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A CHRONOLOGY of

WIRELESS and RADIO

on the WEST COAST

April, 1899: Wireless signals tests between Telegraph Hill and downtown San Francisco, are successful enough to justify further development by the *San Francisco Call* newspaper. [Newspapers]

August, 1899: *San Francisco Call* newspaper successfully uses wireless to scoop the competing newspaper about the appearance of a long-awaited troopship at the Golden Gate, San Francisco. [Newspapers, Morgan] Lightship 70 of the U.S. Lighthouse Service, a predecessor of the Coast Guard, signals the arrival of the troopship to a receiving station near the Cliff House. By 1901, the Lighthouse Service begins regular installation of wireless sets in Lightships. (See CHRS Journal).

November, 1899: American Wireless Telephone and Telegraph Company, the first such enterprise, is incorporated in Arizona, holding Dolbear patents and selling speculative stock; the promoter was Dr. Gustav P. Gehring and the Chief Engineer was Harry Shoemaker (whose work was highly respected). [Mayes]

Circa 1900 – '01: In San Jose, California Charles D. "Doc" Herrold repeats Guglielmo Marconi's wireless English Channel tests the very day he reads the newspaper reports and after having observed lab experiments of Dr. Taylor at Stanford; Herrold achieves one mile's distance with a Rhumkorff coil and a Branley coherer. [Herrold Papers]

March, 1901: The main Hawaiian Islands are linked by wireless by the Mutual Telephone Company; Oahu's call letters are "HU," Molokai Island's call letters are "AM," Puaho is "KA," Lahaina on Maui is "LA," and Nawiliwili on Kaui is "NW." [Radio Station Treasury, 1900-1946; SWP]

1901: United States Army uses wireless to communicate with the Coast Artillery post on Alcatraz Island from Fort Mason in San Francisco. [Dillman report of an audiotape at the SF Maritime Museum] The officer in charge was Capt. Dyer, the engineer Carl Kinsley [SWP]

1901: Marconi's transatlantic tests are widely publicized on the West Coast as in the rest of the world.

1902: Francis McCarty first uses radio-telephone in San Francisco using the system of A. Frederick Collins, a spark coil; development continues with an arc. [PW copy of articles]

July, 1902: Pacific and Continental Wireless Telegraph and Telephone Company, a Gehring – American Wireless subsidiary, transmits the first paid wireless traffic, between Los Angeles (San Pedro, callsign "G") and Catalina Island (callsign "A" for Avalon), California, 26 miles; Robert Mariott is the Chief Engineer (going on to a distinguished career). [Mayes]

1903: Revenue Cutter *Grant* out of Tacoma, WA authorized to install wireless to communicate with Tacoma (and Friday Harbor) for intelligence about opium smuggling and other law enforcement; the Revenue Marine is a predecessor of the

Coast Guard. By 1910 seventeen cutters are equipped with wireless on both coasts. [CGR] On the West Coast later, the Revenue Cutter *USS Bear* employed the callsign RCB. [SWP]

August 1903: The United States Army establishes the Alaska Wireless network; callsigns employed were:

FB Fairbanks
FD Nome
FE Mouth of the Yukon
FG Fort Gibson
FK Circle City
FM Fort St. Michael (reported to be the first station in the West)
FP Petersburg
FQ Fort Egbert
FX Fort Worden [SWP]

April, 1903: The Mare Island Naval Station first employs wireless. [1904 photo, Signals] It employs a Slaby Arco 2kw open gap spark transmitter located in the former homing pigeon loft.

1903: Rev. Richard Bell sends wireless messages from San Francisco to San Jose, in 1907 and thereafter, he and "Doc" Herrold in San Jose communicate by wireless telephone. [HP]

1904: The Navy employs a network of three Northern California stations, San Francisco (Yerba Buena Island in the Bay) (call letters TI) and Mare Island (call letters TG) with landline telegraph links, and one on the Farallon Islands (Call letters TH). [Howeth]

Summer, 1904: The DeForest Wireless Telegraph Company establishes its first West Coast station in the Palace Hotel, in San Francisco; its operator, Tim Furlong, adopts the callsign "PH." The station was built by Sam Maddams in 1903, who had been Marconi's operator at Poldhu who sent the "S" heard by Marconi across the Atlantic two years prior (December 12, 1901). In 1904 the DeForest company exhibited at the St. Louis Exposition; Mr. C.B. Cooper was

deForest's operator and he later came west through Colorado to California as one of the more colorful wireless operators. [SWP]

November, 1904: The Mare Island and the San Francisco Navy stations begin regular weather broadcasts by radio telegraph. [Howeth]

1905: Francis McCarty demonstrates his wireless telephone from the Cliff House in San Francisco. [PW] Amateur operators such as Butler (“Bert’) Osborne, later W6US, flourish in San Francisco and nearby.

1905: At Fort Mason in San Francisco, Capt. George Squires of the Signal Corps experiments with trees as antennas for wireless communications (newspaper); Squires as a general officer is later Chief of the Signal Corps in World War One.

Circa 1906: The callsigns used on the West Coast by 1906 suggest several chains of stations, or proposed stations:

Avalon on Catalina Island and Los Angeles used "A" and "G" respectively in their earliest transmissions under the aegis of the Pacific and Continental Wireless Company.

Pacific Wireless Telegraph Company succeeded Pacific and Continental Wireless in August, 1903 and bought the Catalina Island circuit and stations. Pacific's stations included at least:

A at Avalon, Catalina Island, CA
G in Los Angeles, CA
D in Port Townsend, WA
DA in Seattle, WA, and
SF in San Francisco, CA. [SWP]

Continental is reported to have operated a station at Portland, OR that employed the callsign "O-2;" another such station operated out of Seattle with the call "S-2," from Queen Anne Hill with 5 kilowatts of power (5 kw). [SWP]

Another network used callsigns starting with D or P, plus a second letter, in California, Oregon, Washington and Alaska. The “D” stations may have derived

from the DeForest name, and the “P” stations from the Pacific Coast on which the were sited. The D and P stations were United Wireless stations (some erected by the DeForest Company); United's West Coast headquarters was in Seattle. By 1910 the chains included:

Commercial Stations:

DA Perry Hotel, Seattle, WA
DB Tacoma, WA
DE Pasadena, CA
DF Santa Barbara, CA
DF Vancouver, BC
DG Sacramento, CA
DK Everett, WA
DM Salem, OR
DN San Louis Obispo, CA
DO Roseburg, OR
DU Juneau, AK
DV Chelahis, WA

Maritime Stations:

PA Seattle, WA
PB Ketchican, AK
PB Tacoma, WA
PC Astoria, OR
PD Friday Harbor, WA
PE Portland, OR
PF Aberdeen, OR
PG Gray's Harbor, WA
PG Westport, OR
PH San Francisco, CA
PI Avalon, CA (earlier "A")
PJ Los Angeles, CA (earlier "G")
PK San Diego, CA
PM Eureka, CA
PN Katalla, AK

PO Cordova, AK
PQ Monterey, CA
PR Victoria, BC
PU Bellingham, OR
PV Klamath, OR
PW North Victoria, B.C.
PX Marshfield, OR (later called Coos Bay)
PY Olympia, WA

RA in Safety Harbor, Alaska is listed to United; the Army Signal Corps station established a Safety Harbor station in 1903 with DeForest equipment. Nome, Cordova and Sitka, Alaska operated with callsigns SA, SN and SO, respectively.

United Wireless is reported to have been operating thirty coastal and inland stations between 1900 and 1906. The inland stations were not intended to handle maritime traffic, but rather to compete with landlines. [SWP] United Wireless, like Pacific Wireless, sold large amounts of stock to the public without significant commercial revenues from its actual, let alone projected, stations.

Other than the Navy chain, the Army Alaska chain and PS at the Presidio Army Base, San Francisco, CA and PT at Fort Bragg, OR (both also listed to United), there are no other callsigns appearing in the lists for the West Coast circa 1900 - '06. [Radio Station Treasury, 1900-1946; SWP]

April, 1906: The Navy Cruiser *USS Chicago* handles outbound San Francisco traffic, over a thousand messages, after the great earthquake and fire, with Yerba Buena Island as a relay and Mare Island connecting to landlines. [Howeth]

April, 1906: Ray Newby loses his antenna in San Jose to the earthquake, Newby is later an American Marconi operator and "Doc" Herrold's station operator in San Jose, holding the license. [HP]

1906: The proposed California and Hawaii circuit by Pacific Wireless, with antenna towers on Mount Tamalpais, is not implemented; persons unknown, rumored to be associated with a competitor, caused the fall of the towers in December. [Mayes] Mr. A.F. Krenke, who had been the operator at "G" in Los Angeles on the Catalina Island circuit, is the station manager. [SWP] Pacific

Wireless is regarded by many, then and now, as primarily a promotion to sell stock, hyped by comparison to the success of the Bell Telephone Companies. So too, the Gehring companies and the DeForest companies are widely seen as fraudulent enterprises. The engineers of such companies, such as Harry Shoemaker and Lee deForest did, however, make very significant contributions to the art, most importantly deForest's audion vacuum tube triode of 1906.

Circa 1906: Forty commercial wireless stations operate on the West Coast; DeForest -- United include: California - 9, Washington - 9, Oregon - 6, Canada - 3, Alaska - 2; Pacific Wireless, California -3, Washington -2; Massie Wireless has one, and there are five in Hawaii [SWP]

Circa 1906: One of San Francisco's first stations operates with the call sign "IAA" established for Massie by A.A. Isbell near the Cliff House "PH" is another, formerly at the Palace Hotel but moved to Russian Hill, as a DeForest company then as United Wireless; a third, Pacific Wireless station, uses "SF," and the Army station at the Presidio signs "PS." [Radio Station Treasury; Mayes]

Circa 1907: Known to all by his personal sine "LM," the legendary Lawrence A. Malarin begins his wireless career as the operator at San Francisco's PH in the Palace Hotel. Fired at the insistence of the Navy for invective in the ether, he became the United Station manager, [Pratt, SWP] and later the American Marconi manager. His idiosyncracies included assigning similarly named operators to the same duty stations. [SWP] Operators penned doggerel verse about him, e.g.

> *"LM" once handled the great PH,*
> *Is what I have been told,*
> *He did his work, he'd never shirk,*
> *And now he's the Chief quite bold*. [PRN]

Circa 1907: The sailing ship Archer, a bulk carrier, is the first commercial vessel to install and use wireless on the West Coast; it communicates with its home company near Seattle, Roche Harbor Lime Company, station RH, 10kw. [SWP]

1907: Amateur operators form the Bay Counties Wireless Telegraph Association; [Maxwell papers] an active member was Haraden Pratt of San Francisco, later telecommunications advisor to President Truman; [Perham Foundation] another

active member is Ellery W. Stone of Oakland, later Radio Inspector. The club issued its own licenses, 3 letter calls starting with "S," for its members who could copy 20 words per minute in code and pass a technical test. [SWP] By 1912 some 50 operators held "S" calls licensed by the club. [BCWTA papers] Haraden Pratt, President of the club, was SKH and Ray Newby was SEW. [SWP]

June, 1907: The steamship *SS President* of the Pacific S.S. Company is the first ocean liner to be fitted with wireless in the Pacific [Howeth], using a 3KW Massie system on 400 meters, callsign V-2 with A.A. Isbell as the operator; the Southern Pacific Company is listed with three vessels in 1907 with DeForest gear at 2KW on 300 meters, callsigns KA, KM and KR. [1907 List] Before callsigns were required and assigned in 1910, vessels of varying ownership used calls of the form letter-number like the SS President, rather than two letters e.g.:

A-2 SS Acapulco, Pacific Mail SS Line
A-3 Tug Tyee, Seattle and Columbia River Tugs
B-2 SS Governor, Pacific Coast SS Line
H-2 SS Rose City, San Francisco and Portland SS Co.
(Continental Wireless's only shipboard installation)
M-2 SS Geo. W. Elder, C.P. Doe & Co.
P-1 SS Enterprise, Matson Navigation Co.
P-2 SS Hilonian, Matson Navigation Co.
P-3 SS Portland, (schooner)
P-5 SS Col. E.L. Drake, Standard Oil Company
P8 SS Admiral Watson, The Admiral (Alexander) Line
S-2 SS Roanoke. C. P. Doe & Co.
U-2 SS Lurline, Matson Navigation Co.

Most vessels use two letter calls. United Wireless leased its equipment for each vessel at $200 a month and paid its operator $40 a month, 25% more than Marconi paid on the East Coast. [SWP]

1908: "Doc" Herrold fires explosive mines at a distance using wireless signals, and controls small boats. [HP]

1908: United Wireless equips and mans its first Maritime installation on Union Oil Barge No. 3 [PRN] Tim Furlong, operator.

1908: The City of San Francisco establishes a wireless circuit between its Chief Electrician, Ralph Wiley, and the Fire-alarm control station at Jefferson Square, operator George Kellog. [Pratt, SWP]

1908: The Bay Counties Amateur Wireless Club reports by wireless on the Stanford vs. Berkeley "Big Game" to Palo Alto and Alameda from Berkeley. [SWP]

1908: The United States Navy stations at Mare Island and in Panama communicate with the fleet in the South Pacific. [Modern Electrics April, 1908]

October, 1908: Lawrence Malarin in San Francisco at PH and Arthur Isbell at HU in Honolulu first establish wireless contact between California and Hawaii.

1908: The Navy Battleship *USS Ohio* of the Great White Fleet broadcasts music over its Deforest wireless telephone on its West Coast cruise, first the ship's band, then phonograph records obtained when calling on San Francisco; the ship uses a deForest arc system. [Howeth] The broadcaster was Chief Electrician Meneratti. [SWP] Sam Maddams at PH first monitors music from the Fleet, and reports it to the press. O. C. Brill was the DeForest engineer with the Fleet.

1908: United's Monterey, CA and Friday Harbor, WA stations maintain regular nightly contact. [SWP, Pratt]

1909: "Doc" Herrold broadcasts voice and music from *"San Jose Calling"* identifying as station "FN" and operating as low as 20kHz by an arc transmitter of his own design. [HP]

1909: The Navy's wireless chain includes Tatoosh Island, WA (callsign SV), and Cape Blanco (TA), Table Bluff (TD), Point Arguello (TK) and Point Loma (TM) in California using Massie, Telefunken, Shoemaker and DeForest gear. Some of these stations are reported to have had two "humps" in their wavelengths, indication simultaneous although probably not intentional operation on two frequencies. [1907 List]

1909: Amateur operators form the San Francisco Radio Club, Inc. [Morgan] A San Francisco newspaper runs a full page story on the young wireless operators of

San Francisco associated with Lowell High School. The 1909 Modern Electrics callbook, the Wireless Blue Book of the Wireless Association of America, lists only 10 of the many amateur operators in California, but includes Ray Newby "EZM' and the Ozone Wireless Co. of San Francisco, "MJ."

1909: Station "CH" operates from the San Francisco Chronicle building while "PH" is moved from Russian Hill to South San Francisco. [Mayes]

1909: The Canadian Government operates a wireless station on Gonzalez Hill at Victoria, B.C., and at a lighthouse at Triangle Island, 45 miles out in the open Pacific, as its outpost for communications with ship traffic to Japan via the Aleutian Islands northern route. [RN 9/31]

April, 1910: "Doc" Herrold and his College of Engineering and Wireless's radio-telegraph signals are heard at the Farallons Islands and Mare Island, 90 miles, with Ray Newby the operator on a one inch Electro-Importing (EI) spark coil from Hugo Gernsback's company. [HP; EI affidavits]

1910: Howard Seefred in Los Angeles, later in charge of the ARRL Pacific Division, as a teenaged amateur operator monitors stations as far away as Friday Harbor, WA (callsign PD, 1,110 miles) and Seattle, WA (callsign PA, 1,060 miles). [Log]

1910: William Dubilier, then a young man in Seattle, demonstrates a wireless telephone; by 1916 he is selling his then-novel mica condensers to the Navy. [Articles]

1910: The then new Federal Telegraph Company demonstrates wireless telephone between San Francisco and Sacramento. [Morgan] In July, it puts the Beach Station in operation in San Francisco with the original 12 kw Danish arc (later callsign KFS). [SWP]

1910: Ralph Heintz equips an aircraft for wireless signaling and receives the messages on the ground. [Morgan]

1910: Standard Oil tanker *Atlas* installs American Marconi wireless, Ray Newby is the operator [SJMN interview] using callsign GN. [SWP]

1910: United Wireless operates station KE in St. Helens, OR and 37 other West Coast stations. [Mayes] At station DZ in Portland, a beautiful young blond woman, Abba Lindsay, worked the day shift, the first trick: " ...she dressed in a snappy blue marine operator's uniform and made quite an impression on the customers." [SWP, 35; TVRN, ops]

1910: Joe Hallock was another operator at DZ (and 02 and KE); he later went to sea in 1911, then to PC at Astoria, OR, and later he became the Portland FCC administrator [SWP] after instituting Portland's first broadcasting station and working on the 1,000 kw Federal arc station in France. [TVRN, ops] He started as an amateur in Portland in 1906.

1911: The Ship Act of 1911 requires licenses of maritime wireless operators. [SWP, Pratt]

1911: Operator Sydney Fass, an friend of Haraden Pratt and Dick Johnstone and sixteen years old in 1911, obtained his license and went to sea on schooners, crude oil tankers and liners and operated for United Wireless at PM at Eureka, CA. He was later to serve in the Navy in both wars, retire as a Commander after 33 years in the reserve, and he owned and operated one of San Francisco's largest Radio and TV stores in the fifties. [TVRN, ops]

1911: Operator Edwin J. Lovejoy is licensed and was the Chief operator and manager of United Wireless station PJ in San Pedro at age 18. In 1914 he joined Federal Telegraph and operated KFS in San Francisco and KLS in Los Angeles, and arcs aboard ships as he installed them. After service in both wars in the Navy, he retired with the rank of Commander and had a distinguished career with the FCC. [TVRN, ops]

1911: After indictment of its principals, United Wireless continues to operate only 10 west coast stations, focusing on maritime installations. [Mayes]

1911: The Army uses Tanforan Field in Northern California for the first military tests of air to ground wireless signaling. [Morgan] By 1916, aircraft over the Pacific have signaled 125 miles to shore. [Stone]

1911: The Navy station at Tatoosh Island, Washington monitors radio-telephone signals from the Bay Area, [PF] probably those of National Radiotelephone Company, successor to McCarty, and a company for which "Doc" Herrold worked as a consultant. In 1912 National was licensed as 6XE, experimental portable, license number 101. [Maxwell papers]

July 1911: In Los Angeles, teenaged radio amateur operators, trained at Los Angeles Polytechnic High School, intercept and disclose collusion over the Catalina wireless circuit involving the Hearst newspapers, with much attendant publicity and a criminal prosecution later dismissed. [clippings in Seefred log; ME] The Wireless Association of Southern California, of over 200 such young Los Angeles amateurs, forms as a result of the incident. It operates a 2kw spark transmitted using the callsign ALA [Seefred log]

1911: A typical nautical wireless outfit is that on the good ship *Charles Nelson* a bulk carrier of the Nelson Lumber Company: a Marconi de-coherer magnetic detector with a wind-up mechanism to move the wire through the silk covered litzendraht coil, and Brandes headphones, and a Fleming valve detector with two valves connected to a loose coupler, good for 200 miles nighttime reception. The transmitter is a Killbourne and Clark 240 cycle rotary spark. So reports its operator, R.S. Ormsby, still at sea in 1954 on his 26th ship. [TVRN, ops]

1912: In Los Angeles, American Marconi operated a wireless school at the YMCA and used the callsign YM for its 2kw transmitter. [Seefred log]

May, 1912: The Federal Telegraph Company establishes the San Francisco and Hawaii Circuit from South San Francisco using an arc. [Mayes] By December, Federal can communicate across country to Washington. D.C. and to Hawaii by its initial 35 kw arc circuits. [SWP] Federal arc stations included:

POL Central Point, OR
PFW Fort Worth, TX
PNU Honolulu, HI
PNX Phoenix, AZ
PKC Kansas City, MO
PLA Los Angeles, CA
PSC South San Francisco

PSN Portland, OR
PSO El Paso, TX

Federal operators and engineers first observe and analyze "skip" propagation because of differences in reception of the main wavelength and the back-wave, a higher frequency artifact of the arc keying method.

July, 1912: American Marconi acquires United Wireless, including its West Coast operations. [Mayes] Until this acquisition, American Marconi was primarily an East Coast operation with little West Coast presence. American Marconi's chief operator in San Francisco was LM, with offices in the Merchants' Exchange Building, with whom every seagoing operator checked in when in San Francisco. [TVRN, ops]

1912: American Marconi buys out Massie's West Coast system including the San Francisco land station and 13 shipboard installations. [SWP, Pratt]

1912: The American Marconi Company commits to the Marshall receiving station and Bolinas transmitting station (later KPH) in Northern California, using a spark system. [PF]

1912: The Navy uses the term "radio" rather than "wireless;" deForest first used the term commercially in the De Forest Radio Telephone Company organized in 1907. [Howeth]

1912: Phelps Dodge operates a wireless station at its main Arizona mine. [Mayes;]

1912: Herrold connects San Francisco and San Jose by radio-telephone daily for eight months. [HP] About this time in San Francisco, H.D. Dwyer tests his radiotelephone, with a receiver in the home of Haraden Pratt; Dwyer later tries to establish a San Francisco to Fruitvale (Alameda County) circuit.

1912: Howard Seefred, in Los Angeles, logs United Wireless stations:

DE Pasadena, 2 kw
DN San Luis Obispo, 2 kw

EX *Los Angeles Examiner*, 2 kw
PH San Francisco, 15 kw
PI Avalon, Catalina, 2 kw
PJ East San Pedro, 5 kw

Seefred had heard Pacific Wireless stations "G" in Los Angeles and "A" in Avalon on Catalina Island. He also monitored the Los Angeles 12 kw Federal arc station PLA, and several Marconi-equipped vessels:

IAA SS Lurline
IAB SS Wilhelmina
IAC SS Hyades
IAD SS Hilonian
IAE SS Enterprise
IAJ SS Jason
IAK SS Stanley Dollar
IAO SS Cuzco.

Seefred also logged Marconi shore stations whose callsigns he gives as:

IAF San Francisco, CA
IAG Seattle, WA
IAH San Diego, CA

as well as the chain of Navy stations on the California coast.

1912: Wireless operators strike, harassing operating stations. [SWP] The strike was called by the Commercial Telegraphers Association of America, and resulted in gradually improved working conditions [TVRN ops].

1912: State-of-the-Art is Telefunken gear: a quenched sparkgap, a sharp-tuning receiver with litzendraht wire coils, and an electrolytic detector; most operators use galena crystal detectors irrespective of patent rights. [SWP, Pratt]

December, 1912: Successors to McCarty conduct wireless telephone tests between Los Angeles and Point Loma, San Diego, 135 miles. [HP] San Francisco McCarty wireless telephone tests interfere with reception at PH prompting this log

entry: "...Recalling the days of 'Bugs' McCarthy [sic] the Wireless Telephone Capatilist [sic] in the Metropolis Bank Building. 9:55 p.m. 'Bugs' in with his fone, stronger than usual. Try to get GW but can't hear him through fone, CURSES!!!!"[PRN]

1912: The Federal arc station PSF, the Beach Station, earns similar note in the PH logs:

There's a station way down on the Beach
The noise it turns out is surely a peach
The Opps tear their hair, They cuss and they swear
But Old Poulsen he sticks like a leach. [PRN]

So do amateur operators: "8:30 a.m. The combined forces of 3,000 ham factories are bursting forth with their weird codes upon the quietude of this lovely rainy morning." [PRN, 60]

1912: The Radio Act of 1912 requires licenses of all operators and consigns amateur operators to wavelengths of 200 meters and down, thought to be useless short waves.[Gernsback; ARRL book] Haraden Pratt obtains one of the first licenses from Radio Inspector R.Y. Cadmus in San Francisco. [SWP, Pratt]

1912 - 17: "Doc" Herrold broadcasts from San Jose on a daily basis using an arc of his own design, renewing his broadcasting activity immediately after the end of the First World War, using deForest vacuum tubes. [HP]

1912- 13: Lee deForest perfects the triode Audion in Palo Alto at Federal Telegraph which builds a three-stage cascade audio amplifier, with a gain of 120, to demonstrate to the Navy in September, 1912 (IRE 50th); shortly thereafter deForest and Charles Logwood experiment with feedback circuits, shortly before Armstrong, in New York, discovers regeneration. [DeF]

1913: The official callbook lists just over 300 amateur operators in the 6th District (California, Nevada, Utah, Arizona and Hawaii) perhaps 10% fewer than the 2nd District (southern and central New York and northern New Jersey); Seattle's 7th District had about 75 licensees for Washington, Oregon, Alaska, Idaho, Montana and Wyoming.

September, 1913: Radio telephone tests between Point Arguello and Mare Island (300 miles) by the Navy, performed by "Doc" Herrold with an arc, monitored at NAA in Virginia and at Bremerton, Washington; Herrold's music broadcasts were monitored off San Pedro and heard as far south as San Diego. [HP]

1914: Edwin Howard Armstrong picks up a San Francisco wireless station when testing his regenerative Audion circuit. [EHA]

1914: Haraden Pratt establishes an amateur radio station at the University of California at Berkeley. [Morgan]

September, 1914: American Marconi officially opens its Bolinas, California spark station of 300 kilowatts power, callsign KPH, known as the "rock crusher," with receivers at Marshall. Its hotel at Marshall, still standing as part of the Marconi Cove State Park, was known among the operators as the Hotel De Gink. [Brenniman]

November, 1914: *SS Hanalei* wrecked off Point Reyes, wireless operator Adolph J. Svenson lost. [SWP] Six other wireless operator died in sinkings and wrecks, "lost at sea at the post of duty" on the Pacific Coast through 1914:

George C. Eccles	*SS Ohio*	1909
Lawrence Prudhunt	*SS Rose Cranz*	1913
Donald C. Perkins	*SS State of California*	1913
Walter E. Reker	*SS Admiral Sampson*	1914
Harry Fred Otto	*SS Francis H. Leggett*	1914
Clifton J. Fleming	*SS Francis H. Leggett*	1914

[Wireless Operators Monument, Battery Park, New York; VWOA 1992]

1915: AT&T and deForest exhibit at the San Francisco Exposition; at deForests's "Wireless Telephone Booth" he monitors "Doc" Herrold's San Jose broadcasts, made to San Francisco at Radio Inspector Lt. Ellery Stone's request. [HP]

September, 1915: AT&T via the Navy station at Arlington, VA converses over radio-telephone with Mare Island, monitored in Hawaii by Lloyd Espenscheid, preliminary to successful trans-atlantic tests in October. [Howeth]

1915: Charles V. Litton, then 11 years old and the later founder of Litton Industries, operates his own amateur radio station in Redwood City. [Morgan]

1915: A student of Herrold's, Robert J. Stull, sets up a broadcasting station at the University of California at Berkeley. [HP]

1915: Killbourne and Clark begin to manufacture wireless equipment, primarily two transmitters, but also the Type E receiver, in Seattle, WA.

1916: Dick Johnstone, a Marconi operator at KPH at Bolinas and Tom Lambert on the tanker J.A. Moffett, callsign WRE, communicate for the whole voyage to China, 5,000 miles, each using only a galena crystal set for a receiver. [SWP]. Johnstone was a popular operator at KPH with a distinguished career including the rank of Commander in the Navy during World War II. Other well known KPH operators were Haraden Pratt, Frank Shaw dating from PH days and "Pop" Hyde, who like LM was an old landline telegrapher. [SWP] Johnstone later wrote an engaging memoir of his early days in wireless.

1916: Howard Seefred logs Funabashi, Japan (6,000 miles) on a Galena crystal set.

1916: O. B. Moorehead establishes what becomes his vacuum tube manufacturing company in San Francisco, with backing from Elmer T. Cunningham, to manufacture the earliest high vacuum tubes; many are produced for use in the war, notably the Type B on a four-pin base and the tubular "Electron Relay." Cunningham and George Haller form Haller-Cunningham Company and manufacture wireless gear, primarily the Impulse Excitation transmitter and also the HALCUN Type B receiver. Haller was the first to suggest a cylindrical plate for the audions that he and others were making in San Francisco very early. [Mayes, Jr.] Cunningham later made a deal with RCA that gave him the right to cherrypick its vacuum tube production as his own product (e.g., the type '301 tube). [SWP, Pratt] he was known as a hard-nosed businessman. Cunningham founded the Remler Radio Company ("Elmer" backwards) in San Francisco which lasted until about 1972.

1916: Henry Dickow founds the magazine *Pacific Radio News* in San Francisco. He started as an amateur in 1907 and went to sea as a newly licensed teenager in

1914, after LM told him to wear long pants. Dickow helped to found the San Francisco Radio Club, Inc.
[TVRN, ops]

April, 1916: Killbourne and Clark's manufacture of wireless gear in Seattle, WA leads to litigation with American Marconi, in which C.B. Cooper is a principal. [SWP] Killbourne and Clark won in 1917. [PRN]

November, 1916: The transpacific radio telegraph circuit opens to commercial traffic. [Howeth]

January, 1917: San Diego's Navy 200 kilowatt arc station first goes on the air (S.N. Hooper at the silver key); followed by Hawaii and The Canal Zone at the end of the year, in the Navy's transpacific chain. [Howeth]

1917: Haraden Pratt, in charge of wireless on the West Coast for the Navy and working from San Diego and Los Angeles, triangulates the location of a German wireless station transmitting from Mexico. [PF]

1917: Frederick E. Terman, later the Vice President of Stanford University and the father of electronics development in what became Silicon Valley, as a teenager operates an amateur radio station in Palo Alto. [Morgan]

1917-18: "Doc" Herrold at his school in San Jose trains a thousand wireless operators for the Navy and Army in World War One; his school earlier trained 1,200 maritime and commercial operators. [HP]

1919: Amateur Radio operators are back on the air after World War One's prohibitions. [QST]

1919: Colin B. Kennedy founds his Radio Company in San Francisco; R.S. Ormsby is one of his engineers; Kennedy makes custom as well as production models and is known as the "wireless tailor" for his custom work. [SWP]

Circa 1919: The Navy is the largest user of wireless, with over a dozen stations in California (11th & 12th Districts), more than 20 in Oregon, Washington and

Alaska (13th District) and three in Hawaii (14th District), as well as a large station at Darien in the Canal Zone in Panama. [Howeth]

Circa 1919: As many as 400 vessels equipped with wireless ply the Pacific Coast. [SWP]

March, 1920: Lee deForest establishes broadcasting station 6XA at the California Theatre in San Francisco, moving to Berkeley in the Fall; Herrold and Newby licensed for broadcasting as 6XF (and 6FE — portable) in San Jose. [HP]

1922: Ralph Heintz (having formed his own radio company in 1921) establishes an AM Broadcasting station, KFDB, on Telegraph Hill in San Francisco [Telegraph Hill History] within blocks of the site of some of the first wireless experimentation in 1899; the Age of Radio Broadcasting dawns with stations in California, Oregon and Washington as well as the rest of America and the world.

The primary sources of this chronology are:

Herrold Papers courtesy of Mike Adams;
Archives of the Electronics Museum of the Perham Foundation
(now at History San Jose);
Sparks Journal of the Society of Wireless Pioneers;
History of Communications Electronics in the United States Navy (Howeth);
Electronics in the West (Morgan);
Wireless Communication in the United States (Mayes).

We continue to seek more information about these and other events in the history of wireless development and communications on the West Coast.

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