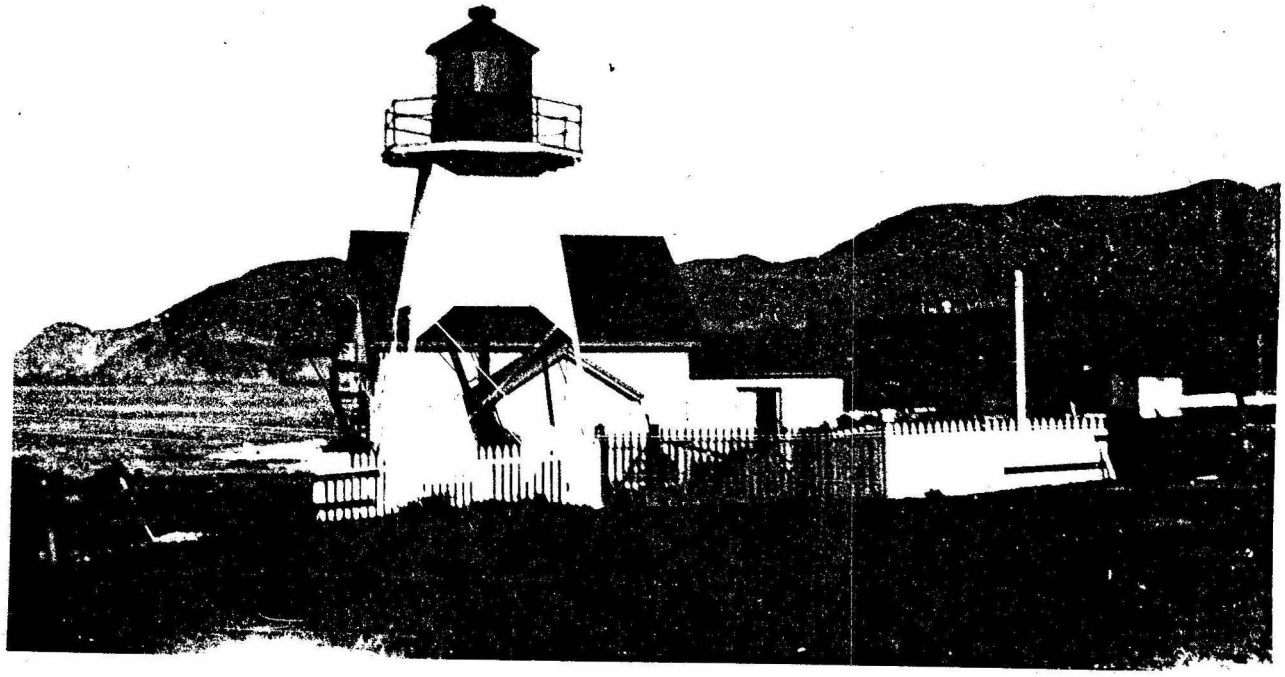
Radio Compass building, Point Montara, NLH, 1922. Inside of two lower rooms shielded with copper screen. Loop antenna in upper room on shaft rotated from below for null signal bearings. Wooden fence to keep people away from building.

Personnel quarters, Point Montara, NLH, 1922.

Pictures by
Clarence W. Mulligan



Point Montara, NLH, 1922. Delmar Tuft, RM1c, Radioman in Charge checking oil in Model T truck for ship's cook to go for supplies for station.



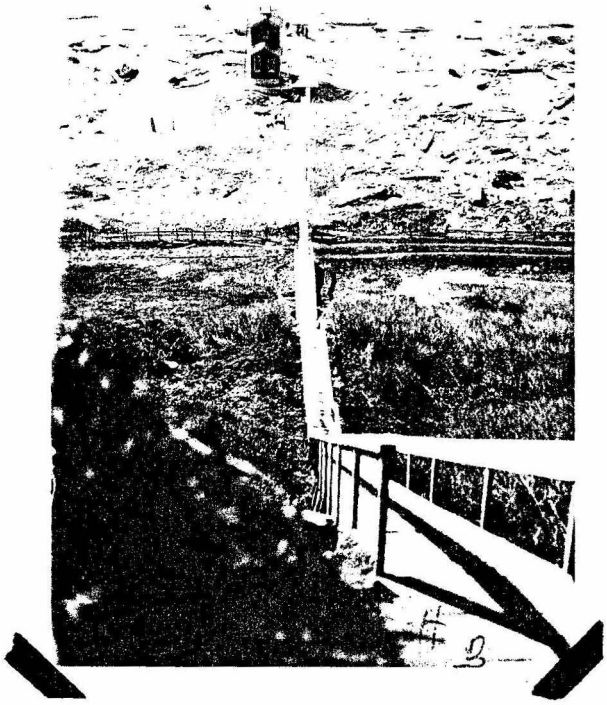
Point Montara lighthouse, 1922.

Pictures by
Clarence W. Mulligan

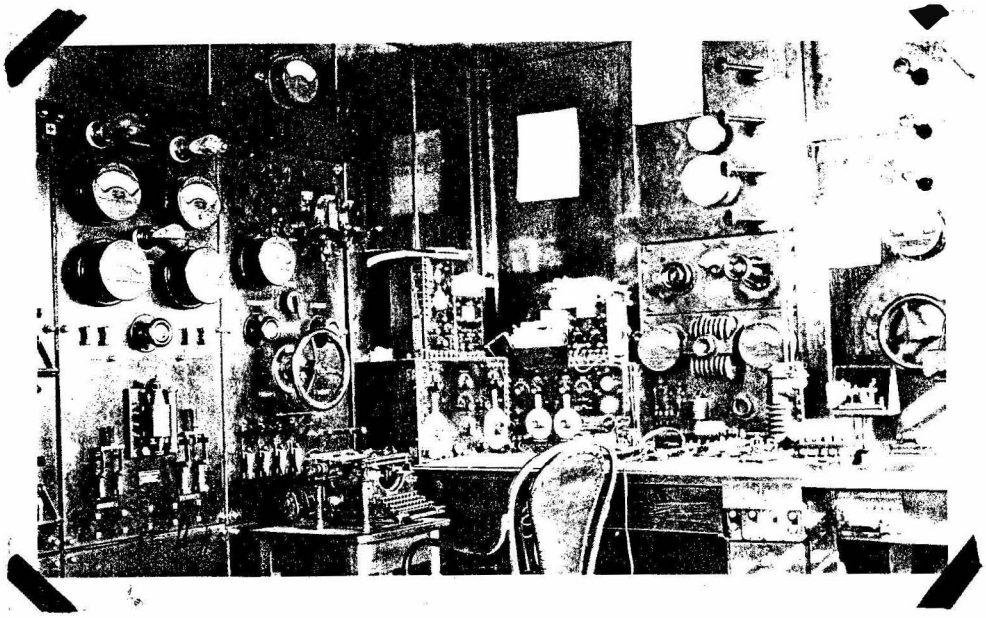
C. W. Mulligan, in boatswain's chair, applying red lead to guy wires. Salt accumulation cleaned periodically from insulators to prevent arcing. Point Montara, NLH, 1921.

Point Montara Radio Compass Station, NLH, 1921. Operator, C. W. Mulligan. ½ KW Fessenden spark transmitter; keyed from compass building by remote control.

Pictures by
Clarence W. Mulligan

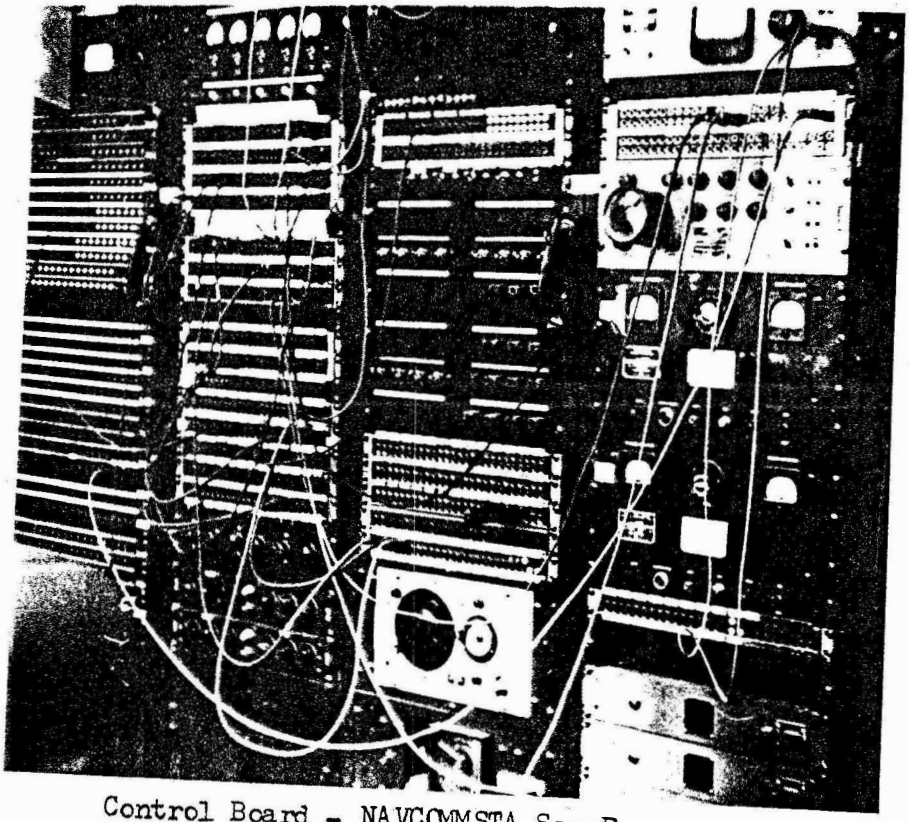


U. S. Naval Radio Station, Table Bluff, Eureka, California (NPW) 1922
(Direction Finder building on the beach with connecting stairway - 300 steps by actual count)



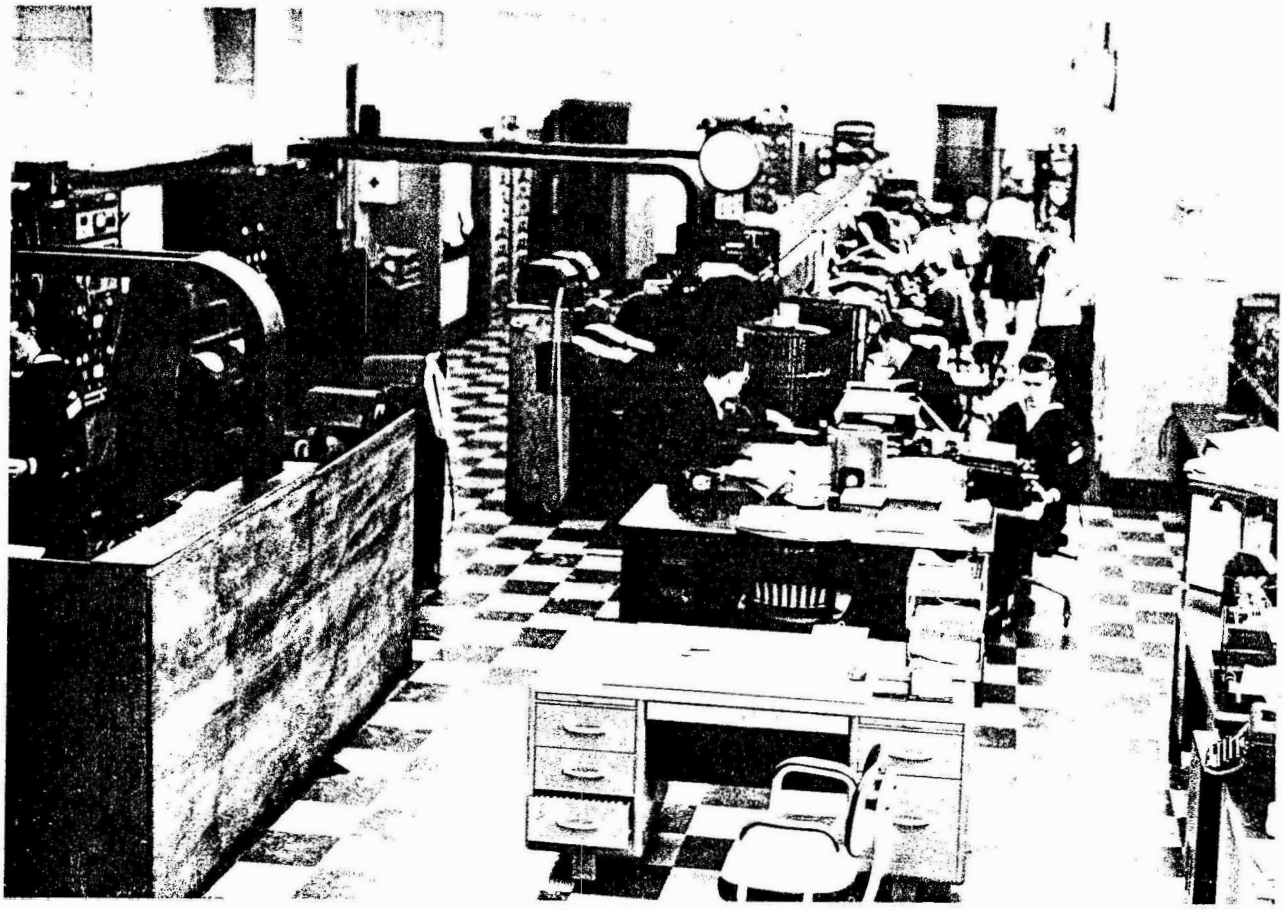
U. S. Naval Radio Station, Table Bluff, Eureka (NPW) 1922
(Main operating building - equipment L to R: two 20KW arc panels; long wave receiver; medium wave receiver; arc transmitter panel; 5 KW spark transmitter panel & meter)

Pictures by
Ernest P. Briggs



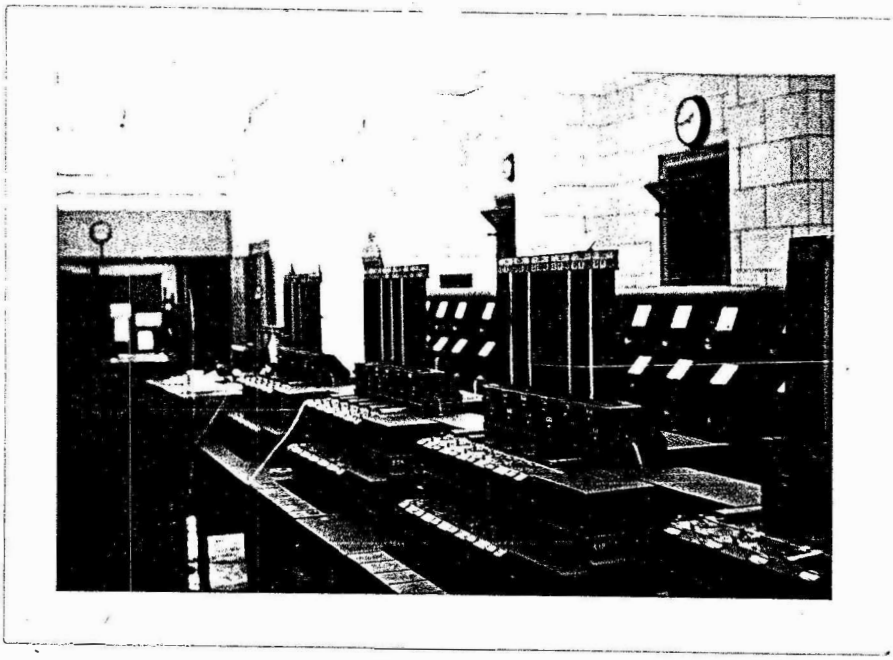
Control Board - NAVCOMMSTA San Francisco 1952
Picture by Les Funston

Communication Office, NFG, NAVCOMMSTA San Francisco 1952. Picture by Funston.



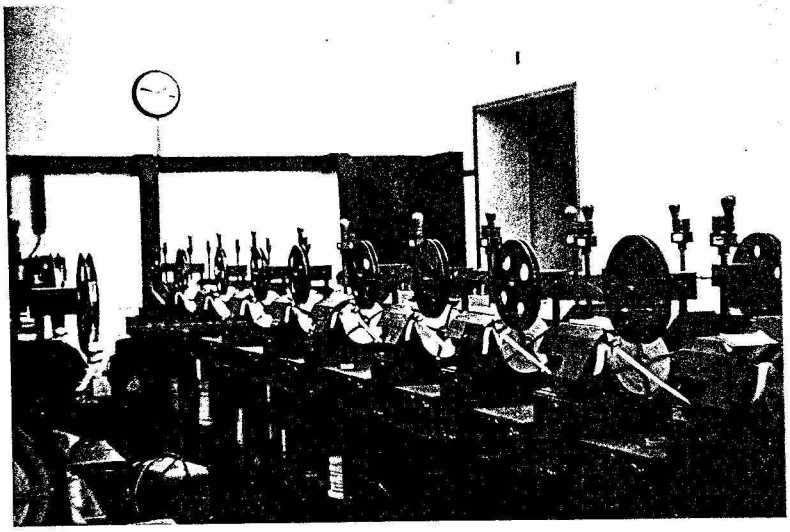
Communication Office, NRG, NAVCOMMSTA San Francisco 1952. Picture by Funston

NAVCOMMSTA San Francisco 1952. Picture by Funston.
(LCDR J. B. Halpin, OinC NRG, standing.
George Todd RMC, Control Supervisor
R. E. Jones RMC RET, back to camera)

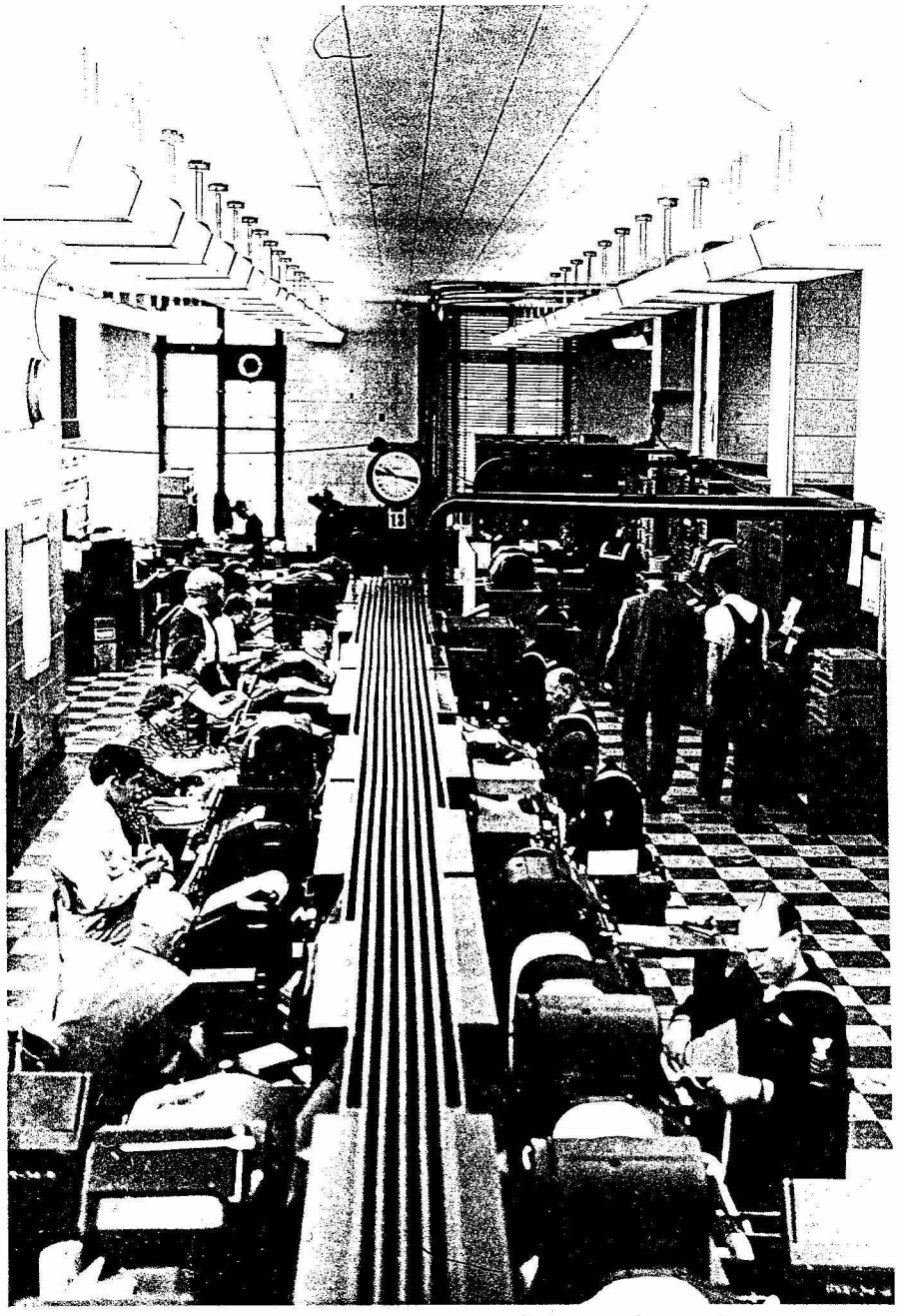


Teletype tape receivers and transmitters (NTX)
"Torn Tape" Relay room,
U. S. Naval Communication Station, San Francisco, California
1947-48 **Photo from John B. Halpin**

Teletype tape relay room, U. S. NAVCOMMSTA, San Francisco, California.
Tape transmitters on left, receivers on right, tape record reels in back.
1952 **Photo by Les Funston**

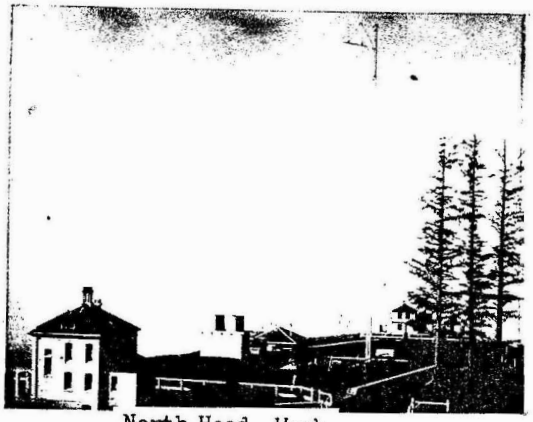


Reperforators and reels used to provide a permanent record of all transmissions at NTX Relay Room, U. S. NAVCOMMSTA, San Francisco 1947-48 **Photo from John B. Halpin**

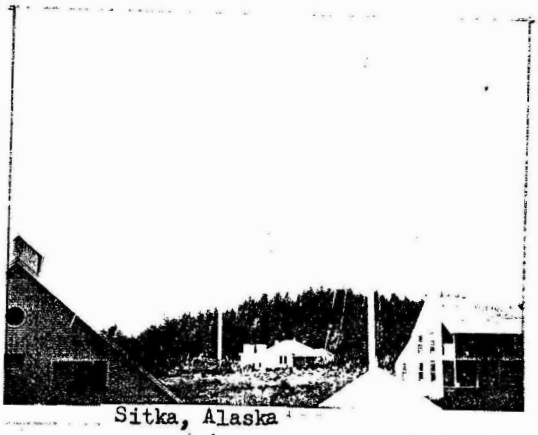


Conveyer belt at U. S. Naval Radio Station (Control), San Francisco (NPG), 1952. Originally installed in 1936 before the days of teletype, when manual code and high-speed Boehme operators transcribed messages for further relay or local delivery.

Photo by Les Funston



North Head, Wash



Sitka, Alaska

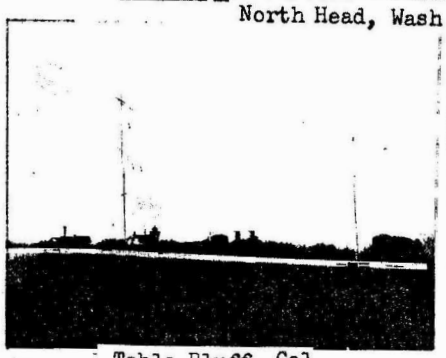
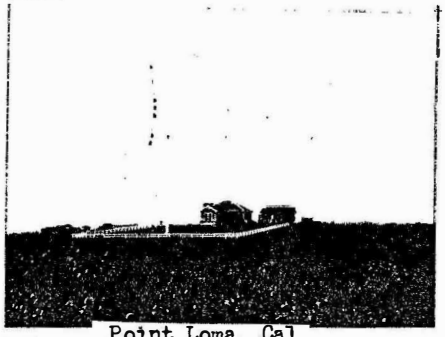


Table Bluff, Cal

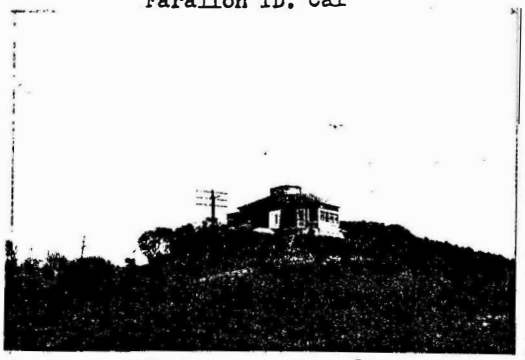
Geo. E. Hanscom



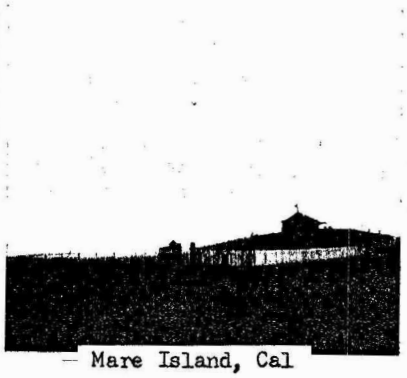
Point Loma, Cal

Farallon ID. Cal

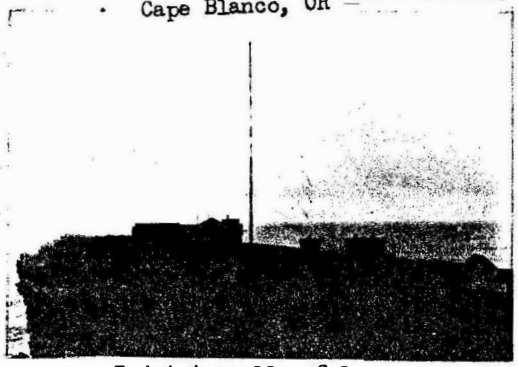
Cape Blanco, OR



Yerba Buena ID. Cal



Mare Island, Cal

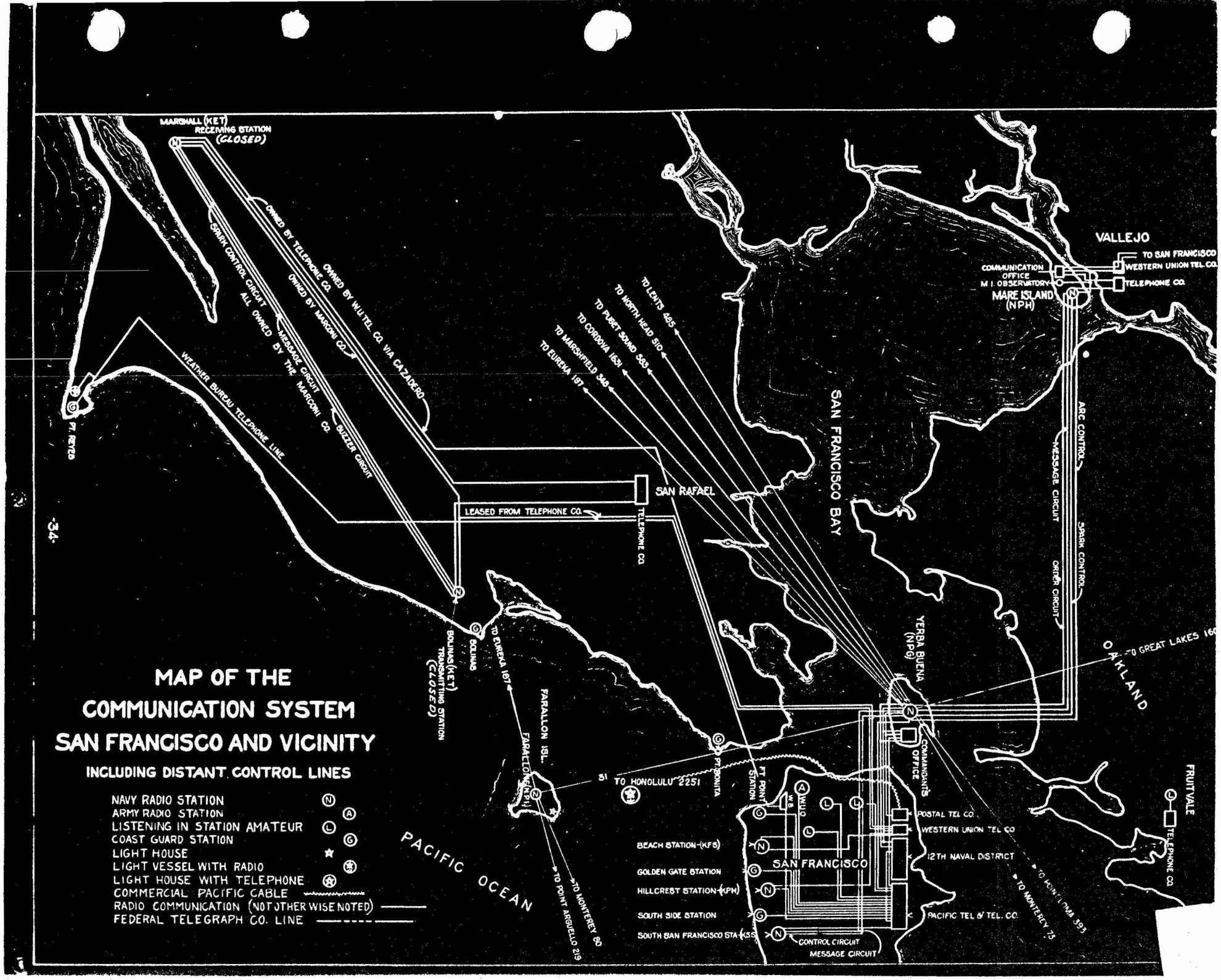


Point Arguello, Cal

U.S.N. WIRELESS TELEGRAPH STATIONS
ON THE PACIFIC COAST.
circa 1910

Copy provided in 1986 by:

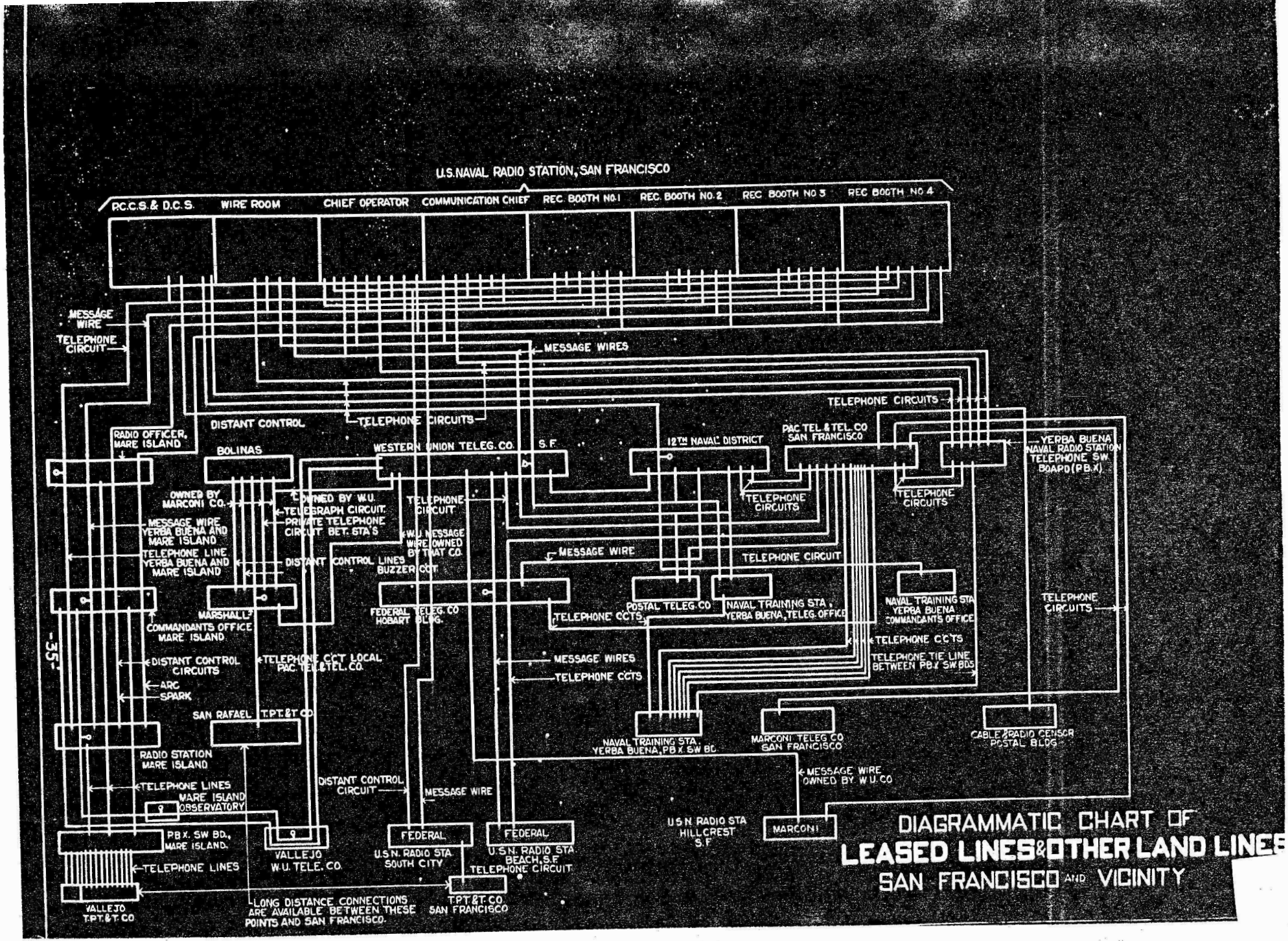
Sue Lemmon, Shipyard Historian,
Mare Island Naval Shipyard,
Vallejo, CA 94592



MAP OF THE COMMUNICATION SYSTEM SAN FRANCISCO AND VICINITY

INCLUDING DISTANT CONTROL LINES

- NAVY RADIO STATION (N)
- ARMY RADIO STATION (A)
- LISTENING IN STATION AMATEUR (L)
- COAST GUARD STATION (G)
- LIGHT HOUSE ★
- LIGHT VESSEL WITH RADIO (V)
- LIGHT HOUSE WITH TELEPHONE (T)
- COMMERCIAL PACIFIC CABLE
- RADIO COMMUNICATION (NOT OTHERWISE NOTED)
- FEDERAL TELEGRAPH CO. LINE


U.S. NAVAL RADIO STATION, SAN FRANCISCO
P.C.C.S. & D.C.S.
WIRE ROOM
CHIEF OPERATOR
COMMUNICATION CHIEF
REC. BOOTH NO. 1
REC. BOOTH NO. 2
REC BOOTH NO 3
REC BOOTH NO 4
MESSAGE WIRE
TELEPHONE CIRCUIT
MESSAGE WIRES
TELEPHONE CIRCUITS
DISTANT CONTROL
RADIO OFFICER, MARE ISLAND
BOLINAS
WESTERN UNION TELEG. CO
S.F.
12TH NAVAL DISTRICT
PAC. TEL. & TEL. CO SAN FRANCISCO
YERBA BUENA NAVAL RADIO STATION TELEPHONE SW. BOARD (P.B.X.)
OWNED BY MARCONI CO.
OWNED BY W.U. TELEGRAPH CIRCUIT
PRIVATE TELEPHONE CIRCUIT BET. STA'S
TELEPHONE CIRCUIT
MESSAGE WIRE YERBA BUENA AND MARE ISLAND
TELEPHONE LINE YERBA BUENA AND MARE ISLAND
W.U. MESSAGE WIRE OWNED BY THAT CO.
DISTANT CONTROL LINES BUZZER CCT.
MESSAGE WIRE
TELEPHONE CIRCUIT
MARSHALL COMMANDANTS OFFICE MARE ISLAND
FEDERAL TELEG. CO HOBART BLDG.
POSTAL TELEG. CO
NAVAL TRAINING STA, YERBA BUENA, TELEG. OFFICE
NAVAL TRAINING STA YERBA BUENA COMMANDANTS OFFICE
TELEPHONE CIRCUITS
TELEPHONE C'CTS
DISTANT CONTROL CIRCUITS
TELEPHONE C'CT LOCAL PAC. TEL. & TEL. CO.
ARC
SPARK
MESSAGE WIRES
TELEPHONE C'CTS
TELEPHONE TIE LINE BETWEEN P.B.X. SW. BDS
SAN RAFAEL T.P.T. & T. CO
RADIO STATION MARE ISLAND
NAVAL TRAINING STA. YERBA BUENA, P.B.X. SW. BD.
MARCONI TELEG. CO SAN FRANCISCO
CABLE & RADIO CENSOR POSTAL BLDG.
TELEPHONE LINES MARE ISLAND OBSERVATORY
DISTANT CONTROL CIRCUIT
MESSAGE WIRE
MESSAGE WIRE OWNED BY W.U. CO
P.B.X. SW. BD., MARE ISLAND.
TELEPHONE LINES
VALLEJO W.U. TELE. CO.
FEDERAL U.S.N. RADIO STA. SOUTH CITY
FEDERAL U.S.N. RADIO STA BEACH, S.F.
TELEPHONE CIRCUIT
U.S.N. RADIO STA HILLCREST S.F.
MARCONI
VALLEJO T.P.T. & T. CO
LONG DISTANCE CONNECTIONS ARE AVAILABLE BETWEEN THESE POINTS AND SAN FRANCISCO.
T.P.T. & T. CO SAN FRANCISCO
DIAGRAMMATIC CHART OF
LEASED LINES & OTHER LAND LINES
SAN FRANCISCO AND VICINITY

Rough and Ready Island

MODESTO BEE
Modesto, California
27 December 1984

By RAY SOTERO
Bee staff writer

STOCKTON — The base theater on Rough and Ready Island is called "Satellite Cinema," but the fare is rarely anything current.

A couple blocks away are two Capitol-sized microwave dishes, the larger 65 feet wide. Yet, more than $50 million in gear controlled by the Naval Communications Station has an all-business purpose, commanding officer Capt. Kenneth Johnson said.

"We can't even get cable TV on this island," he said.

Sailors may belong on ships and ships may belong at sea. But it is the airwaves the Navy is riding throughout the west and the eastern Pacific Ocean to help commanders on shore and skippers at sea talk.

The microwave dishes are the eyes and ears of the communications station and defense information system here, the largest and busiest link in a set of five U.S. military communications stations in the world.

Inside a nearby temperature-controlled building rows of Sperry-Univac computers and cryptography machines are the brain.

Together, with the help of 143 military and 93 civilian technicians and support personnel, they carry an average of 7.3 million messages each year between West Coast ships and stations.

Sending, receiving and forwarding an average of 10,000 messages every 24 hours is the biggest role at the 1,433-acre installation spread over most of an island along the Stockton deep water channel just west of downtown.

Johnson said there were no direct major building improvements or spending increases at Rough and Ready after Ronald Reagan became president. And none is planned for the near future.

Indirectly, however, Johnson's responsibilities loom larger. As the Reagan administration tugs toward its goal of expanding the current 525-ship fleet to 600 ships, that means more work for Johnson's data processors, antennas, receivers and transmitters.

For example, there would be a hefty jump in radio message traffic through Stockton if a pending decision results in basing another Iowa-class battleship — and its support group of destroyers and auxiliary ships — on the West Coast.

"If the Navy grows, our responsibilities grow proportionately," he said.

In the meantime, the Stockton community garners the benefits of the island's $25 million annual payroll — and $11 million annual paid for local goods and services.

Existing Navy hardware can handle much of the extra load a growing fleet may bring but more support personnel may be necessary, particularly when hand-delivering traffic to the Bay area, he said. Hand routing is when workers physically drive to a ship or station to drop off and pickup messages "over the counter." That is done usually when ships are in port and radio centers are shut for servicing or rest.

"Think of us as a giant post office," Johnson said.

Like civilian post offices, work at the communication station increases during the holiday season. In December, the monthly average of Western Union telegrams doubles from 2,000 to 4,000. When relatives and friends send holiday greetings to those at sea or abroad, the messages print out on nearly a half dozen Western Union machines that line a corner in the heavily guarded main communications room.

From Stockton, the Navy transmits it to a servicemember's command — at no extra charge.

The cost to the sender is the usual charge for sending a message from home to Stockton.

Not all of Johnson's duties are so cheery. As skipper, Johnson has traditional Navy duties of meeting every new servicemember reporting on board for duty, passing out promotions and being the bearer of sad tidings should it be necessary to notify next-of-kin. He also must ensure the lawns are cut, trees trimmed, the base's firefighters properly trained.

More importantly, as commanding officer, Johnson has overall responsibility for a base that acts as landlord to several subordinate federal agencies. Those agencies rent 47 warehouses 200 feet wide by 600 feet long. That's enough to cover 30 football fields — and is twice the warehouse space available in Stockton, public affairs officer Cmdr. Fred Gorrell of San Francisco said.

Everything from Army tugboats to ingot bars and 50-gallon drums of "strategic" precious metals are stored on the island.

By Al Golub, Bee staff photographer

Capt. Kenneth Johnson stands by two microwave dishes.

By land, the only way to reach the island is over a narrow bridge.

Employing nearly 1,100 workers, Johnson's biggest tenants are:

— The General Services Administration: Filling 21 warehouses, this is the island's largest agency. It has 350 employees who serve several other federal agencies by acting as the business and supply arms of the government. It stores $63 million in goods and acts as property manager of federally owned land in San Joaquin, Stanislaus and six other Central Valley counties.

— The Industrial Plant Equipment Office, formerly known as the Defense Depot Tracy: The second-largest tenant, this is a branch of the Department of Defense Logistics Office. It's in charge of storage of spare military parts and serves as the industrial plant site for the Tracy depot. That means it stores, inspects, tests, repairs and rebuilds industrial plant equipment in 13 warehouses with 140 workers.

— Defense Property Disposal Office: A branch of the regional office in Utah, this agency is in charge of selling, trading and scraping excess government goods. It has 51 workers.

— Sharpe Army Depot, watercraft storage division: Using nearly 200,000 square feet of outdoor storage space and 700,000 square feet of wharf footage, this agency is in charge of storage of small Army water and amphibious craft.

"The Army has more small craft than the Navy," Johnson said. They is used primarily for waterway patrol or large amphibious landings.

— U.S. Border Patrol: The nine-man office is under the direction of a regional bureau in Livermore and serves as a detention facility for holding illegal aliens until they are returned to their native country.

Despite the array of goods and jobs performed at Rough and Ready, Johnson said the only hazardous wastes stored at the base is PCBs, or polychlorinated biphenyl, a complex compound linked to cancer. PCBs are used in the oil and cooling systems of some transformers and related antenna gear, but are being phased out, Gorrell said.

The Shell and Mobile oil companies own a small part of the northeast corner of the island, and the Navy said there are no reports of groundwater or waste disposal at the sites.

If there is contamination on the island, neither the farmers nor the Boy Scouts are aware of it. Not all of the island is used, and the Navy leases 400 acres to local farmers. Boy Scouts often camp out on the island's western fringe, enjoying the marshes and wildlife while at the same time knowing there are emergency, security and fire department personnel on the island.

Elsewhere on the sprawling grounds, two-thirds of which is below sea level, are 12 miles of dikes to keep channel water out, 39 miles of railroad to move stored goods, Navy grocery and department stores, a nine-hole golf course, quarters for single and married personnel, 32 homes, chow hall, gym, bowling alley, hobby workshops and outdoor pool.

The result is a far cry from what began as a marshy swamp often flooded by the San Joaquin River. The first known settler went only by "Napoleon" and had left the Mother Lode Gold Rush town of Rough and Ready, which had been named after Gen. Zachary Taylor, the 12th president.

Taylor had been given the name "old Rough and Ready" during the U.S. Mexican War of 1848.

Since then there has been a success of military bases. Wounded veterans of World War I recuperated there. The Navy bought it in 1943 as a staging area in support of the planned invasion of Japan. It has been a communications station since 1960, when it was moved from San Francisco.

Said Johnson: "We have a job to do, and we don't plan on going anywhere."

Excerpt from "Evolution of Naval Radio-Electronics and Contributions of the Naval Research Laboratory" - Louis A. Gebhard, GPO 1979.

VERY-LOW-FREQUENCY TRANSMISSION.

The transition from the international Morse code keying transmission system to the automatic teleprinter system came about much later on the very-low-frequency circuits than on those in the high-frequency band. This was primarily due to the extremely low bandwidth characteristic of the huge shore station antennas at the very-low-frequencies, which imposed a limit on the speed of transmission (20 words per minute, continuous wave, international Morse code keying) to about one half that required for teleprinter operation at its lowest speed. In overcoming this limitation, NRL devised the first teleprinter system providing effective operation on the very-low-frequencies (1951). The performance of this system was demonstrated in operations using transmissions from the Navy's VLF station at Annapolis, Maryland (NSS, 15.5 kHz) over long distance circuits to Iceland, England, Panama, Canal Zone, and North Africa. This system was self synchronizing and provided the encoding of a standard teleprinter signal into a four level signal having one half the keying rate of the original. The transmitter was shifted through the four frequency levels by the encoded signal which, as modified, could then be accommodated by the bandwidth of the antenna. At the receiver, a decoding device converted the received four level signal back into its original form for operation of the teleprinter. A novel, stable, regenerative circuit provided a much higher degree of selectivity in the frequency-shift receiver than had previously been attained (25 Hz bandwidth). A specially designed discriminator permitted segregation of the signals on the four frequency levels, which were separated by a very small difference in frequency (4 Hz).

With the advent of the Polaris weapon system, grave concern arose regarding the reliability of command and control communications via the Navy's VLF transmitting system. In responding to this situation, NRL developed a VLF facsimile transmission system which was first to provide reliable command and control communication from a single high power transmitting station in the United States to continuously submerged submarines when operating in any critical world area (1959). Early in 1959, the submarine USS KATE used the system successfully on its trip to the North Pole. The submarine USS TRITON, in accomplishing the first circumnavigation of the globe, submerged, used the system throughout the voyage with good results (February-May 1960). The system was installed on all Polaris submarines and provided highly reliable command-control communications during the critical period that followed. This system became known as "Bedrock." The Navy's existing transmitting system had to contend with high atmospheric noise levels prevalent at the very low frequencies which produced low signal to noise ratios and seriously affected the reliability of communications in distant areas of operational importance, such as the Mediterranean Sea. In the system devised, the superior performance obtained under extremely low signal to noise ratio conditions was achieved through the use of very narrow frequency bandwidth transmissions and the redundancy provided by facsimile type signalling. A facsimile-controlled exciter provided the small frequency shifting of the transmitter. The frequency-shift receiver utilized the novel techniques for high selecti ity and discrimination previously devised for the VLF teleprinter system. Transmitter components were provided for installation at shore stations: NSS, Annapolis, Maryland; NAA, Cutler, Maine; NPM, Lualualei, Hawaii; NPG, Jim Creek, Washington; and NBA, Summit, Panama Canal Zone (1958-1964). Receiver components were supplied for submarines, the first installation being made on the USS SABLEFISH (January 1959). In the trials of the system made with this submarine in the Mediterranean Sea area, excellent submerged reception results were obtained on transmissions from the station at Annapolis, Maryland. Similar results were obtained by the

submarine USS BANG at its station in the North Atlantic off Norway (February 1959).

NRL developed a frequency-shift keyer which for the first time permitted automatic operation of the Navy's VLF transmitters at a rate as high as 60 words per minute with a high degree of reliability for command-control communications to Polaris submarines (1963). All of the Navy's high power stations were then equipped with these keyers. The system utilized two frequency levels for keying with provision to avoid the large voltage and current transients previously experienced when the large quantity of oscillatory energy in the antenna system was abruptly changed in frequency. These transients had, at times, caused a flashover of "horn-gaps" and other protective devices followed by objectionable shutdown of transmitters due to overload. In certain instances, critical damage occurred, such as the burnout of antenna loading inductance cable, rendering the station inoperative for a considerable period. The transients were avoided by beginning each successive "mark" and "space" frequency shift at the zero-crossing points of the "mark" and "space" frequencies, when these points were coincident in phase, and by arranging the rate of change of frequency to be linear during the transition process. The transition period was of such length as to hold the sideband energy generated during transition within the frequency bandwidth of the antenna. Maximum utilization of the antenna bandwidth was obtained by very precisely maintaining the "mark" and "space" frequencies; this was possible with NRL-devised techniques. Full utilization of the antenna bandwidth and confinement of the sideband energy to within its limits are major factors in maximizing the rate of transmission. The system permitted changes in the transmitter frequency to be made quickly and easily. Frequency-shift keyers of this type were provided for the Navy's VLF stations at Cutler, Maine (NAA); Jim Creek, Washington (NPG); Lualualei, Hawaii (NPM); Northwest Cape, Australia (NWC); and Summit, Panama Canal Zone (NBA) (1966). During 1970, Annapolis, Maryland (NSS) and Yosami, Japan (NDT) were equipped.

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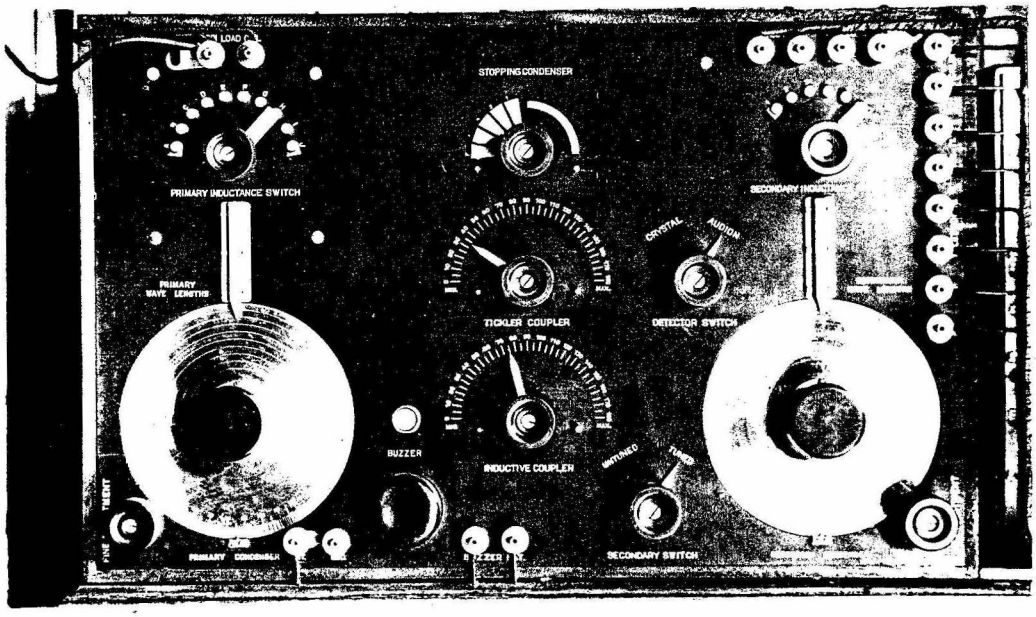

Navy designed SE 143 medium-wave receiver with integral crystal detector and audion.

Excerpts from an article in the Society of Wireless Pioneers' SPARKS JOURNAL, March 1985: "The Story of Haraden Pratt - Pioneer," as furnished to Henry Dickow:

"Both my father and mother were Morse wire telegraphers. They met over a private telegraph line that ran around the city from rooftops. They taught me the American Morse code on a telegraph circuit that interconnected the floors of our home. I was able to build my first wireless receiving set from scant bits of literature then available.....

.....In 1908, the "Great White Fleet" of the U. S. Navy was at anchor in San Francisco Bay. Some of the ships of the fleet had been equipped with both wireless telegraph and telephone apparatus before sailing from the East Coast on an around-the-world good will cruise. It occurred to me that I might hear signals from these ships. I hurried to the basement, dusted the cobwebs from my 1905 apparatus, adjusted the needle on the carbon detector and, sure enough, in came the signals, loud and clear. They were mostly from the flagship USS CONNECTICUT and the USS COLORADO. Messages were going back and forth between the ships and the Navy radio station on Yerba Buena Island, conveying invitations to, and acceptances from, the officers for social engagements ashore. The Navy was using Continental Code, which I did not know, but with a copy from a library book, I was able to translate the messages.

Chief Electrician Meneratti used the set on his ship to send music for the entertainment of his friends on other ships, by placing the microphone in front of a phonograph. I could hear the music occasionally, but both the transmissions and reception were erratic. Chief Electrician aboard the CONNECTICUT was Arthur Rice, who later served as Radio Aide at the Mare Island Navy Yard while I too was there.....

.....By this time I had become a confirmed wireless "bug" and it was not long before I had a completely new and modern wireless outfit. At times I was even able to hear the new station at Kahuku in the Hawaiian Islands built by Arthur Isbell in 1908, as well as the Navy station at Key West, Florida.....

.....Only a few of the sparse group of wireless operators then available was assigned to duty at station PH. Fortunately, I became one of them. When PH took to the air at Hillcrest, a gentleman's agreement was in force between the various operating companies and the U. S. Navy. The first half of each hour was reserved for Navy traffic, the second half for the commercial stations. Thus the operators had time to "clear the meat hook" of message traffic. When traffic volume was low, the operators took to reading dime novels.....

.....Upon my graduation from college in May, 1914, I was appointed assistant engineer at the 300 kilowatt transpacific Marconi spark station at Bolinas, with the receiving station at Marshall on Tomales Bay some forty miles up the coast from San Francisco. My assignment at Bolinas was not an easy one. Blueprints were often missing, some were wrong, and some equipment failed to arrive. To make matters worse, my only technical assistant electrocuted himself.

At this high-power Marconi station, some 2,000 amperes of current flowed in the local oscillatory circuit through bus-bars which were twentyfour inches wide. When the power was first turned on for the initial test, the building filled with smoke from burning paint on the beautiful steel and iron bus-bar supports, which became excessively hot. Entirely new supports of bronze had to be made in San Francisco to replace the iron and steel.....

.....In February 1915, I was given employment by George Hanscom at the Mare Island Navy Yard as machinist at $4.32 per day. Later I was appointed an Expert Radio Aide. My duties at Mare Island consisted of running the laboratory, designing apparatus of

many types, and fitting out shore stations. Later I installed a lot of special equipment on ships, including direction finders on the four stack cruisers. I was also the inspector of Federal arc equipment for the new 200 kilowatt station under construction at San Diego.

Finally I was placed in charge of technical aspects of privately owned stations which were commandeered by the Navy on the outbreak of WWI. The Bolinas 300 kilowatt "rock crusher" came under my jurisdiction. We soon shut down this station because of the terrific interference it created.....

.....I was later transferred to Washington, D. C., where I was placed in charge of construction and maintenance of all high-power radio stations. Some had already been completed at San Diego, Pearl Harbor, Darien and Cavite, while new installations were going in at Guam, Sayville, Tuckerton, Annapolis, Puerto Rico, and a 1000 kilowatt plant near Bordeaux, France. Additionally, an Alexanderson Alternator system was under construction at New Brunswick, New Jersey, and I spent considerable time with Alexanderson and Harold Beverage on this interesting project.....

.....General "Black Jack" Pershing, who commanded our forces in France during WWI, expressed concern when the American submarine telegraph cables off Fire Island, New York, were cut by the Germans in July, 1918. At Pershing's instigation it was decided to build another super-power station of 1,000 kilowatts capacity in the United States. North Carolina was chosen as a suitable site because of immunity from sleet storms which wrought havoc with wireless antennas during the winter of 1917-1918. Another reason for locating it in North Carolina was because this was the home state of Josephus Daniels, Secretary of the Navy, who was required to provide the funds by requesting an allotment from the special appropriations committee which served on the orders of President Wilson.

Steel was in critical supply during the war years. Bernard Baruch's office refused to give us the necessary material for the steel towers. I then let a contract for several 600 foot brick chimneys to support the antenna. The radio apparatus would be housed in a room at the base of one of these chimneys. The contract for the chimneys was intended for the Alphonse Custodis Chimney Company of Brooklyn, New York. It required the entire output of several brickyards in the south to manufacture the enormous quantity of bricks for the project. The contract award was in the amount of $3,250,000. The papers were on my desk, needing only the signature of Franklin D. Roosevelt, Assistant Secretary of the Navy, and an additional endorsement by the fiscal officer. Then came the Armistice. The project was abandoned. The land was returned to the rightful owners and appropriate payments in damages made.....

..... I later became Vice President and Chief Engineer at the International Telephone and Telegraph Company. In 1951, I was asked to accept an appointment as Telecommunications Advisor to the President of the United States. I became President of the Institute of Radio Engineers in 1938 and continued as an officer and director until 1965, when I was named Director Emeritus.

Not much remains of the kind of wireless and radio communications that developed during the major part of my career. Now, only the ship-shore wireless services continue very much the same as they have been in the past.

Most of today's accomplishments were not even in the dreams of mankind a few short years ago. Wireless telegraphy has come a long, long way since Marconi sent his first signal across the Atlantic in 1901!"

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Excerpts from a story in the Spring, 1977, issue of the SPARKS QUARTERLY JOURNAL of the Society of Wireless Pioneers, by Raymond B. Walling:

The Navy had taken over KPH, then located at Hillcrest in the Daly City area during the early days of WWI and the call was changed to NWO. RCA expected to regain ownership and operation of the station at that location on termination of WWI but the Navy chose to retain it.

Early in 1920, RCA began plans for the re-establishment of KPH with the controls and operation at Marshall and the transmitter at Bolinas; the location of the Trans-Pacific transmitters. Frank Shaw of KPH Hillcrest fame, and possibly before at "PH" in the Palace Hotel, San Francisco, was designated the chief operator and was assigned the task of establishing the station. Frank invited me to become the second member of the KPH operating staff and at least 2 seconds elapsed before I accepted. Within a matter of several days KPH was open for business.

The transmitter was a shipboard model P-8 quenched gap rig operating at about 1½ kw. It was installed in a small "Chic Sales" type of building at the base of one of the Trans-Pacific 365' towers. The antenna was a 4-wire flat-top on spreaders and suspended from the top (or near the top) of the tower at a sharp angle to a ground anchor.

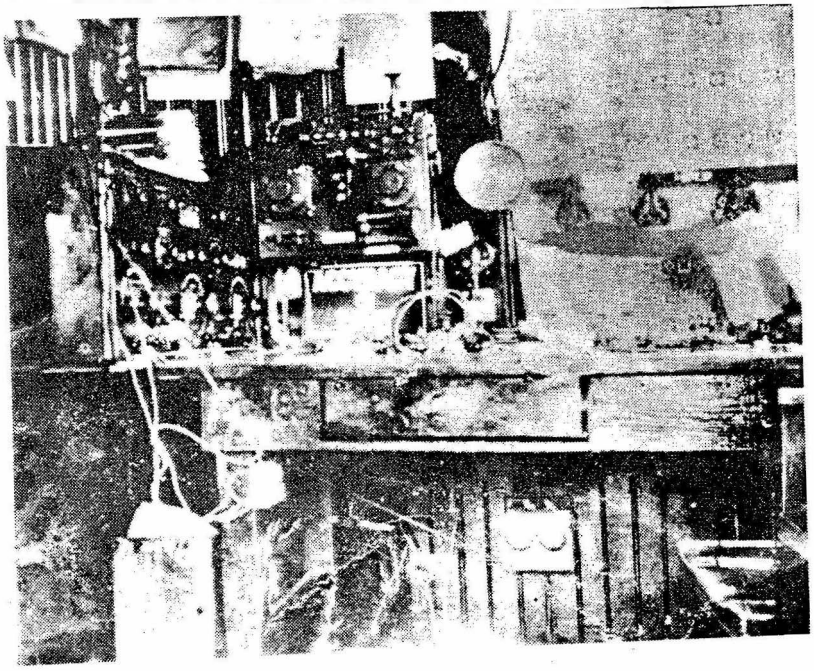
The receiving installation was something that almost defies description. The tuner was of the loose-coupler type of unknown origin or manufacture. the primary coil was tuned with a slider arrangement; the coil being approximately 12 to 14 inches in diameter and 24 inches in length. The secondary coil was mounted on a track for ease of adjustment in and out of the primary coil. Then it was also a two hand job. The secondary coil was tapped and adjusted with a switch. In those days this type of loose-coupler was known as a "churn" and this particular one was almost capable of making butter if you had the necessary components. The detector was of the regenerative type followed by two stages of audio. The tubes used were of the UV-200 and UV-201 types.

If my memory serves me correctly, KPH was placed in operation in April or May of 1920, with Frank Shaw and I standing 12 hour watches. Frank stood the 7 pm to 7 am watch and I the other 12 hours. The watches were set up in this way because of Frank's vast experience in marine coastal station operation and it was believed he was more qualified to woo traffic away from the Navy stations who were then open to commercial traffic. KPH was no competition to the Navy stations due to the low, 1½ kw power. Even with Frank's experience KPH had difficulty in maintaining normal communication with the coast-wise ships. The offshore range was a matter of possibly 1000 miles and we had to rely heavily on Matson ships for an assist and relay. The Japanese passenger ship picture-bride traffic was quite lucrative but again KPH was no competition to the Navy stations for this traffic. KFS was not competing for this traffic and to the best of my memory they never did. On several occasions when a Japanese passenger ship called the coast with his first traffic, KPH would ask a Matson ship to tell the Japanese ship that his signals were strong and to go ahead blind with his traffic. The Japanese operator refused to buy such a deal. He wanted to hear the station at the other end. So the traffic went to the Navy station and KPH twiddled its thumb and ground its teeth. KPH continued to fight a losing battle for traffic and we started heckling RCA for better and more powerful equipment.

One evening, when I was on watch, the Navy station NPW at Eureka called KPH several times and was answered each time without results. Finally the Navy station NPK at Point Arguello transmitted a general call: "Can anyone hear little KPH?" That remark was, of course, logged for Mr. Isbell's benefit but there was still no comment forthcoming from him. (A. A. Isbell was the RCA Pacific Coast Superintendent).

A few weeks after that incident, the installation of the rotary gap transmitter was begun at Bolinas. The power was 7½ kw. This transmitter was installed in the same "Chic Sales" building that housed the other transmitter and the same antenna was utilized. The installation was far from a thing of beauty but it proved to be very efficient and the signals covered almost the entire Pacific Ocean. A number of squirrel-cage type of antenna loading inductances were secured to the bulkhead and the rotary gap motor and wheel were mounted on a piece of 2 by 4 lumber. The condensers were of the oil immersed tinfoil and glass type. A minimum of maintenance was necessary- burnish the keying relay contacts and change the spark gap wheel.

On completion of the rotary installation, Frank instructed Bolinas to keep it off the air and continue to use the P-8 transmitter until Marshall called for the rotary. The reason for this was that a Japanese passenger ship inbound was expected to start clearing his traffic in a day or two and Frank wanted to surprise him and the Navy stations. And that he did! When the SS Taiyo Maru (JAHA) called a Navy station with his traffic, Frank got the rotary going and a swered him. The ship answered on the first call and said: "FB KPH - here is a hundred." That was the end of the Navy competition. Frank hauled out the secondary of the "churn" for sharpness and copied the entire traffic file without a repeat. That was real operating. Much credit was due the Japanese operator for his smooth and precise fist. With this incident, KPH's dilemma (traffic-wise) was a thing of the past and we could generally handle any traffic we could h ar.



KPH 1916

This is a picture of the receiving equipment at KPH. On the wall is the old Marconi standby receiver with carborundum detector. On the left is the Marconi 101 receiver with galena crystal. At the extreme right is the antenna switch, then the telegraph keys and switches to control the rotary spark gap.

With this receiver, operator Arthur W. Peterson had a record of over 6000 miles. The SS Floridian and Dick Johnstone worked direct with JOC and JCS Japan, but only for a few moments. Both of these are real records for a crystal detector receiver. Six months after this photo was taken, the station was struck by lighting. Every bit of the equipment to the left of the photo was demolished instantly. The blast was so furious that it did not catch fire but blinded Johnstone temporarily. It also knocked off 20 to 25 feet of the 250 foot mast. The other mast was not injured and a temporary mast and aerial was rigged putting the station back on the air in a few hours. Operators, Frank W. Shaw, Arthur W. Peterson and Richard Johnstone.

Cmdr. R. Johnstone photo

Lest We Forget

This is a history of the Electrical Shop of the Mare Island Navy Yard. To those of us who knew the "Old Days", the memories of those Supervisors, mechanics and other ratings, who worked in Building 101, are golden and should never be forgotten. But the passage of time has a tendency to blur and dim those memories and so, with the objective in mind of perpetuating the names of the old timers of the Electrical Shop, this history is written.

In the year 1901, by order of the Commandant, Rear Admiral Merrill Miller, a new shop to be known as the "Electrical Shop" was organized. The personnel was selected from the employees of the Equipment Shop of the Yards and Docks Department, and Building 101 was assigned as its quarters. This building was a two story and attic brick structure 60 ft. wide X 120 ft. long, with an 80 ft. long sheetmetal addition, centrally located adjacent to the seawall. It housed, on the ground floor, the Electrical Machine Shop, the Plating and Buffing Rooms, the Boiler and Firerooms and the Blacksmith Shop. In after years, the Physical Laboratory and the first Gyro Compass repair room occupied a portion of this floor. The main office, the Joiner and Pattern Making Shop and the Electrical repair facilities occupied the second floor with the Sheetmetal Shop occupying the attic.

The personnel of the new shop consisted of Master Electrician George Hanscom, Quarterman Electrical Machinist John Askin, Leadingman Electrical Machinist Harry Arvidson, Electricians William Callen, William Gregory, Victor Sikora, Solan Bailbache, Edward McDonnell, William Sedgely, Thomas Keeshan, John Sides, Arthur Hanson, John Hood, Frank Cassiday, Samuel Bateman, James Lamont and Fred Mumma; Machinists Charles Arvidson, John Jay Smith, George Koretke, William DeSanno, Paul Boevin, Fred Engle, Al Cady, A. Bergandahl; Instrument Maker Doc Goodenough; Joiner Joseph Rosevear; Painter W. C. Moore; Pattern Maker George Walker; Electroplater Frank Wetmore; Buffer and Polisher William Ward; Blacksmith J. Higgins; Shipfitter William Burgess; and Sheetmetal Worker Edward McCauley.

During the following year the shop rolls were augmented by the following names: Electricians Alonzo Halliday, Roscoe Harrington, Morgan Jones, George K. O'Hara, William Slaughter, Seymour Burton, A. S. Miskin, Eugene Tillman, J. K. Smedley; Machinists Edward Barnikol, Albert Hodges Sr., John Loeffler, O. W. Mellin, W. Meath, Bennett Benson, T. P. Moseley, Adolph Widerman; Molders W. D. Walker and Martin Nelson; Patternmaker W. T. Street; Joiner Alex Odom; Fireman Samuel Murray; Blacksmith Frank Lemon; Buffer and Polisher Albert Hoffman; Clerks Owen S. Cooper, Chester Staples and Guillford P. Monell.

At this writing the known survivors of these groups are Leadingman Electrical Machinist Harry Arvidson, Electricians Thomas Keeshan, John Hood, James Lamont, Morgan Jones, George K. O'Hara, Arthur Hanson, and Buffer and Polisher Albert Hoffman. Of this group only George K. O'Hara is still employed at the Navy Yard.

The first Master Electrician was Mr. George Hanscom, who served as such from 1901 until 15 March 1909, when he was succeeded by Mr. William A. Barstow, who served until 30 September 1936, when he retired from service and was succeeded by Mr. Frank W. Savage. Mr. Savage served until his retirement on 31 March 1946, when he was succeeded by the present Master Electrician Robert F. Cooke.

The first Quarterman Electrician was John Askin who was followed by Morgan Jones, Frank W. Savage, Charles Pracht, William N. Simons, Robert F. Cooke, Garner Funkhouser, James F. Upchurch, Leon Courtland, Harold Osborne and Albert Albany.

The first Chief Quarterman Electricians were Robert F. Cooke and William N. Simons.

The Leadingman Electricians, while the shop occupied Building 101, were Frank W. Savage, Morgan Jones, Roscoe Harrington, E. Okerlund, William N. Simons, Henry Berringer, Emil Rehn, Victor Sikora, Charles Pracht, Willis Mann, David Knighton, Frederick Walcott, Herbert Yocum, Earl Malone, Robert F. Cooke, Henry Alden, Garner Funkhouser, James Upchurch, Julius Bleamel, Leon Courtland, Albert Albany, Harold Osborne Charles Cunningham, James Patterson, John Frates, Joseph Ronan, Sam Justice, Eldon Deal, Percy Harris, Stanwood Talbot, Adolph Casarino, John Roddy, Robert Erler Sr., Arthur Morey, J. H. Frye, Fred McDonald, H. D. Christman, John Manyik, Chester Mell, H. R. Widener, C. C. Tyor, Mark Andrews Jr., and N. Gundershang.

The first Leadingman Electrical Machinist Harry Arvidson was followed in turn by Leadingman Toolmaker George Koretke, Leadingman Machinists John Jay Smith, Theodore M. Lauer, Edwin F. Houseman, Henry Marchant, William K. Rule, Frank J. Bathe, Walter D. Mann, John N. Pouget and John H. Tufft.

In 1938, the first Quarterman Machinist rating was conferred upon Theodore M. Lauer, followed by Edwin F. Houseman in 1940.

The early employees of the Physical Laboratory were Professor William Lynn, in charge; John Hess, Fred Wolff, Robert McPherson, Albert Hodges Jr., Edward Kavenough, James Paterson, L. L. Rosenberg, Thomas Hudd, Melville Danner and Henry Ferrero.

In the early days of the shop's existence, the Drafting Department of the shop consisted of Glen Dickey, Bert Whitely, Ross Robinson and Vance Simonton.

Building 101 remained the home of the Electrical Shop until 15 March 1942 when Building 686 was officially occupied.

The writer gratefully acknowledges the assistance rendered in the compilation of the foregoing facts by Thomas Keeshan, Arthur Hanson, Frank Savage and Theodore Lauer.

PERSONAL RECOLLECTIONS of Ernest P. Briggs, LT USN RET

My experiences in the 12th Naval District were many and varied. Probably you have heard the saying among radiomen "The worst shore duty is better than the best sea-duty." Generally speaking, this seems to be quite true. Especially for those who were married.

My first orders to shore duty came as a surprise. In February 1922 I arrived at the Navy Radio Station, Eureka, California, NPW, along with three other radiomen. We were all young and eager as this was our first shore duty. The station was five miles from the nearest town and sixteen miles from Eureka, in the heart of the redwoods country. It was quite different from what we had expected. We learned to like the country and we loved the people.

Our radio station served to help merchant ships at sea keep in touch with shore and vice versa. It was an ideal location, on top of a 300 foot bluff, at the ocean's shore, away from competing radio stations by almost 300 miles. We could communicate on 500 Kcs with naval or commercial ships until they were within easy range of Honolulu, San Francisco or Alaska.

It was a nice change working with commercials, using "Q" signals instead of "Z" signals and a more relaxed type of communication. So much for the work!

In looking for recreation, we were not so fortunate. We learned that transportation was the big problem if we were to "be there" for the Saturday Night Dance in Humboldt County. Each little town had its own Volunteer Fire Department and each had to make some money to operate and have fun doing it. They had dances, etc. They were dependent on each other in getting a crowd in attendance. At each Saturday Night Dance the usual attendance was about 200 to 300. At $1 per person they had a little money coming in for operating expenses. Ah, for the good old days!

After depending on luck for a month, seven of us radiomen decided to buy a car. There was one little garage in town. He sold us a four year old Model T Ford. This was the beginning of a new life for us. Most any day the radiomen off watch could muster enough dough to put gas in the car and take off for Eureka. The Model T would be breathing fire. The rainy season is long and active in Humboldt County so we usually had all four isinglass curtains streaming in the breeze as we ate up the miles. No rest for poor Lizzie! One of the boys was courting the telephone operator on the night watch in Eureka. So instead of rest and recuperation at night for poor Lizzie, she would be burning up the road to Eureka once more.

We found it necessary to bring Lizzie to the garage two or three times a month for repairs. So, although the cost wasn't high by present day standards, it was taking a big bite out of our little paychecks. No one person really wanted to take over Lizzie, but I was finally talked into the transportation business. The first time I took my girl out into the redwoods, we had seven in the car. It being a hot August day, there were hills to climb. As expected, the car got overheated and real balky. After it got dark, about 7 PM, we started for home. Lizzie had not had time to cool off. We pulled into a garage in the heart of the redwoods, still 35 miles from Loleta, where my passengers lived. One of the boys phoned a friend in town who drove out, picked us up and returned us to civilization. When I finally got Lizzie home I had had more than enough of providing transportation. One of our other brave souls volunteered so I passed the car to him with no cash involved.

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PERSONAL RECOLLECTIONS of Ernest P. Briggs, LT USN RET (continued):

Telling it like it was in the good old days at NPW in Eureka, is my pleasure. It was my first shore duty, plus a good bunch of guys (unmarried) made it happen. You mention Ray Brightman. He was there and can verify. It was redwood country and for me, it is very special. I am sending some of my old snapshots for the sake of all who are interested: In #1, from left to right, are R. Parry RM, Veltman RM, Brightman RM, Schmidt Yeo, Constantine RM; #2, Van Wiegan RM, Knight RM, Parry RM, James CRM; #3 shows the direction finder station down on the beach with a connecting stairway with 300 steps, by actual count; #4 shows the equipment at the radio station: left to right, arc 20 Kw 2 panels, long wave receiver, medium wave receiver, arc transmitter panel, 5 Kw spark panel and meter. Our most important piece of equipment is not shown, the kerosene heater. We had a steam heating system but it took patience and much coal shoveling to get it started, so we were usually dependent on the portable, besides it kept our coffee warm.

Change of scenery: I received orders to report to NPG in San Francisco. I got hitched and was on my way all within a week. At this time, in early 1923, NPG was located on top of the hill on Goat Island. On reporting, I was given one week to find a place to live. I found an affordable apartment in the old section of San Francisco. I was lucky in having another NPG operator in the same building, who was also a just-wedded sailor. Herb Daw was a good shipmate and my friend for many years. I never did get well acquainted with the setup at NPG on Goat Island. We had some circuits that were discontinued when we were moved to Sansome Street in San Francisco. We have an Old Timer Communicators member who is usually in attendance at our meetings, Max Steiner, who was there on Goat Island. He can no doubt fill you in on the details.

The radio station was located on that island in the center of San Francisco Bay in a picturesque setting but not so practical for a communications center. At that time the Bay was alive with ferry boats but none stopped at the island. Tied to the dock was the Navy Receiving Ship, USS BOSTON. A small tug took passengers between the Receiving Ship and Pier 14 in San Francisco. This was the boat that all hands at NPG had to ride to and from their watch standing at NPG. The boat ran on schedule and we had a steep hill to climb to get from the dock to the radio station. It was a wild rush either way. All hands breathed a sigh of relief when the NPG control station was moved over to downtown San Francisco.

We had 24 hour circuits with NPM, NPL, NPC or NPE. NPW and NPI were on a call basis. We had landwire connections with the Commandant's comm office, United Press, Associated Press, Mare Island, etc. My assignment was one ear on 315 Kc and one on 500 Kc the commercial calling and distress frequency. Besides which, during the 0800-1300 hours I listened for the cross country air mail planes, a recent addition for NPG. Of course, this was only possible by putting the 500 Kc receiver on a loudspeaker. KPH, the RCA ship-shore station, would alert us in case there was an SOS on 500 Kc. At this time we had schedules with NSS in Washington who received us only at certain hours through his Bar Harbor receiver station. One day, it so happened the traffic chief sat me down on this circuit and NSS just happened to have traffic. He called. I, innocent, said "K" and NSS came back with a 300 word message which had me struggling. When it came time to change message blanks, I tried to break-in but no luck so I called for help. When we finally got it straightened out, he had to repeat 200 words. So that ended my time on the NSS circuit. When I was starting to feel at home in this madhouse, word came that we were moving to the Appraisers Building on Sansome Street in San Francisco. We were happy to be rid of that boat trip with the hill climb!

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PERSONAL RECOLLECTIONS of Ernest P. Briggs, LT USN RET (continued):

It was in May 1923 when we finally bid farewell to Goat Island. It took time to get the new receiver station ready at South San Francisco. They provided quarters for the men operating that station. I went with the gang going to Sansome Street in San Francisco, so I didn't have to move from my little apartment. Of course, some problems came up in the moving, but that seems to be normal in the Navy. Herb Daw went to South San Francisco with the receivers.

In the new Control Station in the Appraisers Building, I got the NRM circuit. Opposite me was Sporford on the NSS direct circuit (Bar Harbor, Maine, eliminated). My work was mostly sending to NRM whereas NSS was mostly receiving and with the hot summer months coming on, receiving NSS was usually impossible in the RM daylight hours. Sporford was an excellent operator and could "pick 'em out of the static" if possible. I had problems too. Part of my job was to copy NPO, Cavite, blind starting at 0200 until clear, usually about 0700. He sent each word twice unless he heard otherwise from me and it took time to send him a message through NRM to NPN to NPO. By the time the static would come crashing in, I would return home exhausted, only to fall asleep and start listening to NPO sending to me all over again. What terrible dreams!

Where there is life there's hope! My 4 year cruise was drawing to an end and I had this crazy idea to return to civilian life. My first Naval ship, in 1919, was a destroyer (one of the old 4-stackers) on which I served two months in the Boston Navy Yard while she was put in commission and readied for duty on the West Coast. During this interval the radioman on board made chief and I was rated electrician (radio) third class. I was his right hand man. Never dreaming I would hear from him once he was out of the Navy, but sure enough the last two months I was in San Francisco, I kept receiving letters that he was doing electrical work, that he needed help, and finally that he was holding the job open for me. Being young and not too bright, this impressed me, so when I was discharged, we took off for Cincinnati and went to work for my old shipmate, wiring new houses for lighting, etc.

Because he was wiring houses built for his brother-in-law, who just happened to be turning them out as fast as possible during the good weather, we had plenty of work. However, one learns by his mistakes and soon I was aware that this venture was not for me. If you have ever lived in the midwest during summer you know what it's like in August. Hot and humid! Coming from San Francisco to live there is hard to take. Add to this the work was extra hard as I had no knowledge or preparation for this type of work. My pay was poor but I was probably overpaid. So, within five weeks time my wife and I were on the train back to California. I headed for San Diego to reenlist in the Navy and perfectly willing to be called a career man. It so happened they needed radiomen in the 11th Naval District and, although I was alerted to the fact not to expect more than another year on shore duty, this did not discourage me.

I was soon pounding brass at NPL control at the foot of Broadway in San Diego* and couldn't have been happier if it had been Broadway in New York City.

Returning temporarily to the 12th ND and NPG: names of men around me at Goat Island: Abrahams was my CRM watch chief and at Sansome Street, Farely CRM. The transmitters used to work NSS and NRM were two 100Kw arcs at Mare Island. At NPL working NSS was a pleasure. We had excellent receiving conditions except for 2 or 3 hours in the afternoons when atmospherics took over, whereas going to NSS our big 200Kw transmitter at Chollas Heights seemed to do the job anytime. As for the snapshots I sent, consider them my contribution to the history.

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*1923-1924

PERSONAL RECOLLECTIONS of Ernest P. Briggs, LT USN RET (continued):

Remembering names wasn't my strong point, sad but true! After my 30 months on the Asiatic Station plus 2 years on the USS WOOD, it was my luck to once again be ordered to the 12th Naval District.* This time, being CRM, I went to 100 Harrison Street and a job as Traffic Chief of one of the four crews designated to handle the watchkeeping. It was quite an undertaking. On an average day, 400 messages were dropped on my desk for me to read the routing, the group count, then if all appeared to be normal, to write the new heading and routing so my supervisor could place it back in circulation.

Incidentally, let me go back and make a correction regarding a watch crew. To each crew was assigned a watch officer. Sort of an emergency man to call on for advice. Their being so few emergencies, it was very easy to forget him. We also had a senior chief and a warrant officer in charge of the station. These last two were only present on the day watch. Bradley was OinC and man of all radio stations.

Our radio circuits were: NSS, NRM, NPL-NPC, 315 Kc with one ear on 500 Kc. We also had a local delivery desk manned during the day watch. During the night watches, the supervisor had to deliver local priority messages by telephone. In the backroom, the same old landwire Morse men were clicking away. Don't sound like very much but enough to keep everyone busy. On schedule, the NSS operator would occasionally receive by inked-tape machine and send by punched tape machine.

In addition we had LCDR Ross as DCO and that gives an idea of the station. Personnel at that time included CRM's "Dusty" Rhodes, Cranston, Gerry Ketchum. Rhodes, who's supervisor was Jack Trott was later with me at NSS HIPOWER station. My supervisor at that time was Holdakowski CRM. Ski really should have been a Traffic Chief but had always managed to dodge the job on some weak excuse. Rhodes had been at the Farallon Islands for about 2 years so was soon transferred back to sea duty and I got to move into his apartment at Fulton and 4th Avenue where I inherited his ten gallon crock and other beer making equipment, so I was all settled down, I thought.

One night I relieved Cranston at midnight and ten minutes later KPH informed us of an SOS on 500 Kc. Ski put our best operator on the circuit and we reviewed our instructions from the bulletin board. My instructions were to call practically all officers in the 12th Naval District to inform them of the disaster so they could instruct me as to what to do. We had three DF stations near the Golden Gate to fix their position. This was the only help we could offer. There were other ships standing by but it was a real foggy night and they were unable to pick up many survivors. Result? I was changed to the local delivery desk and later as CRM in charge of the RDF station at Point St. George, still in the 12th Naval District. I wasn't regretting leaving NPG after this hastle and the new location was good fishing territory. I had a nice year at the DF station then went back to sea duty on the USS ARGONNE flag for COMBASEFOR.

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*1929-1931

PERSONAL RECOLLECTIONS of Raymond B. Brightman, LCDR USN RET:

I reported to the Receiving Ship, San Francisco, on October 15, 1920, as an Electrician (R) Third Class and was detailed to the Radio Compass Station on Farallon Islands (NPI). At that time NPG, the control station, was located on top of Goat Island. The chief in charge of the Farallon station was named Lindholm. He was the only man assigned to quarters there. He had his wife and small child with him. The rest of the men lived in barracks. NPI was run by gasoline engines and 120 volt batteries. You used one set of batteries while you charged the other one. Sometimes you could run for 24 hours on one set. One other man at Farallon was named Manry. He was later a warrant officer.

NPG control was still located at Goat Island when I was transferred from NPI to the Radio Compass Station at Point Arguello, NPK, on February 5, 1921. As I remember, NPK was then in the 11th Naval District. We had to send our POM SAT's every midnight to NPL at San Diego.

I got tired of those old radio stations with their tired old spark sets and old time receivers and so forth so I requested duty on some modern ship. The CALIFORNIA was going into commission then and sure enough they granted my request and I was transferred to the Receiving Ship at Mare Island on August 10, 1921, to put the CALIFORNIA in commission. The transmitting station for NPG was at Mare Island with their big arcs. The control station was still on Goat Island. I didn't actually see it so I can't say that, but from everything that I can remember, the control station was still there in 1921 and 1922.

While I was on the CALIFORNIA, I liked the equipment but I didn't like the regime, so I found an opportunity to get some more shore duty. I was detailed on February 8, 1922, to the Navy Radio Station at Eureka, NPW. I stayed there until September 13, 1924, when I was transferred to the USS MULLANY. At that time I was RM1c. I don't know where the NPG control station was at that time. As far as I know it was still at Goat Island. Maybe someone else can think back that far. Most of the guys I knew in those days have either got dementia praecox or are dead or something so I don't know where you would get that information.

About the operation of the direction finder stations (radio compass stations they were called in those days): We used to have three stations: NPI the Farallon Island station, NLH Point Montara and NLG Point Reyes. We used to stand watch at two places on each station. At the main station where all the transmitter gear was, we maintained a watch on 600 meters and we worked on 952 meters, or something like that. At the DF station we stood watch on 800 meters.

As I recall the way we worked, there were no master or slave stations. When a ship wanted a bearing he would call any station, NPI, NLH or NLG. Each one of us, hearing his call, would take a bearing and transmit it to him. We would plot all three bearings and the ship would plot them. Maybe there was a master station that did all of the coordinating but I don't think there was in most cases. If the position shown by the three bearings was in a small triangle, within three miles, the ships were pretty happy. Of course, if the ship was close to the harbor entrance he needed something sharper than that. I don't think they trusted our bearings too much anyway, but they did give an approximate position.

As to NPK at Point Arguello, that was a single station. There was a point of land, Point Conception I think, which was rather dangerous. A ship would call for a bearing and we would give it to them - a single bearing. More bearings at intervals would give the ship a good idea of their location. I think there was a station at San Pedro but it also gave single bearings. The ships probably knew where they were anyway if they had good instrumentation and the sun was shining and the stars were out and their compass

was OK. It was pretty good practice anyway and I guess the later stations were pretty much improved. These were pretty rudimentary stations, believe me. Anyway it was an experience.

I don't know whether I mentioned before that these compass stations were all enclosed at the bottom. A room all enclosed with copper screening. Even the doors and windows were screened and when they were closed the whole room was shielded. The phone and telegraph lines that came down from the transmitter building were also shielded and had RF chokes so we weren't bothered by any local noise or any other interference so we depended solely on that loop antenna. They were pretty good. We got a pretty good bearing.

This is the way the compass shack was constructed: There was an 8 to 12 foot loop antenna on top of this little shack located down on the beach away from the main transmitting station. The loop was supported by a pole that ran down through the building to a table. On top of the table was a disc about 12 or 14 inches in diameter, marked with 360 degrees from true north. It also had a wheel with which you could turn the loop.

You could get the null signal down close to zero by rotating the wheel - and the loop antenna. There was a compensating condenser, connected across the loop terminals. You could also tune the condenser to sharpen the null signal. Eventually you would have a true no signal condition. You could move it off half a degree or so and you would then hear the signal again. Then you would know that you had a good bearing. That is the bearing that you would send to the requesting ship.

Occasionally they would send up a destroyer or other Navy ship to steam back and forth in visual distance from the compass station so that the compass bearings could be compared with the visual bearings. This is the way that they calibrated each compass station. A chart was prepared from these observations which was used to correct the radio compass bearings before they were transmitted to requesting ships.

When I was there in 1921, there was a law limiting the immigration of Japanese people, a sort of quota effective in 1922. To beat the effective date, Japanese ships came to the U.S. loaded with people headed for San Francisco. The Japanese operators on those ships were pretty well government oriented and would rather work a government radio station than a commercial one, such as KFS or KPH, and often would choose a station such as NPK to send their traffic to.

They would have 600 or 800 passengers on board, all of whom would have a message for their sponsor in San Francisco. The ships all docked in San Francisco so all of the messages were addressed to San Francisco. The messages all had the same text. The only differences would be the address and the signature. We could handle a lot of traffic that way. We had one man receiving the messages and another one alongside sending the messages to Western Union in Los Angeles. We would cut out everyone on the WU line and work direct with "GS" in Los Angeles. One month we handled some 600 messages and we got a bonus check in the mail from Western Union. I think it was $60. There were four or five of us involved, so we split it up. It only amounted to five or ten bucks apiece, but since our pay was only 60 or 70 dollars a month it came in pretty handy. Just a little thing to remember.

Back to the Farallons. There were three islands. Only one was inhabited. Our place was over run with jack rabbits. It is the Farallon Islands. There is no "S" on the name. Everyone calls it Farallons but actually it is Farallon. For what it is worth.

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PERSONAL RECOLLECTIONS of Roy E. Brown, LT USN RET:

While still on board the USS CALIFORNIA in 1935, I had put in for shore duty in the 12th Naval District. Not having a "Continuous Service Certificate" anymore (it was lost either at Cavite or Corregidor), I am not sure of some of the dates.

I first went to 100 Harrison Street, San Francisco, where the control station was located, sometime in late summer or early fall of 1935. When I went to ship over, the doctor said I had a heart condition and I was sent to the Naval Hospital at Mare Island, for a month, where I finally convinced them I was OK. It was probably a condition brought about by spending too many hours punching teletype messages to Western Union and Postal Telegraph, drinking too much coffee, and not getting enough sleep.

Back at Radio San Francisco, as I recall, I operated MUX most of the time. New Year's Eve, December 31, 1935, an unusual event occurred when some of the circuits were probably abandoned. I remember this only hazily but I think some of the operators of one of the watches had to be rounded up in joints on Market Street! A message had come through from F8Z wanting to know why the NPG - NSS circuit was out!

Sometime during the next year, 1936, probably in late winter or early spring, the control station was moved to the new Federal Office Building located at McAllister and Leavenworth Streets, as you probably know. All circuits were located on both sides of a long conveyor belt, as I remember, with the Traffic Chief's desk at the east end of the room and the Supervisor at the east end of the belt. The Morse telegraphers had their operating positions somewhere in the south center part of the belt. The coffee room was in the west end. On the north side of the building (we were on the third floor), across McAllister Street, were the Argyle Apartments next to the William Taylor Hotel, which was on the corner.

When I first went to shore duty at 100 Harrison Street, I rented a small cottage in east Oakland near some cousins of mine. Getting on a street car at Fruitvale Avenue, catching a train near Montgomery-Ward department store on East 14th Street, then catching a ferry at the Oakland Mole, and walking from the Ferry Building over to NPG, took up a lot of time and loss of sleep too. In 1936, I moved to an apartment at the end of McAllister Street near Golden Gate Park. I bought a car to get to and from work.

We rotated our watches: 3 evenings, 3 mids, 3 days, then 72 hours off. I was first on the NPG - NPM MUX circuit. On the other end was "Soupy" Halpin at NPM. Joe Passinissi, who had been at NPM with me and was later with me on the Prune Barge, also came to NPG at this time. Another operator, whom I refer to as "Quick Trigger" also operated the NPM MUX circuit. One morning when I relieved QT, he had let a bunch of NPM tape pile up on the floor. It was all tangled up. Trying to straighten it up, he let it hang out the window, joggling it up and down. It got away from him and sailed down Market Street, with QT after it. Needless to say, I had to tell NPM to repeat the entire batch of numbers, which totalled quite a bit!

There were a few young Marines assigned to the station for training. They were used mostly to make up message blanks and make coffee for the watch. While inspecting the coffee room one day, the building caretaker found it in a mess so he closed it down and would no longer permit coffee making there. From that time we had to send the Marine messengers down to Market Street to buy coffee for the watch. One day, probably on a weekend, one of the Marines was returning with an armload of coffee cartons. He encountered an inquisitive lady in the hall who asked him where he was taking all of the coffee. He told her about the coffee making ban. The lady was quite indignant and said that Navy tradition always provided coffee for the watch standers. She said that she would talk to the President of the U. S. and try to get coffee making at NPG

PERSONAL RECOLLECTIONS of Roy E. Brown, LT USN RET (Continued):

restored. The Marine told the Supervisor about this unusual person and what she had said, thinking I guess, that she was a screwball. Well, it just so happened that she was the wife of the station radio engineer and also a personal friend of Eleanor Roosevelt. Anyway, within a week an official message came through from Washington, D.C., inquiring about the status of the coffee making situation at Radio San Francisco. Needless to say, the caretaker promptly restored coffee making privileges at NPG!

As I said before, the Argyle Apartments and the William Taylor Hotel were across the street from the Federal Office Building. The occupants of the apartments and the hotel rooms were probably not aware that NPG operated around the clock so many forgot to lower their blinds at night, much to the amusement of some of the Navy and Marine personnel. One of the Marines spotted a nude, fat broad, one evening, standing in her apartment ironing her clothes. It was too much for a couple of the Marines. They were dared to go over and knock on her door. They did! From the report they gave later, she invited them in, asked them what they wanted, talked with a while, continuing to iron her clothes all the while, probably getting a big laugh over the situation. The Marines left shortly afterward, probably somewhat embarrassed over the incident!

We had a ship-shore circuit at NPG. The signals were probably piped in from South San Francisco, I can't be sure. There may have been receivers there with antennas on the roof but again I just can't remember. One radioman there, M. J. Crowell RM2c, may be able to help you more. He was stationed at South San Francisco. I know because my wife, Pat, and I visited him there. We were introduced to the sport of betting on the nags at Tanforan and Bay Meadows, much to our later regret. Another radioman on my watch, W. C. Mitchell RM2c, was assigned to the ship-shore circuit at NPG. He too might be contacted to obtain further information.

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Many of us at NPG were sent out to the RDF stations about September, 1936. I was assigned to the station at Eureka, NPW. I drove up the Redwood Highway, with its narrow winding curves, in a 1930 Cord sedan. I ran out of gas somewhere before Ukiah and had to be towed to a gas station by an old Model T Ford. I had purchased the second hand car in San Francisco, making payments on the "Morris Plan." Being a straight eight with front wheel drive it took the curves on the highway beautifully and I made excellent time going up to NPW. There was only one other Cord in all of Humboldt County. I lived in the barracks at the station until my wife, Bernice, came up by bus. I soon rented one half of a duplex in Loleta where I became acquainted with people in the town including the Orsenicos who operated the Sego condensed milk plant.

Reporting for duty at the station, I was soon indoctrinated in the use of the direction finder equipment. Joe Conroy was the Chief in Charge; Mickey Morrow second in command. I was assigned with Mick on a two man watch, four section watch bill. I climbed down the stairs to the direction finder while Mick handled the traffic station. Sometimes we would interchange. Our weather reports, that we sent to NPG, would include looking out a window for visibility, usually with fog conditions. Sometimes the window might be a little dirty! Or looking at the top of the mountain in the distance for the cloud ceiling, estimated to be around 1,000 feet at the top. Being right next to the lighthouse station, we would be pounded with the fog horn bellowing out at all times.

The station was situated on a bluff overlooking the ocean and south spit and bay. There were steep stairs leading down to the beach below at the beginning of the spit. At the base of the cliff we had a water pump which tapped a fresh water spring running out of the cliff. The cliff was covered with Chinese nettles and berry brambles.

PERSONAL RECOLLECTIONS of Roy E. Brown, LT USN RET (Continued):

One was smart not to try to climb the cliff except by the steep stairway. One night about midnight, when Mick and I had the watch, a man burst into the radio room in a disheveled, incoherent condition, covered with nettles and brambles, wanting us to help him. He and his wife had driven up from San Francisco for some fishing. They had gone down the long spit by a winding road some distance from the station. That road took them along the inside of the south harbor to a point near the harbor entrance, some distance away. They had waited too long before starting to return on this semblance of a road, being preoccupied with their fishing. The tide came in and covered the road. It being a dark night, he was not able to follow the road. Becoming panicky, he turned his car up on the higher ground of the spit and became stuck. Had he continued driving on in the water-covered road, he might have made it. Anyway he had left his hysterical wife in the car where she got entangled with the fish lines and had a fish hook stuck in her scalp. This character was very demanding and insisted we help him by getting a farmer to tow his car out! We told him that no farmer would come out in the middle of the night and that by morning the tide would be out again and he could do it then. We notified Joe Conroy, then both of us followed the man down to the car, got his wife loose and brought her back to the station. Someone took both of them in to town. We had to take lanterns to find his wife in the dark. The tide had risen and covered the front seat of the car. The battery was under the front seat. We brought them back up the stairs this time. The man had missed the steep stairs the first time and had climbed up through the brambles and nettles!

During the salmon run in the fall, we cooked salmon in various ways, sometimes baking them. Small game in the thickets, such as brush rabbits, quail and ducks, that flew over the Eel River, were often added to our diet. Raw milk was available from a nearby dairy. There were also some fresh water streams and ponds where one could catch trout, but most of the fish we caught were salmon and steelheads.

Eureka, being a lumber town, had bars and houses of prostitution in one section of town near the water front. Merchant Marine sailors and Coast Guard sailors would hang out in those places. There was a story about a dog that was kept aboard a Coast Guard ship who would go on liberty, from bar to bar mooching drinks and would be picked up later by one of the men from the ship, too drunk to make it back by himself!

Heavy fog often blanketed the area along the coast. Anyone in Eureka at night during those times had trouble staying on the street. He was apt to find his car on someone's front lawn, if he was not careful. Driving was brutal on the highway between Eureka and Arcata. Police escorts with flares would conduct the motorists through. Painted guidelines along the highways were nonexistent in those days. I remember having difficulty finding the turnoff road leading to the station on some nights.

Merchant ships plying up and down the coast relied on bearings from the direction finder stations during those foggy conditions to keep off the rocks or to enter the harbors safely. Ships would often call both Eureka and Point St. George for bearings. The calling frequency was 500 Kcs. When contact was established, they would shift to 375 Kcs giving their call letters and a series of MO's while the DF operator would get a null signal. The ear could detect a change in the weakest signal rather than the strongest signal. A sense antenna enabled the operator to determine the correct bearing and disregard the reciprocal.

We handled commercial traffic and weather reports from ships. Sometimes they had coded messages which had to be repeated back. Joe Conroy routed these messages or made delivery by other means. At night we would often have difficulty getting true bearings because of "night effect." The null of the signal would swing back and forth as the incoming signals shifted their course. I remember once telling a ship that according to

his bearing, he should be on the rocks. The ship operator said that he could hear bell buoys ringing. The ship immediately changed course and headed out to sea.

I think it was during the time I was at NPW that the Graf Zeppelin was flying over North America. We were assigned the job of locating signals they were supposed to be sending out on a specified frequency. As I remember, it was Mick Morrow who heard the first transmission from the dirigible, call sign DENNE.

The families of two RM1c occupied a set of duplex quarters. There were separate quarters for the Chief in Charge, Joe Conroy and his wife Della. Dormitory, mess and recreation rooms were provided for the few single men there. "Frenchy," the ship's cook, cooked their meals, when they could find him.

One of the radiomen did all of the purchasing of food. "Frenchy" would sometimes cook other things that were brought in by the crew, such as fish and clams. Once a couple of us brought in a bunch of small butter clams that we got out on the spit. Frenchy dumped them in a large metal pot without first cleaning out the sand and grit. As the clams opened while being cooked, the sand and grit settled to the bottom of the pot. That didn't seem to bother Frenchy as he invited us to scoop the clam broth from the top.

Water was pumped up froma spring at the base of the cliff, below the lighthouse. It was one of my jobs to keep the pump packed. Water was stored in a huge storage tank high above the station in order to provide water pressure.

We could purchase gasoline at the station for our cars. I believe the price was then 10¢ a gallon! Since my 1930 Cord sedan with its straight 8 cylinders only got about 7 or 8 miles to the gallon, I was a frequent purchaser of gasoline. I finally adjusted the carburetor and weaned it to give me 10 miles per gallon. Occasionally I would try out the car for speed on the main highway. I doubt that I let it go more than 75 or 80 MPH but I'm sure that I could have got over 100 MPH easily.

When I first arrived at NPW, a couple of the single men borrowed my 1930 Cord from time to time. The back seat was quite wide for stretching out their girl friends, I guess. One of the radiomen at the station, whom I will call "Whang," liked to take out the lighthouse keeper's daughter, Ethel. "Whang" wasn't averse to bumming a jug of wine from the Portuguese farmers but the few times he borrowed the car, he managed to get it back safely. This was before my wife, Pat, came up. Sometime after WWII, in 1945 or 1946, I visited that lighthouse. "Whang" happened to be there at the time. He was married to Ethel and not as "screwball" as he used to be.

Since it was against the law, in those days, to sell liquor to Indians, I remember a couple of old bachelors in Loleta who bought jugs of wine at the local liquor store and resold it later to the Indians at a profit. They used to go out on the south spit and bring in gunny sacks full of horseneck clams as well as do a little poaching of fish and game. Those characters were friendly though and taught me a few tricks about getting clams. They had a dog with a wooden leg. He had lost the leg in a bout with a train and these characters had splinted a wooden leg to the stump.

Sometime in early 1937, I assembled an old breadboard transmitter with the TNT circuit. It had type 10 output tube and a converter and BFO to a standard broadcast receiver. I brought it out to the DF station one night and connected it to the station antenna. I soon made contact with other amateurs. This was during a quiet period in the early morning hours. I got caught! Joe Conroy came in early that morning and put a stop to it, but I'm sure that he tried to hide a smile. That was the end of that!

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PERSONAL RECOLLECTIONS of Roy E. Brown, LT USN RET (Continued):

I thought I'd better get some more highlights out of my experiences at NPW before I get too involved with docent work in Calaveras Big Trees Park. The following is not necessarily in chronological order and may seem a bit rambling.

The south jetty bordered the entrance to Humboldt Bay. It was connected to a long spit, called the south spit, which led to the base of the cliff below the NPW station. That spit contained a wealth of challenges. There were mud flats where one could fill up a gunny sack of horseneck clams. An old abandoned short dock, extending into the bay near where the spit and jetty met, was ideal for throwing out crab nets. That dock was in a state of near collapse. One had to be careful while using it. Micky and Rose Morrow, Bernice Brown and I once had a picnic there on crabs which we caught and boiled in a can over a driftwood fire.

NPW had a station wherry anchored in the Dungan pool in the Eel River, a few miles from Loleta. Various radiomen would use the row boat during the run of salmon up the Eel River. Salmon were plentiful during the spawning season, usually in the early fall after the first rains. Two or three different varieties of salmon were included in the run. A catch of salmon in the 20 lb range was not unusual. One weighing 12 to 15 lbs was considered a chub. Steelhead were also plentiful. There was a limit on the number of salmon each person could catch in one day. A radioman named H. R. Brown indoctrinated me in how to troll for salmon. You can imagine the thrill I experienced when I got my first strike and was able to land the fish with the help of a gaff.

One time Mick Morrow, Joe Conroy and I went out in the wherry trolling for salmon. We drifted downstream. It was getting dark, with none of us getting any strikes. Do you remember the old song: "Sit down Pop, sit down you're rocking the boat?" Well, it happened to us! While Mick and I were changing positions, the boat turned over. We swam to shore pulling the boat after us. I had brought the group down to the river in the Cord sedan. The car was parked where our trip started. I said that I would walk up, drive it down and pick them up. It was really dark by now. I decided, what the heck, I needed a drink. After getting the car I drove in to a bar in Loleta for a fast one and also bought a small bottle to take back to the group. I must have missed them. I drove all the way back but didn't find them so I went on home. Anyway, they walked back to Loleta where their vehicle was parked. They were sort of put out but forgave me.

There were other amusing incidents such as the time someone's fish, about an 8 lb steelhead, jumped in back of me while I was rowing the boat. It was on another person's line. The hook had dislodged and slid back in to the water. I will tell you later who claimed the fish!

Joe Conroy was an ardent baseball player. He got up a softball team with the radiomen and some of the local talent in Loleta. We had some good times competing with other teams in the Fortuna area.

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PERSONAL RECOLLECTIONS of Donald L. Hyde, LCDR USN RET,
Officer in Charge, U. S. Naval Radio Station (T) Dixon, California 1949 to 1952.

Your information per your letter sounds OK to me despite my poor memory of today. Yes, the original plans were cut. The first year I was at Dixon, I had to report the number of linear and board feet of lumber needed to board up all of the windows of all buildings in case of mothballing, as was hinted being considered by big brass.

When I got there in October 1949, there were two houses and two personnel buildings. One had four apartments but only two were occupied as the hot water tank had gone through the roof one night shortly before. It was repaired fast! The other had only two apartments as the other two had been converted into the Barracks. These twin buildings had gas heat but no air coolers that worked and no galley.

There were two big water tanks and a 400 foot well with very hard water. One day a wind storm blew the wood top off a 50,000 gallon water tank and tossed the shreds into the MEMQ parking lot. No injuries.

The weather ranged from 26° F. (when the water pipes froze in Quarters A) to 120° in summer. I saw one week of 114° every day. The terrain is flat adobe soil, great for sugar beets, tomatoes (with plenty of water) and sheep raising. The station is 62 feet above sea level. The former name of the area was "Starvation Flats," as most farmers did not have such a deep well for dry summers. It is grass fire country.

The station area was one mile wide and two miles long. The only paved road (one mile long) led to the transmitter building in dead center. By lease, cattle grazed in the antenna fields, which may have helped keep out a lot of pheasant hunters with shotguns.

There was a big Voice of America transmitter station on our eastside.

The Dixon transmitter building had twelve transmitters then. I think nine were 15 KW, Press Wireless jobs. One was the radiophoto circuit to Honolulu or Alaska. Two more transmitters were model TDH, all on RTTY but I forget the frequencies. There were a dozen rhombic antennas, big ones aimed in directions all around the compass. We did have a flexible antenna transmission line switching system in the building overhead.

Scuttlebutt rumor was: When the Admiral's wife at Mare Island got one of the first TV receivers (B & W) circa 1950, she found out her quarters were spang in front of a rhombic antenna. She phoned the Mare Island radio station and said: "Turn it off! Right now." Maybe she and Korea saved Dixon!

The transmitter building was well cooled by a huge water-cooling system in the rear. There was also a large emergency generator nearby. Our main power came from a 66 KVA line that also fed the VOA next door. The area was very good for strong signal squirting. That I knew when I saw the SSB Pacific Telephone and Telegraph transmitting station not far away. Later the Air Force built another nearby transmitting station a bit farther east of us.

I recall the dang wind and heat quite clearly. Also the surprising spiders that came in (in season) by the zillions on their web parachutes to festoon the rhombic wires with white "curtains." Didn't seem to bother the transmitters but at first it sure did startle me.

We also saw huge B-36's from Travis AFB quite often. Big pusher type, 6 motor bombers that could really rattle the metal venetian blinds in our quarters when they circled over the station. Personnel was skimpy: 6 civil service, 6 nonrated and 6 rated in 1949. All OK. The station had sure grown larger when I revisited in later years. New transmitters, more quarters, and a pool!

PERSONAL RECOLLECTIONS of Donald L. Hyde, LCDR USN RET (Continued):
Officer in Charge, U. S. Naval Radio Station (T) Jim Creek, Washington 1954-1957.

It has to be seen to be believed, OM! The RCA Model AN/FRT-3 megawatt transmitter is in a huge building in the narrowest part of a steep valley in the Cascade Mountains. Darn near in the creek itself - which could roar and throw and roll 100 pound rocks, or bubble gently. It had trout and salmon too. I saw mama bears tossing 2' salmon to cubs from the shallows in wide spots. There were beaver ponds nearby downstream in side pockets. Mountain lions ate deer on the rocky slopes of the ground-wire system. Eagles perched on the 10 towers. Away from the transmitter building and ground system (cleared of trees) we had a lot of pine and fir trees, foxglove flowers and wild blackberries which really pleased the brown bears.

There were five towers on each of two mountains. The shortest antenna cable was 6000 feet and the longest was almost two miles long. There were 8 foot insulators in double clusters of four at each cable end. Cable ends were near 3000 feet above sea level. I saw new snow up there on 2 June 1955. There was a 12 mile road to the town of Arlington, Washington. It was 61 miles to the DCO in Seattle. The flashing red lights on the towers were reported by airplanes to be visible 200 miles plus at sea!

Yes, the rig was keyed by landline from NPG - VLF-CW on 18.6 Kcs - OK kHz today! and Navy wives could hear it nicely while they were at their ironing boards with a steam iron. The quarters and maintenance buildings were downstream about one mile from the transmitter in a big meadow above the creek. Deer often looked <u>into</u> windows because they liked the grassy lawns. We had an administration building (with a sickbay), two MEMQ's of six units each, with garages behind. One six car garage lost its roof in a high wind when all six doors were left open to the east.

The 40 man barracks had a galley and some darn good cooks. Most of the 40 civilian personnel ate lunch there too, as did a lot of the many inspectors and visitors (official) who kept showing up constantly. The firehouse had two huge Ford pumpers, specially built for mountain forest fires. 12 sailors slept in the firehouse. The civilian fire chief shut down all nearby logging whenever the humidity got below 30%. It usually rained, like 88 inches annually. Maintenance and storage buildings were nearer to the creek, and strongly built of cement.

The 5000 acre station had two lakes which were promptly fished out every season soon after new fish (trout) were planted. Quarters "A" was never built. We had two duplex buildings for married officers. I shared one with a LT (Assistant OinC) and two CWO's shared the other. All buildings were steam heated from a central boiler house, except the transmitter building. Real nice in winters. 18" snow was common in the housing area. The underground steam pipes melted the snow in long streaks on the lawns, which sure pleased the deer in search of grass. We had a snow cat (sedan with 4 treads like a tank) for winter access to the mountain tops.

I left there in 1957 but I hear that the big rig is still pumping out signals today. An Everett, Washington, newspaper clipping said that the OinC is a Chief Radio Electrician, with a CPO assistant, and <u>all</u> other personnel are civil service, maybe 40 today. I guess that really saves Uncle Sam a lot of $$$$ yearly!

July was usually the summer!

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PERSONAL RECOLLECTIONS of Robert E. Melling, RADM USN RET.
District Communication Officer, 12th Naval District, 1935-1937.

When I reported for duty as District Communication Officer of the Twelfth Naval District in 1935, the District Headquarters were in the Marine Corps warehouse at 100 Harrison Street in San Francisco, on the top floor of a four or five story concrete building. The radio receivers were in the communication center, but the transmitters were at Mare Island with keying and control lines leased from the telephone company. The receivers worked remarkably well, considering their location in the city with all the traffic noise and electronic static. There were skylights in the roof which gave us good light and air, but unfortunately collected a lot of coffee bean hulls from the Hills Brothers coffee roasting plant across the street. Now and then a newcomer radioman would open the skylight, ignoring the shouts of the crew on watch, dumping a bushel or two of hulls on everything in the radio center.

At the time, the new Federal Office Building was nearing completion at the Civic Center. My predecessor, Lieut. Comdr. Rip Struble (later a Vice Admiral) had done a magnificent job in preparing and executing the plans for the communication center there as well as the concrete vault for the Registered Publications Distribution Office. The radio receiving positions were arranged on both sides of a long table with a fast message belt to carry them to the supervisor at the head of the table and from him to the operators. We also had a landline to the local Western Union office as San Francisco was the transfer point for all personal messages from the Pacific Fleet and Asiatic Station. We had a Chief Yeoman who became a nervous wreck trying to match the Western Union bills with the reports and checks from the ships which had originated the personal messages. Fortunately the people at Western Union were quite sympathetic and understood his problem.

As San Francisco (NPG) was the principal relay station between Washington and the Pacific and Asiatic Fleets, we had a high-speed circuit with Washington (NSS) using Kleinschmidt tape equipment. This was also used with Honolulu (Pearl Harbor NPM). I can't remember the frequencies used but of course they were higher during the day than at night. We also had 24 hour circuits with San Diego (NPL) and Puget Sound (NPC) and manned the Navy ship-shore circuit on 355 kcs (oops, I mean kHz) and listened on 500 kHz, the international distress frequency continuously. Two or three times a week we would get a report that a ship was on fire southwest of the Golden Gate. It was a factory ship converting sardines and anchovies into dog and cat food. By the time the stupid Californians got around to stopping it, the tuna had moved to Ecuador as their food supply was gone.

The transmitting antennas at Mare Island were of the rhombic directional types scattered around the golf course at the south end of the island. They were on wooden poles which were frequently knocked over by Marines from the nearby barracks mowing the grass with power mowers. I think there were also a few steel towers for the lower frequency antennas.

The operators at NPG were all radiomen first or second class. Third class were not eligible for shore duty. We also had a few Chiefs who were used as supervisors. Now and then they would take a watch at the key just to keep in practice. The landline connection to Western Union was manned by civilians.

In those days life in San Francisco was great. An excellent climate, good housing at reasonable rates, fine restaurants, fine people. (This was before the perverts moved in). We also had three direction finder stations serving the entrance to San Francisco Bay: one on Farallon Island, about 30 miles due west, one at the tip of Point Reyes to the north and the other at Point Montara to the south. Simultaneous bearings from the three stations gave ships a pretty good fix.

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PERSONAL RECOLLECTIONS of Clarence W. Mulligan:

My recruit training was at Newport, R.I., in 1920. From there I went to the Great Lakes Radio School. They didn't teach typing which, I think, was a mistake. When the Navy transferred me from Great Lakes to Goat Island, they chartered a whole train and put Navy cooks on it. We were quite crowded (one to the upper berth and two to the lower). The only time that we stopped was in El Paso, Texas, where they let us off and marched us around a while for exercise. At Goat Island we slept in tents.

After a few days I was transferred to NPI Farallon Island for the radio compass station there. Farallon had another radio station using about a 5 KW spark. We had a bank of lead acid cells for the ½ KW Fessenden spark transmitter. This used a relay key with remote control. A lighthouse tender brought supplies to NPI.

I wasn't at NPI very long before they transferred me to NLH Point Montara on the coast south of San Francisco. Radio compass stations were called detached duty. Each man received $1 per day subsistence money which our ships cook used to purchase food. The cook had a snap of a job. Cooked only two meals a day. We stood 8 hour watches: midnight to 8am; 8am to 4pm and 4pm to midnight. We ate at 8am and 4pm. The man going on watch ate early and relieved the other man so he could eat.

I have recalled the names of a few old shipmates: Delmar Tuft was the radioman in charge at Point Montara. He was a very quiet, unassuming type of person and was liked very much. He and his lovely wife lived in quarters above the station. Preceding him was Chief J. W. Mullins. He came to NLH from Guam with his wife and two children, Otis and Vera about 5 and 7 years of age. He had held warrant but for some reason had reverted to chief. The Navy was saving money I guess. The climate in Guam did not agree with the children. Mullins purchased two milch goats. We made pets of them as well as used their milk. The children thrived on the milk. I do not know where he was transferred when Delmar Tuft came on board. Preceding Mullins, a chief by the name of Dodds was radioman in charge. Dodds had an oriental wife who did not speak much English. I purchased a Japanese kimono from Dodds as a souvenir so perhaps he had served in that area. Other personnel at Point Montara were: Earl Malone RM1c, J. W. Harrington RM2c and Gustave E. Haas RM3c.

I was discharged from the San Francisco Receiving Ship at Goat Island, April 9, 1923. I was sent up to NPG on the hill to stand watches while waiting for my discharge. We sent out QST to all stations - ship obstruction reports and weather on 975 meters, I think (spark). It was teletype and I only monitored and could break in if necessary. I think the arc transmitters were at South San Francisco and used remote control. Some circuits sent duplex. I was not at NPG long enough to make acquaintances but I am certain that ship obstruction reports and weather was sent out from Goat Island in April 1923.

The pictures that I took at NPG were mostly random shots of the area. Enclosed are a couple of the communication station. Do you recognize it? I am also enclosing a short piece of the perforated tape that I used while at NPG on Goat Island. It is Kleinschmidt perforated tape. This short piece was glued in my old photo album that I had at the time. I have always been a pack rat and kept too many old things. They have fond memories attached to them for me.

When WWII broke out I reenlisted in the Navy from a Research Associate job at Cornell University with a M.S. degree in Agricultural Engineering and Education - quite different than radioman! The Navy got me fouled up by promising me a commission and sending me to NYC to enlist after I had my physical in a Marine recruiting station in Syracuse, N. Y. There they discovered their mistake and said they were sorry for the error. The mistake was because they didn't know what Agricultural Engineering was.

PERSONAL RECOLLECTIONS of Clarence W. Mulligan (continued):

I had resigned my job at Cornell and made arrangements for my wife to stay with her parents so I went to the Navy recruiting office and reenlisted at my old radioman rate. They gave me a rating of radio technician, I told them I didn't know radio work and that much had happened since I was an operator. They insisted that I go to the Radio Material School in Washington, D.C. After I started, I found it was too much for me so I went to the skipper and asked for a change of rate. My work in civilian life, prior to the Cornell job, had been as a machinist, so I took the Navy exam, passed and was rated as a machinist mate. They put me to work in a small shop with a carpenter's mate. We built equipment for the Radio Material School

Commander R. Cole was Officer in Charge at the Radio Material School while I was there. Earl R. Schuler CRM, later Ensign, gave me a copy of "Handbook of Chemistry and Physics" when he purchased a new copy. I still have the book. Cooke, a chief, who made commission grade later, wrote a mathematics book which was very popular with radio electricians.

While working in the RMS shop with Hite, the carpenter's mate, we made modifications to radar equipment, etc., so it could be used in classes, such as mounting in racks, etc. Hite made furniture for the school. Hite was a commercial salmon fisherman from Alaska and was familiar with the waters between U.S. and Alaska. He had also been promised a commission. He had pulled his diesel fishing boat out of the water on a dock and built a building over it to protect it during the war.

Another RM3c, who like me was a radio operator of years past and was sent to RMS to be a technician, also requested out. We were too old to keep up with the fast pace of the RMS. His name was James W. Keane. He was working for Walt Disney in California as an artist and had shipped into the Navy like me. Comdr. Cole sent Keane to the RMS post office as a clerk. CPO Duff and CPO Hardy were attached to the RMS shop with me, also a warrant officer named Dingman.

I had two hitches in the Navy then did Naval Reserve training duty at various places to get my retirement benefits. Now I am retired and live here in South Daytona, Florida. I am an amateur and work with the Navy-Marine MARS net. My call sign is WB4VAP.

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PERSONAL RECOLLECTIONS of Chester C. Jolly, RMC USN RET:

I enlisted in the Navy and was sent to the Naval Training Station on Goat Island for boot training. My occupation prior to enlisting had been as a Morse telegrapher for Western Union. On July 4, 1919, I was summoned from the detention camp, where all new enlistees are processed, to the Navy Radio Station up on the hill. They put me down in front of a sounder connected to Toledo, Ohio, where the blow by blow account of the Jess Willard - Jack Dempsey heavyweight championship fight was being transmitted. That task was easy for me because of my prior experience. After the fight, which ended in a knockout by Dempsey in the third round, there were several more pages of comments and analyses. As a result of that assignment, I was transferred directly from the detention camp to NPG, after my processing was completed.

My first Navy job was as an operator at NPG!

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. PERSONAL RECOLLECTIONS of Harold B. Phelps, LT USN RET:

Your list of DCO's at NPG starting in 1916 was when they built the main Pacific Coast Station on top of Goat Hill and formed the Pacific Coast Communication Division with Capt. E. H. Dodd as Pacific Coast Communication Officer. "Izzy" Maddox was DCO when I went there December 23, 1916.

Prior to 1916, the main Pacific Coast Station was NPH on top of the hill in back of the Navy Yard at Mare Island, with a 30 KW arc and a 5 KW spark. NPG at Goat Island had a 2 KW spark on top of Yerba Buena Island for communication with ships and NYMI.

When the big NPG was built in 1916 on YBI we had no landline from YBI to Western Union or Postal in the city. When we got a message for them we would phone them and ask for an operator. They each had one telephone set with a pair of fones attached. We would back up a sounder to the fone and send our traffic. They would do the same when they had traffic for NPG. Life was simple then!

An incident that happened at the time of the USS MILWAUKEE grounding on Samoa Beach in Humboldt Bay near Eureka, California, January 13, 1917, while she was trying to rescue the U. S. submarine H-3:

I was stationed at NPG on Goat Island in January 1917 as an Electrician (Radio) Second Class. We had a three man watch: chief of the watch, spark man and arc man. An E(R)2c on the spark had a habit of taking a little snooze when there were no signals, which was most of the time on the mid watch. We had a permanent schedule at 4am for weather reports from Farallon Island NPI and Eureka NPW, which we phoned to the Marine Exchange. This morning the chief was also doping off. All of a sudden he realized that it was past weather time. He woke the spark operator and told him to get going. The spark man called Eureka but got no response. Finally NPI came on and said that NPW was working an SOS. NPI gave NPG all of his log from the time the SOS began. The chief called Capt. Dodd and others who were required to be informed. Our log was complete, courtesy of NPI, and nothing came of it. I was thankful I was on the arc at the time!

After going to sea for a while, I was transferred back to NPG on YBI January 8, 1919, and relieved "Boob" Fanning who had talked Capt. Dodd into letting him go out to KFS, the Federal station out on the beach somewhere, to study sun spots. He was a character and a great politician. They even mailed his check to him so he never showed up at YBI. They had moved the NRM and the commercial ship-shore circuits to the Postal Building on Battery Street. The shipshore was the old Marconi circuit and at that time every Jap passenger ship left Japan with 400 or 500 Jap "picture brides" on board enroute to San Francisco. As you probably know, the gals would marry a picture of a guy in the States or he would marry a picture of his bride to be. Every bride was allowed one message. KPH would start working those ships almost the minute they left Japan - as soon as their signals were readable after dark and until the signals faded out around daylight. If conditions weren't too good it would take KPH maybe a week to clear those 400 to 500 messages. All messages were the same: origin, address of the bridegroom, the text was only "arrive Thursday" and the signature of the bride. I have often wondered how many picture brides came in to the States on that deal?

NPG might have been on one of the piers after it moved from YBI. I do not know, as I was at NRM for over three years at that time. Then NPG went to the Appraisers Building on Sansome Street and then to 100 Harrison Street in the Marine Corps Building and then to the new Federal Building either the last of 35 or the first of 36 as I went to NPG on July 1, 1936, as a civil service wireman.

PERSONAL RECOLLECTIONS of Harold B. Phelps, LT USN RET (continued):

At NPG on YBI we handled Navy traffic to NRM and the overflow of the cable, if any, and press releases to Honolulu and Japan. The only transmitters we had for this job was the 40 KW arc out at South San Francisco and a 12 KW arc at KFS out on the beach which was used mainly for ships at sea with an arc transmitter. I don't know when this deal busted up as I went out to NRM in August 1919.

The cable went out once and we had about 20 days delay on transpacific cable traffic. We were trying to get rid of them as fast as we could to NRM, which was rather slow. It was a happy day when Postal called and said the cable was back in. "Send down a thousand to start off. We will take the rest as soon as we can!"

After I was out at NRM, one time we had a 23 day delay on cable traffic. All we could do was keep plugging away to NPG with that stack, until the cable was repaired. Some fun! Mostly hand sending, some static at times and fading periods every so often. We had a 500 KW arc but it was generally busy going to westward.

One day we really had static from NPG. We were completely out and the Honolulu Star Bulletin and Advertiser were screaming their heads off for their press stuff. Scott, the radioman in charge, knew I had considerable experience with static so told me to see what I could do with NPG. No traffic - just get the press. I started NPG sending double, then triple and was getting no where fast so I told NPG to send each word until I made a dot on my key. Well, finally, after four hours of hard work I got about 600 words of press, all they had, so that kept the papers busy. I stood off NPG and I couldn't even walk straight when I came out of that booth, with a splitting headache. What a difference it made when the high frequency tubes came along. Good old days? To heck with them I say!

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PERSONAL RECOLLECTIONS of Lee H. Vernon, LCDR USN RET:

I was ordered to the Naval Communication Station, San Francisco, for duty as Officer in Charge, Naval Radio Station (T) Mare Island on June 25, 1951. I had just completed a tour of duty on board the USS MT. MCKINLEY AGC-13 as Electronics Repair Officer. After two and a half years on the MT. MCKINLEY, including the Korean affair, I was very pleased with this shore duty. I reported on board July 24, 1951, relieving LT Lonnie Coker.

I found the radio station to be in excellent condition. In fact, the Commanding Officer would bring his various official visitors to the area to visit Mare Island where he could always be proud of the station. This reputation was to continue.

There were several sets of quarters within the area occupied by the radio station, inside the boundaries of the Mare Island Naval Shipyard. The radio station included the northwest corner of the shipyard. The High Frequency Transmitter Building No. 505, and its surrounding antenna fields, sat on filled land. Originally, this area was very marshy and had been filled with dredgings from the main ship channel. The transmitter building and the road to the building were on solid, built-up land but the antenna structures were in the dredge-filled land.

The Low Frequency area was part of the original radio station installation and was mostly on non-dredge-filled land. The living quarters consisted of a duplex occupied by Chief Petty Officers, one set of quarters for the Officer in Charge, one set of quarters for the Assistant Officer in Charge, one set of quarters for the Senior Chief Petty Officer, an apartment building with either four or six apartments for enlisted married personnel, a barracks for enlisted single personnel, a laundry room

with automatic washers and dryers for use of the enlisted personnel, a large warehouse used by the Industrial Manager of the Shipyard for storage of electronic material to be used in the construction of the U. S. Naval Radio Station (T) Dixon, California. Captain Becker was the Industrial Manager at the time I was there. In this warehouse, the radio station personnel had built a small theater, primarily for use in showing training films but also used to show late movies for everyone's enjoyment. Since the single men, who lived in the barracks, ate all of their meals on the enlisted mess of the shipyard, they became acquainted with the operators of the Movie Exchange Office and were able to get first rate films for all of us to enjoy.

CRE J. C. Johnson was the Assistant OinC when I arrived. He was later relieved by CRE George Ball. We also had on board RE Joe Osterman at a later date. He occupied the quarters assigned to the Senior CPO. Joe Osterman was responsible for the establishment of a touch football team from the radio station that almost won the shipyard league trophy even though we had a very limited number of personnel from which to field a team.

The radio station had no official connection with the shipyard since our command structure was through the Commanding Officer of the Communication Station, whose office was in the Federal Office Building in San Francisco. We operated as a semi-independent command, within the confines of the shipyard, with command and operational direction from San Francisco and Skaggs Island, the receiver site. We enjoyed the security provided by the shipyard, used their recreation facilities and various clubs. We provided our own security patrols of the radio station areas and operating buildings. We had no separate emergency power plant at the Low Frequency Building and depended on shipyard power. We did have our own emergency power plant at the High Frequency Building, building 505. We had regular contacts with the Industrial Manager for all new installations and other work that was beyond the capability of our own maintenance forces.

Our maintenance force consisted of several civilians on a full time basis. We had a carpenter with an excellent shop, a painter, a gardener, two riggers, four electronic technicians, all of whom were ex-Navy radiomen. In addition to the civilians we had a Navy maintenance crew of one machinists mate, four electronic technicians and a "seaman who could type" as the station yeoman.

All of the rest of the personnel were Navy radiomen required to stand the watches in the High Frequency Building. There were three men on watch at all times. These men were responsible for shifting frequencies on the various transmitters as requested by the Control Center in the Federal Office Building in San Francisco and the Receiver Station at Skaggs Island. There was a teletype circuit to both of those control stations. We also had telephone lines and VHF links with both of those stations. The VHF link antennas and associated radio equipment were mounted on the three 200' steel towers surrounding Building 505. Those same towers were used to support the vertical antennas used with the HF transmitters inside the building. There were 52 high frequency transmitters in the building. The most historic transmitter was a Model TBC, Serial #1. Capt. Becker, the Industrial Manager, wanted to remove that transmitter and use it to start a museum at the shipyard since this Model TBC was considered to be the beginning of high-powered, high-frequency transmitters in the Navy.

The major circuits in operation at that time included the double sideband transmitters to Washington and Honolulu, the Notice to Mariners Broadcast Circuit using several frequencies, the Navy ship-shore frequencies, the circuits used by the Security Group at Skaggs Island and the local ship-shore harbor circuits.

PERSONAL RECOLLECTIONS of Lee H. Vernon, LCDR USN RET (continued):
Officer in Charge, U. S. Naval Radio Station (T), Mare Island, California, 1951-1954.

The low frequency transmitter was on continuous standby and was remotely started and stopped from the High Frequency Building. The low frequency transmitter was tested monthly. It was, I recall, a Model TCG, and was water cooled. We had a cooling pond outside the building. This became a swimming pool from time to time much the same as did the water reservoir at Wahiawa.

I was relieved by LT James L. Greiner on February 26, 1954, and was transferred to the Naval Communication Station, Adak Island, Alaska. My tour at this radio station was one of the most pleasant in my career. LT Donald L. Hyde was the Officer in Charge of the radio station at Dixon, California, during my tour. We enjoyed many visits to each others station. I again visited Don Hyde upon my return from Adak. He was then Officer in Charge of the Naval Radio Station (T) at Jim Creek, Washington.

I recently talked with H. M. "Hal" Winters. He informed me that he retired in 1958 after serving as Officer in Charge of the Mare Island station.

The Mare Island radio station area, including the housing and the barracks (which has been converted into apartments), is now, in 1984, under the jurisdiction of the shipyard. Building 505, the HF Building, is now the Annex to the Navy Exchange and houses the garden supply and automotive divisions. The logo "NPG" is still embedded in the entry-way floor. The Low Frequency Building was closed during my last visit and the 400' towers are gone. (They were dismantled in 1961). The High Frequency antennas have all been removed and the fields look very empty.

An interesting and exciting event happened while I was stationed at Mare Island. Our emergency power plant at Building 505 was an enormous gasoline engine driving a three phase generator capable of supporting all of the transmitters while in operation. This gasoline engine had specifications calling for automatic start and assume the load within 60 seconds after a power failure. It was an eight cylinder, in-line, engine with a separate carburetor for each two cylinders but linked together for common throttle control. The pistons were eight inches in diameter. Each week the engine was tested and run for 30 minutes with the load of the station. There were no actual power failures during my tour, only the test runs.

Apparently considerable carbon had built up in the cylinders over the years. This particular week the test worked perfectly at the start. The Machinist's Mate, R. J. Jackson, was standing by the engine as it started, however when the shutdown sequence finished, the butterfly valves in the carburetors did not close all the way and the engine started to diesel and run backwards. With each revolution there was an extremely loud bang out of the exhaust pipe that could be heard all over the shipyard. Jackson was not about to go back in the engine room and close those butterfly valves. By the time I got out to the engine house, we had all of the Security Force and the shipyard fire engines surrounding the building. Jackson and I supported each other and we went into the building and manually closed those valves. I had to write a letter about the disturbance and at the same time request enough money to overhaul the engine. Each of those backfires sounded like a cannon. They had completely destroyed the muffler in the process!

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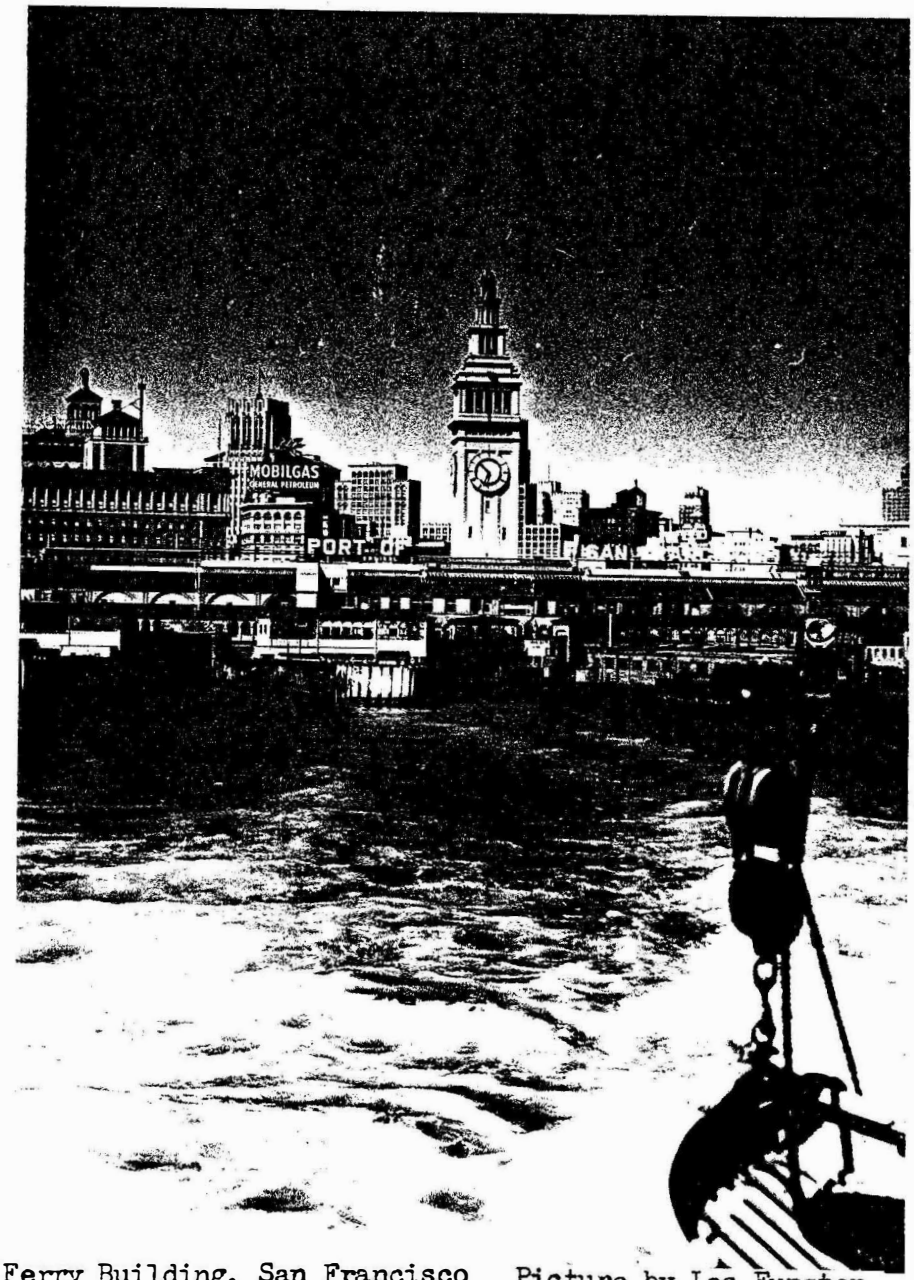

Ferry Building, San Francisco Picture by Les Funston