More on the Tesla/Alexanderson System of Wireless Transmission and It's Application at Bolinas, CA Part 1

…where time can flow backward and energy transmission can be instantaneous.

San Francisco Tesla Society

CHAPTER IX.

WAVES FROM MOVING SOURCES.

Adagio. Andante. Allegro moderato.

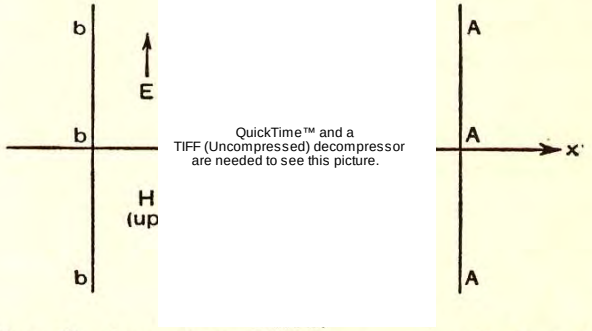
§ 450. The following story is true. There was a little boy, and his father said, "Do try to be like other people. Don't frown." And he tried and tried, but could not. So his father beat him with a strap; and then he was eaten up by lions.

Reader, if young, take warning by his sad life and death. For though it may be an honour to be different from other people, if Carlyle's dictum about the 30 millions be still true, yet other people do not like it. So, if you are different, you had better hide it, and pretend to be solemn and wooden-headed. Until you make your fortune. For most wooden-headed people worship money; and, really, I do not see what else they can do. In particular, if you are going to write a book, remember the wooden-headed. So be rigorous; that will cover a multitude of sins. And do not frown.

There is a time for all things: for shouting, for gentle speaking, for silence; for the washing of pots and the writing of books. Let now the pots go black, and set to work. It is hard to make a beginning, but it must be done.

Simple Proof of Fundamental Property of a Plane Wave.

§ 451. At present, in dealing with some elementary properties, the object is to smooth the road to the later matter. First of all, how prove the fundamental property of a plane wave, that it travels at constant speed undistorted, if there be no conductivity, or, more generally, no molecular interference causing dispersion and other disturbances? We have merely



to show that the two circuital laws are satisfied, and that can be done almost by inspection. Thus, let the region between two parallel planes *aaa* and *bbb* be an electric field and a


Western Electric®

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Nikola Tesla

GUGLIELMO MARCONI

Photo # KN-2578 Fleet Admiral Chester W. Nimitz, by Adrian Lamb

Admiral Nimitz

3-11 Sarnoff as Marconi's Newest Employee

for peacetime communications with South America. Nally was advised that he might well proceed to erect a station in the Argentine to communicate with this station rather than with one owned by Pan-American. He refused to consider this and took no further action in the matter.

When Secretary Daniels deferred obtaining a government charter for the Radio Corp., he promised the officials of the General Electric Co. that the Federal Telegraph Co. would not be permitted to construct arc transmitters for commercial purposes until a final decision had been reached.[39] In compliance with this promise, the Federal Co. was advised that they could not construct transmitters for the Pan-American Co.

At the time the Radio Corp. absorbed the American Marconi Co. and obtained its holdings in the Pan-American Co., no further action had been initiated to establish South American circuits. Shortly thereafter Young came to Washington to confer with Hooper concerning this situation. Following the war, France and Germany obtained radio concessions from the Argentine. These concessions brought about a probability of unhealthy competition or the possible elimination of American interests, as there would be insufficient traffic from any country to warrant more than one station in each.

Hooper and Bullard agreed that the best solution was to form one company which would include companies in all countries holding concessions in South America at that time. The Navy Department gave its sanction to the plan to establish this consortium consisting of the Radio Corp. of America, British Marconi, the Campagnie Général de Télégraphie and Téléphonies (France), and the Telefunken Co. (German).

In conferences between the officials of these companies, an international company was formed, known as the A.E.F.G. with the four companies as equal partners. Each provided two members of the directorate but a neutral chairman, an American, had the power to exercise his veto whenever, in his opinion, any decisions were contemplated which would have been unfair to a minority. In this agreement the Radio Corp. not only achieved a position as an equal partner of the older established companies but, through the power of veto, it actually gained control of the consortium. By a cross-license agreement made at the same time, it obtained the use, in the United States, of the patents of the French company.[40]

12. THE NAVY OBJECTS TO THE RADIO CORP.'S EFFORTS TO ESTABLISH A MONOPOLY OF SHIP-SHORE COMMUNICATIONS

The proposed Government charter for the Radio Corp. had envisioned that it would be granted a monopoly of long-distance radio communications and, additionally, that it would be a patent holding agency which would freely grant licenses to reputable manufacturers, thereby stimulating healthy competition.

Despite the concern of many interested Navy officials, excluding Hooper, many of the former officials of the American Marconi Co. were appointed to policy and managerial positions in the new company.[41] These officials brought with them the imbued belief that only the Marconi Cos. and those which succeeded them had legal rights in the radio field. Further, they were not in agreement with the restriction against manufacture imposed upon the Radio Corp.

In reviewing the vacuum tube manufacturing situation existent in the United States at the time of the formation of the Radio Corp., it will be remembered that it was legally impossible, except by agreement between patent holders, for anyone to manufacture the three-element tube. This tube had been manufactured during the war under Government immunity. Following the termination of the war, the Government could no longer assume the responsibility for infringement. The Radio Corp. then entered into an agreement with De Forest to manufacture them under the limited rights he had retained in his sale to the Telephone Co.

In an effort to alleviate the situation, Hepburn, as Acting Chief of the Bureau of Steam Engineering, on 5 January 1920, addressed similar letters to the General Electric and the American Telephone & Telegraph Cos. pointing out that, although numerous conferences had been held in connection with the patent situation, nothing of practical value had evolved. The letters ended with a plea for an immediate remedy of the situation.

The General Electric and the Telephone Cos. entered into the previously mentioned agreement on 1 July 1920 which was extended on the same date to include the Western Electric Co. and the Radio Corp.

By this the General Electric Co. became for over 2 years the sole legal American manufacturer of the

three-element tube for public sale.[42] The existing manufacturing agreement with De Forest was discontinued, thus giving the Radio Corp. a sales monopoly of this item.

To the surprise of naval officials who had fostered the agreement, the Radio Corp. refused to sell tubes to competing communications operating companies or to shipowners who did not lease or buy their equipment or utilize their radio maintenance service. This situation continued through the remaining months of 1920 and caused Hooper to address a personal letter to Young, under the date 11 December 1920, in which he stated that all the efforts of the General Electric, Western Electric, and Telephone Cos. to serve the Government and the American people in the radio field were being thwarted by several persons in the Radio Corp. who were determined to exercise a monopoly of radio apparatus.

Young replied to this on 13 January 1921 stating that, in his opinion, Hooper was expecting too much in too short a time and asked his patience and cooperation in his effort to develop an esprit de corps within the Radio Corp. organization and an understanding of the necessity of cooperation with all Government agencies.

The exchange of correspondence continued with Hooper replying on 17 January. This letter contained pertinent remarks concerning three matters of the corporation's policy. The first concerned the sale of three-element electronic tubes. He considered the policy should allow their unrestricted sale, believing that what the Radio Corp. might lose in competition in the ship-shore business could be offset by sale of tubes and by increased good will. He further stated that the corporation should be able to keep ahead of its competitors for the merchant marine business by constantly providing better equipments and services. The second matter dealt with the erection of coastal stations. He stated that Sarnoff and others, without knowledge or in disregard of agreements, had shifted back to the same old Marconi idea of a complete chain of commercial coastal stations. These were to be supported by the receipts obtained by a monopoly on ships' installations which they hoped to attain by restrictions on the sale of tubes. He followed this by the statement, "Such a policy must inevitably lead to the Department's withdrawal from any agreements now observed by the Government." Continuing, he advocated the encouraging of two strong competing companies in the ship-shore business, operating under agreed upon and sane policies, one of which should permit shipowners free choice in contracting for installations. He ended this with the statement that the personnel of the Radio Corp. seemed to be against permitting such competition. The final comment referred to a growing tendency of the corporation's personnel to dictate to the Navy what it must or must not have in the details of equipment, and stated that cooperation was not as good as it had been before the Radio Corp. came into existence. Hooper's papers do not contain a reply from Young concerning these remarks.

On 25 April 1921 the Chief of the Bureau of Engineering again addressed similar letters to both the General Electric and the Telephone Cos. criticizing them for failure to provide ships of the merchant marine with tubes unless the owners contracted for service or purchased or leased equipment from the Radio Corp. Indirectly replying to this, the Radio Corp. attempted to tighten its monopoly by implied threats of legal action against commercial users of tubes in equipments not provided by them.

At a meeting of the directors of the Radio Corp. on 21 April 1922, it was agreed that licenses should be granted to companies manufacturing equipment for the U.S. Government provided such equipment was not used for toll purposes. At the same meeting it was decided to sell complete installations or parts thereof to shipowners or agents and to competing radio companies operating ship radio service with the following restrictions:

> Licensed only for use on board merchant ships and merchant aircraft for radio telegraphic and radio telephonic communications destined to or originating on board such ship or aircraft; or for relaying radio telegraphic or radio telephonic communications between ships at sea and aircraft, between ship and aircraft and shore and vice versa.[43]

Authorization was granted to lease competing companies transmitting apparatus of 2 kw. or less antenna input and receivers for installation in shore stations for ship-shore and shore-ship communications purposes only. The royalty to be charged for this equipment was to be based on the percentage of gross business for which the apparatus was utilized. In the event that shipowners and competing companies refused to accept these imposed conditions and continued the corporation's alleged infringement of its patents they were to be

3-11 Sarnoff as Marconi's Newest Employee

Alfred E. Newman

Draft

HIGH FINANCE OF EARLY WIRELESS – STOCK JOBING.

Showing the Several U.S.A. Companies, their Successive Capitalizations and Interrelations, in the "Wild and Wooley" Days!

Telegraph ... Ltd

MARCONI

formed ~~1896~~ 1900 Marconi's Wireless Teleg. Co. Ltd. Capital ? subsidiaries –

year ? 1899 Marconi W.T. Co. of Amer. capital ?

1908 Marconi's Ltd. shares at low ebb down to £5.3d. from £3 or 4. Godfried Isaacs to the helm.

1912 Marconi's Ltd undertakes British Imperial Chain £ 1,000,000. Shares rise to £6. ($30.)

1912: refinanced by English Marconi

1913 Marconi W.T. Co. of Amer. $5,000,000 ($5 shares)

Marconi Scandal in London. "High Profits Made by the Marconi Co." says a letter of 1913. Sept. 4 from broker P.C. Kullman & Co. to Lloyd Espenschied.

1914 European War – Spark stations of Imperial Chain prove to be "duds" compared to C.W. stations of Poulsen arc and alternators of Germans.

Vacuum tube triode amplifier comes to rescue of transatlantic working.

DE FOREST

Promoted on basis of DeForest-Smythe-Freeman patents that amounted to nothing!

Capital $

1901 Wireless Teleg. Co. of Amer. N.J. charter 5 promoters plus de Forest — 3,000

1901 DeForest W.T. Co. N.J. Charter Abe White (Black) promoter — 1,000,000

1902 DeForest W.T. Co of Maine deForest a V.P. & "Scientific Director" a holding company subsidiary – — 3,000,000

1902 Amer. DeF W.T. Co. of Maine operating co. became — 5,000,000

1903 Amer. DeF. W.T. Co. — 15,000,000

an English subsidiary Poulsen arc.? — converted into — Dominican DeF. W.T. Co. — 1,200,000

1906 United Wireless Teleg. Co. — 20,000,000

1912 insolvent, absorbed by Marconi

Promoter Abe White (Schwartz) went to jail, as did his Successor Christopher Columbus Wilson! of United Wireless.

POULSEN ARC

1903 – 1906 ?

1909 Poulsen Wireless Corp. subsid – Federal Telegraph Co.

DOLBEAR

Old patents of Dolbear and Harry Shoemaker exploited by a Phila. syndicate – Dr. Gustav P. Gehring, and then Lafayette E. Pike of Hartford, Conn.

	Capital
1901 Amer. W. Tel. & Tel. Co. & 9 subsidiaries –	5,000,000
N. E. W. Tel. & Tel Co	"
Federal "	"
Nor. Westn "	"
Atlantic "	"
Commercial "	"
Central West'n "	"
Gulf "	"
Continental "	"
Pacific "	"
total capitalization!	$50,000,000

became

1902 Consolidated W.T. & T. Co	25,000,000
1903 " reduced to	7,500,000
name changed to	
1903 International W.T	7,500,000

de Forest, "fired" for misleading his crooked management over the electrolytic detector of Fessenden, – starts a new company on the basis of the Poulsen arc as a radio telephone transmitter (not his), and devises the grid-controlled thermionic tube.

1907 DeForest Radio Telephone Co., Capital – ?

1911 – failed, deForest worked for Federal Teleg. Co. until Audion triode found to be an amplifier, 1912.

1913 Officers of ~~above Co.~~ Radio Telephone Co. went to jail for fraud, but deForest, owning a controlling interest, managed to escape, due to leniency of District Attorney and a Jury disagreement.

COLLINS

	Capital
1903 Collins Marine Wireless Telephone Co. incorp. District of Columbia	1,000,000 one dollar shares
1909 name changed to Collins Wireless Telephone Co. Cameron Spear, Promoter.	ditto
1910 stockholders induced to exchange for Continental W. Tel. & Tel. Co. incorp. in Arizona, said to have controlling interest in Collins and –	5,000,000
Clark W.T. & T. Co Great Lakes	2,500,000
Pacific Wireless Teleph. Co	10,000,000
Massie W. Teleg. Co.	300,000

1913 Jan. 10, For fraud in using the Mails – Sentenced to Atlanta Penitentiary were three officers of the Collins Co., including Archi Frederick Collins for 3 yrs., but he served only one yr.

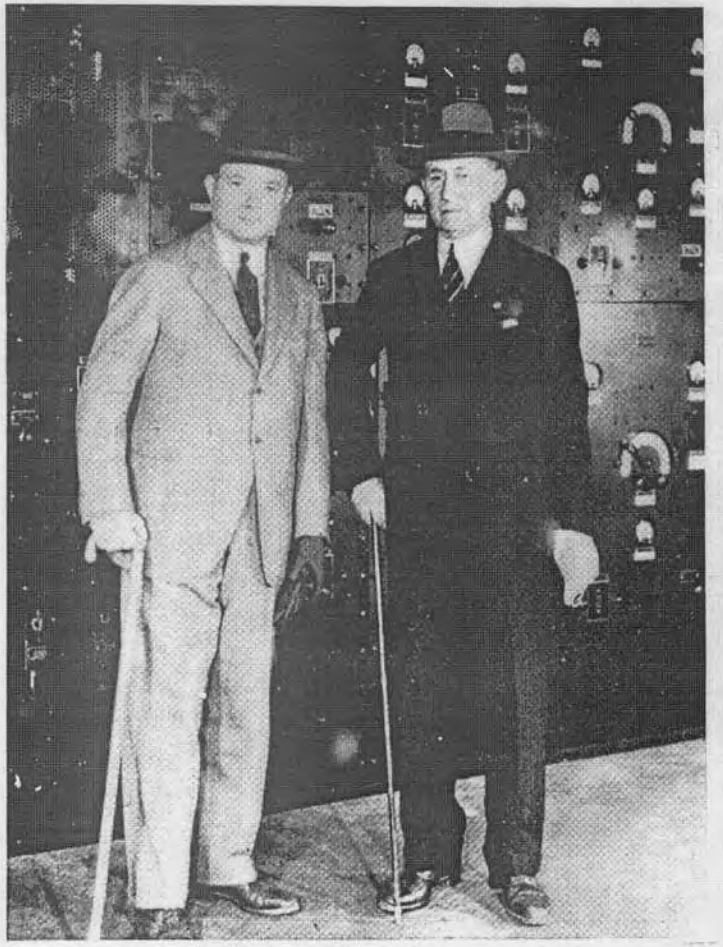
(Trial started 1911 Nov. in U.S. Circuit Court for So. District of N.Y (court abolished 1912 Jan 1) and renewed 1912 July Term in U.S. District Court for So. District of N.Y.)

Sources: Success Magazine articles 1907 by Frank Fayant. Court records. 1901 Prospectus of The Pacific and the Continental Wireless Telephone & Telegraph Companies. Newspaper articles.

Lloyd Espenschied
99 – 82 Road
Kew Gardens 15, N.Y.

1963 July 16

Einstein, Tesla, Steinmetz



DAVID SARNOFF

GUGLIELMO MARCONI

R.C.A. TYPE E EXCITER IN BACK

Sarnoff and Marconi

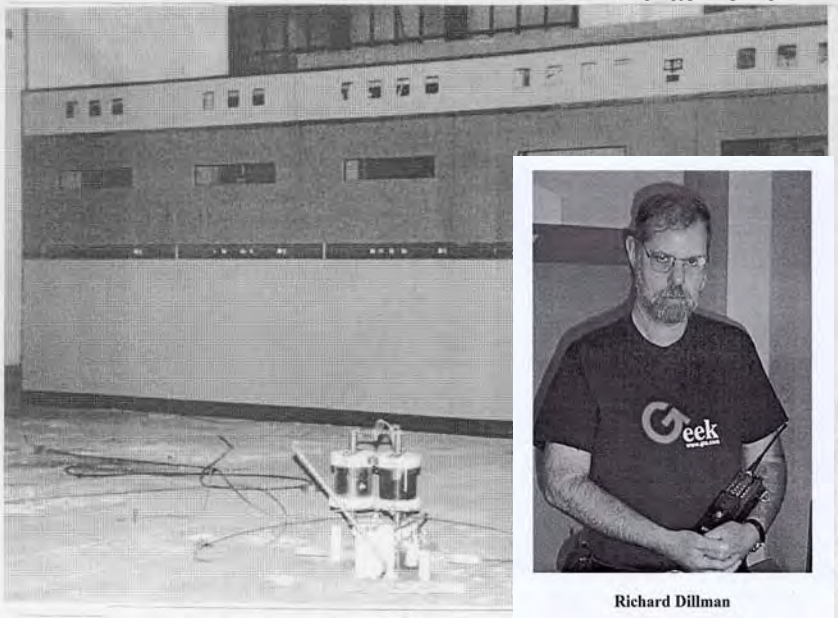
QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Ernst Alexanderson

Franklin D. Rosevelt

7-2 Bolinas Site: Fallen Tower

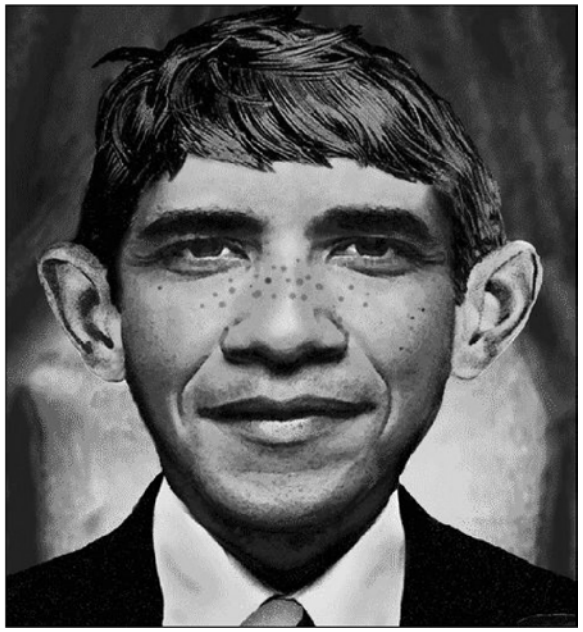
Michael Lerner

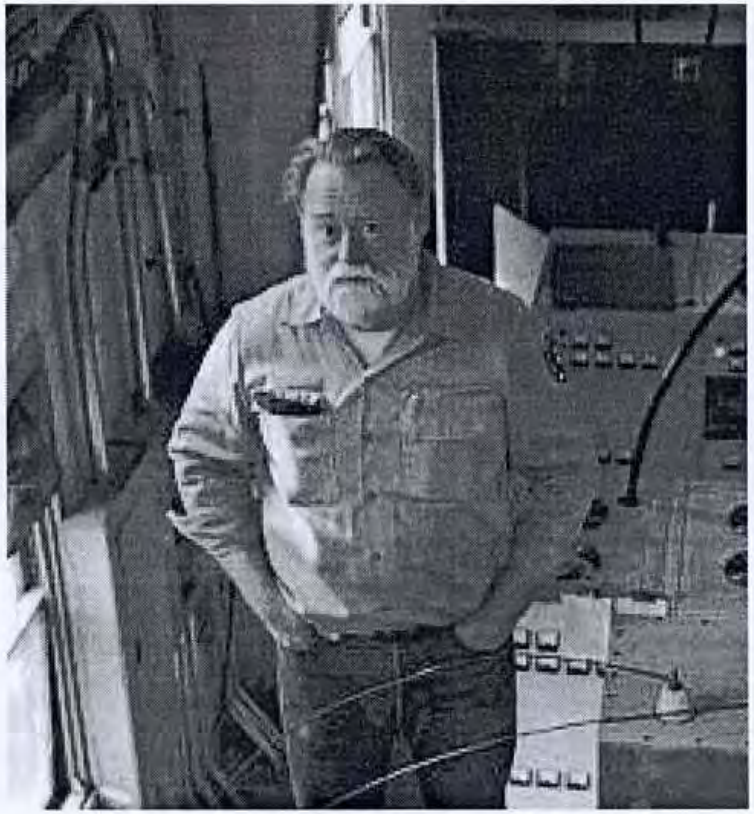


Richard Dillman

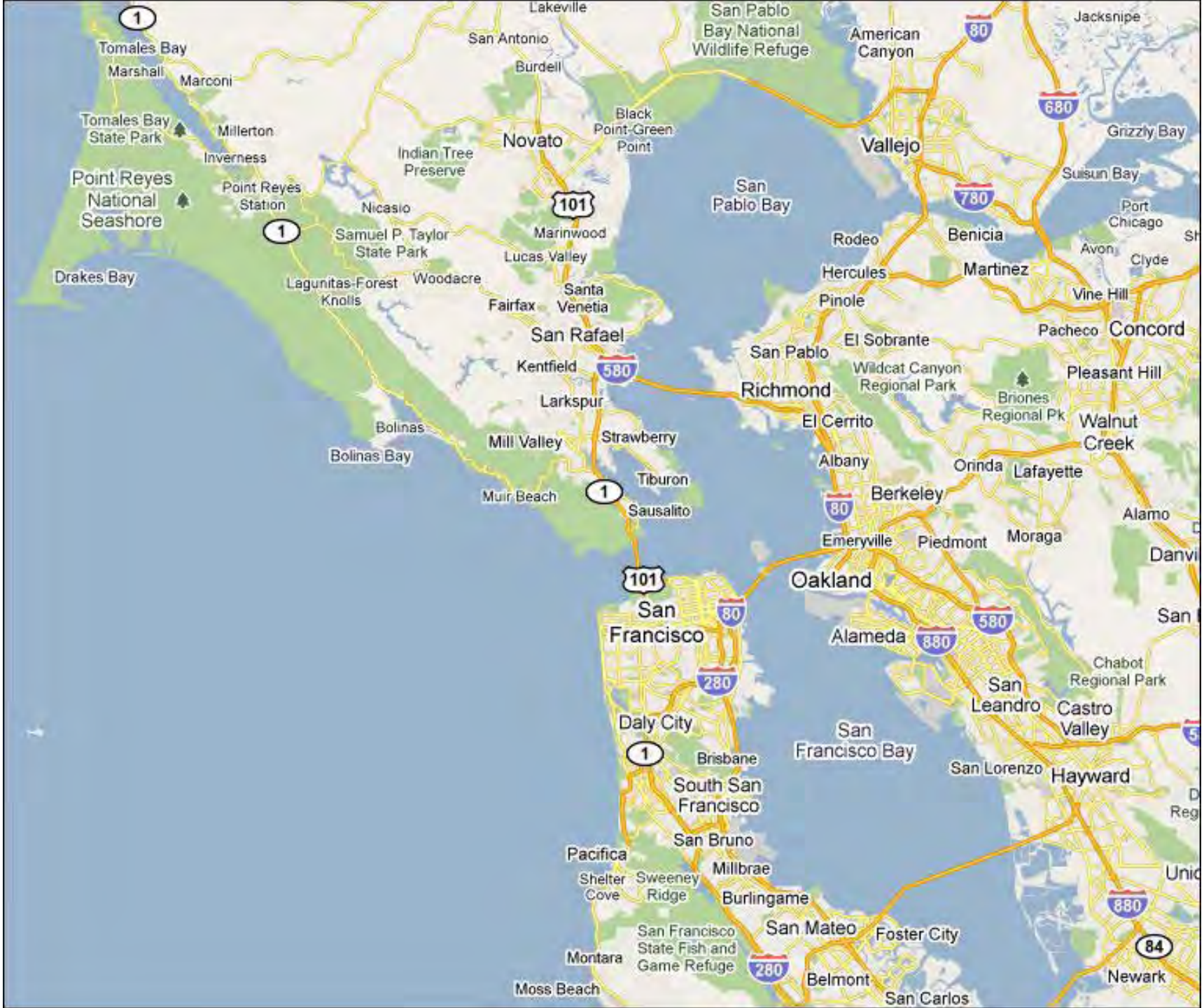
7-3 Bolinas Site: Transmitter BL-10 vandalized

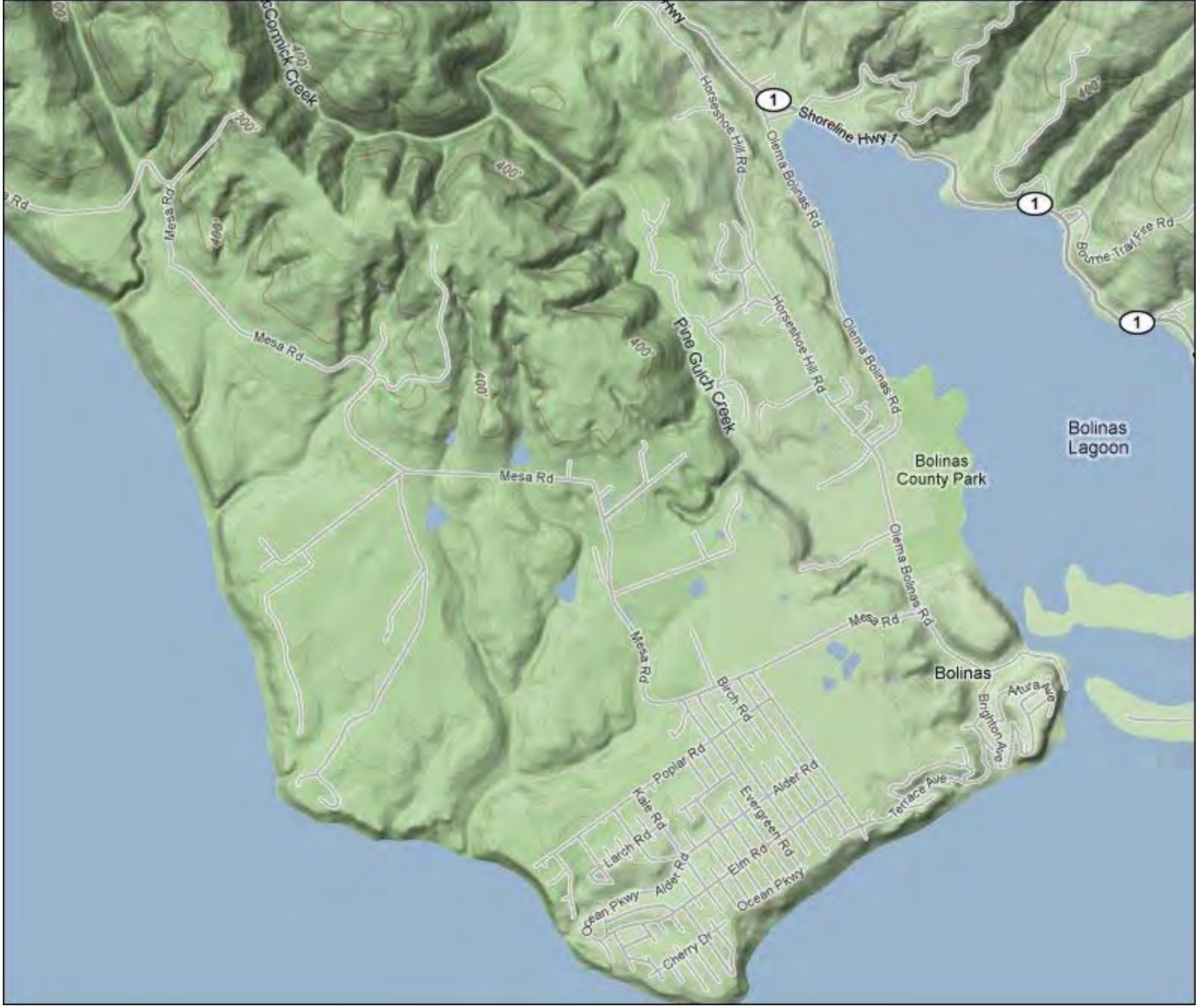
Damage 1

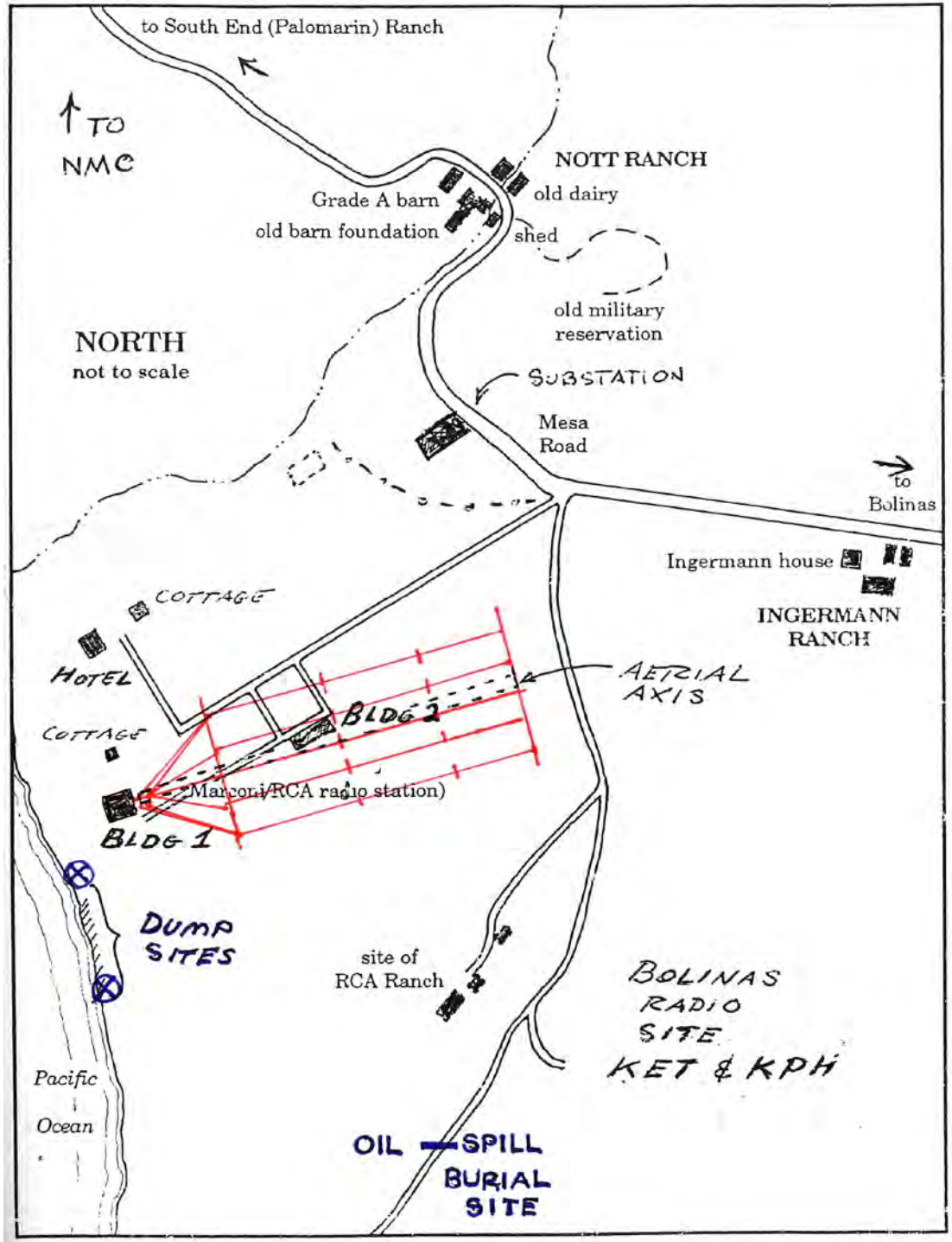


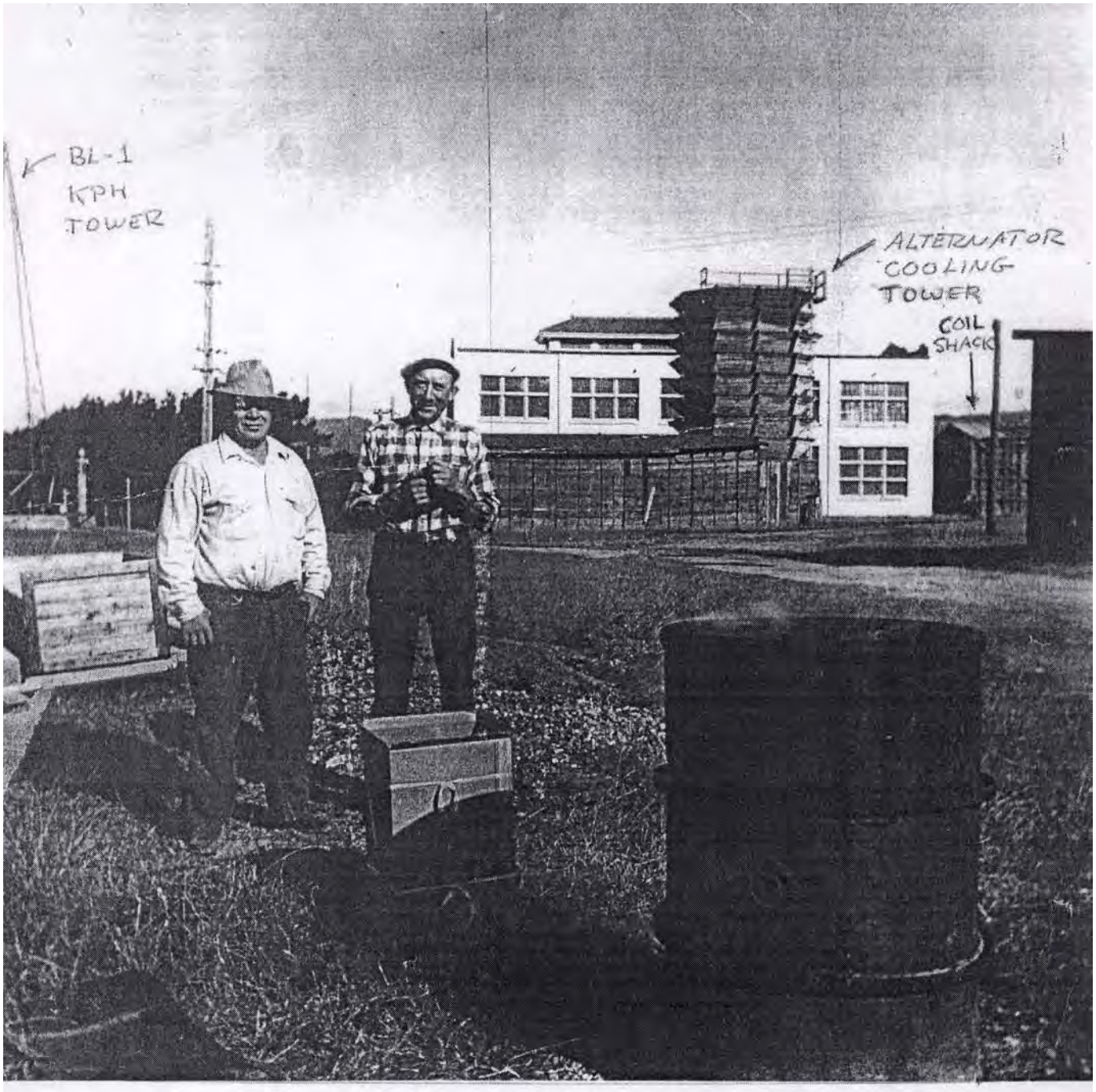


Thomas Horsfall

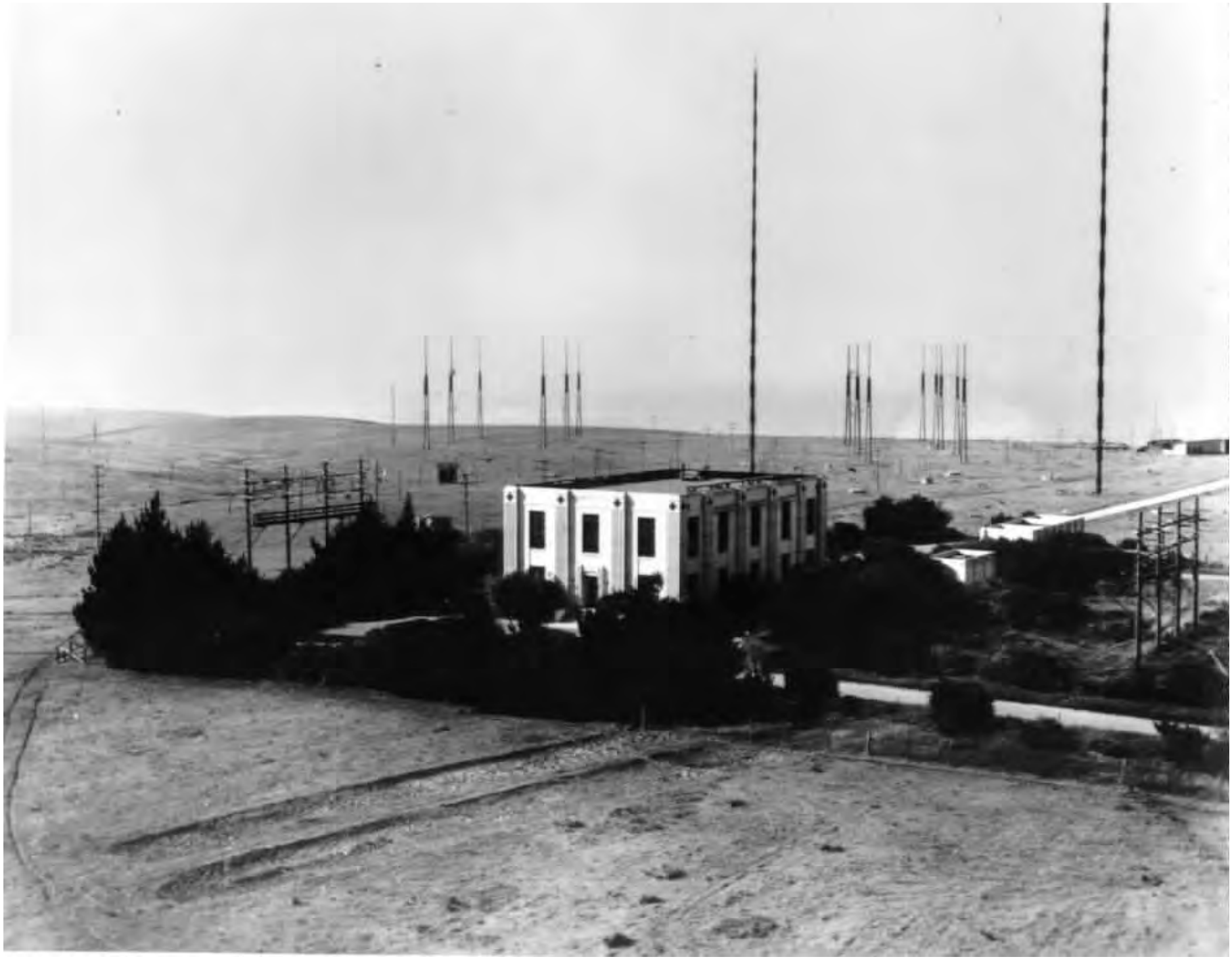

Lakeville
San Antonio
Burdell
San Pablo Bay National Wildlife Refuge
American Canyon
Jacksnipe
Tomales Bay
Marshall
Marconi
Tomales Bay State Park
Millerton
Inverness
Point Reyes National Seashore
Point Reyes Station
Indian Tree Preserve
Novato
Black Point-Green Point
Vallejo
Grizzly Bay
Suisun Bay
Nicasio
Samuel P. Taylor State Park
Marinwood
Lucas Valley
San Pablo Bay
Rodeo
Benicia
Port Chicago
Avon
Clyde
Drakes Bay
Lagunitas-Forest Knolls
Woodacre
Fairfax
Santa Venetia
Hercules
Martinez
Pinole
Vine Hill
San Rafael
Pacheco
Concord
El Sobrante
San Pablo
Kentfield
Wildcat Canyon Regional Park
Pleasant Hill
Richmond
Larkspur
Briones Regional Pk
Walnut Creek
El Cerrito
Bolinas
Mill Valley
Strawberry
Albany
Orinda
Lafayette
Bolinas Bay
Tiburon
Muir Beach
Sausalito
Berkeley
Alamo
Emeryville
Piedmont
Moraga
Oakland
San Francisco
Alameda
Chabot Regional Park
San Leandro
Castro Valley
Daly City
San Francisco Bay
Brisbane
San Lorenzo
Hayward
South San Francisco
San Bruno
Pacifica
Millbrae
Shelter Cove
Sweeney Ridge
Burlingame
San Mateo
Foster City
San Francisco State Fish and Game Refuge
Montara
Belmont
Newark
Moss Beach
San Carlos

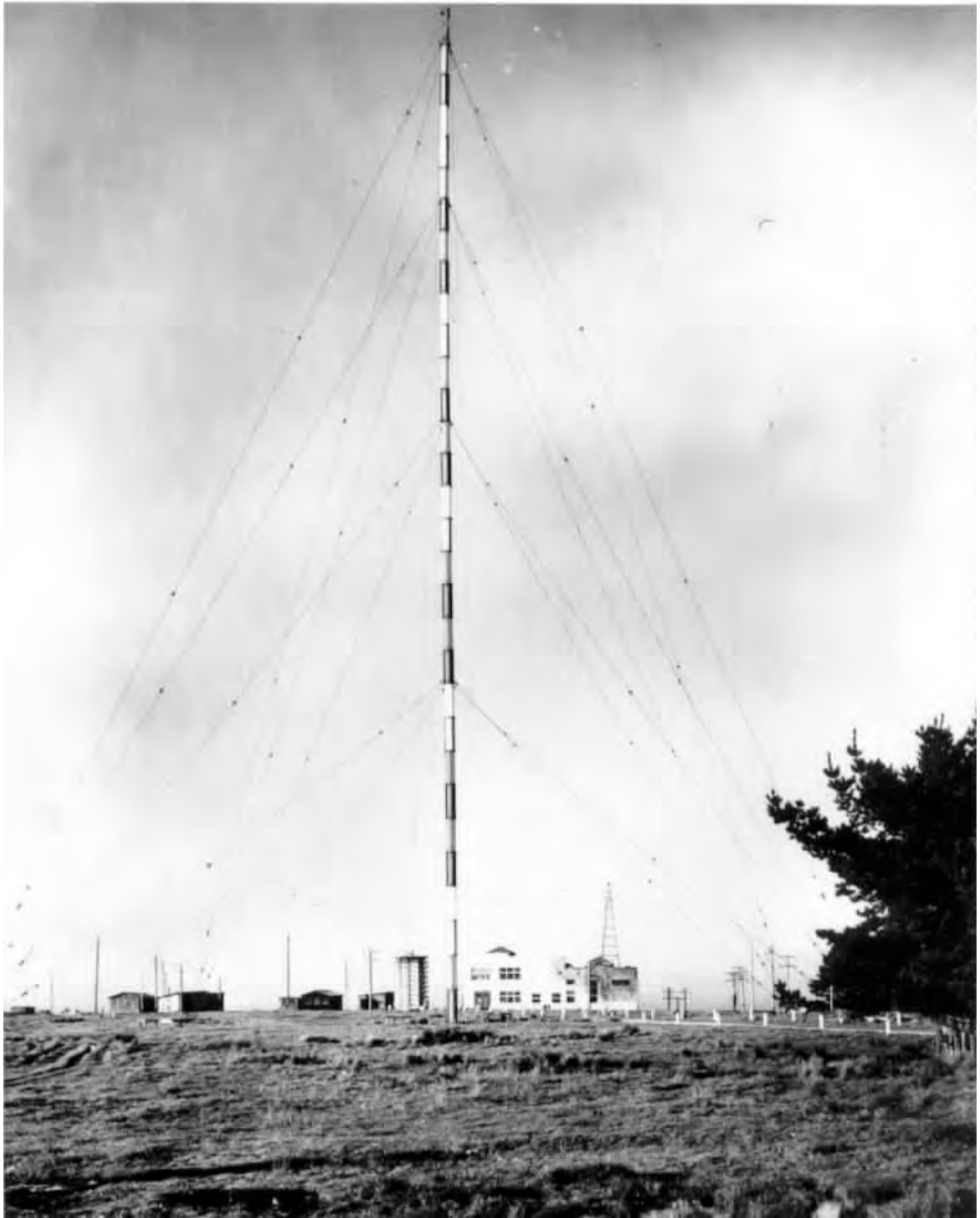

Shoreline Hwy 1
Horseshoe Hill Rd
Olema Bolinas Rd
Bolinas Lagoon
Bolinas County Park
Pine Gulch Creek
Mesa Rd
Bolinas
Ocean Pkwy
Cherry Dr
Elm Rd
Alder Rd
Evergreen Rd
Larch Rd
Kale Rd
Poplar Rd
Birch Rd
Terlace Ave
Brighton Ave
Bourne Trail/Fire Rd

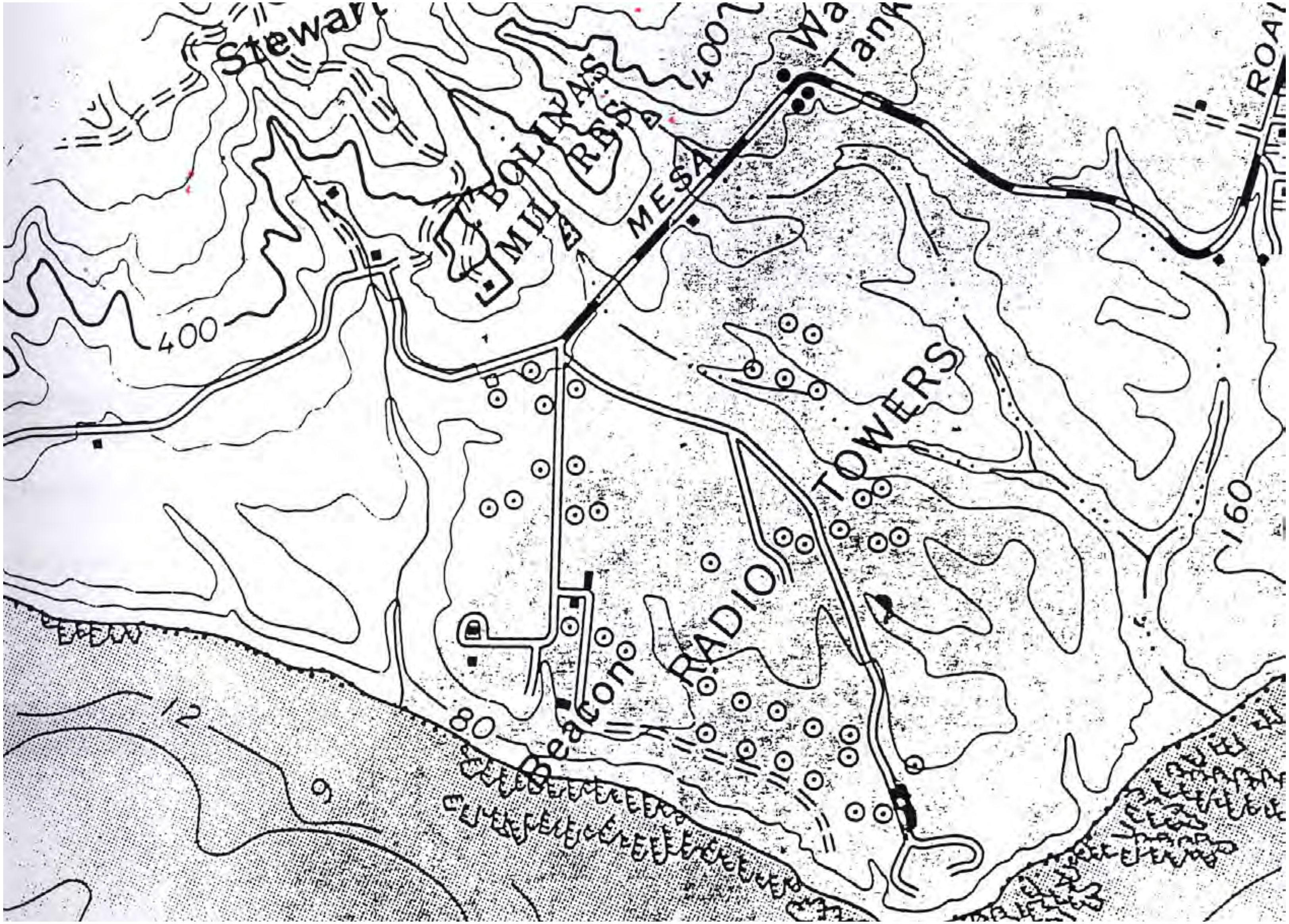

to South End (Palomarin) Ranch
TO NMC
NOTT RANCH
old dairy
Grade A barn
old barn foundation
shed
old military reservation
NORTH
not to scale
SUBSTATION
Mesa Road
to Bolinas
Ingermann house
INGERMANN RANCH
COTTAGE
HOTEL
COTTAGE
BLDG 2
AERIAL AXIS
(Marconi/RCA radio station)
BLDG 1
DUMP SITES
site of RCA Ranch
BOLINAS RADIO SITE
KET & KPH
Pacific Ocean
OIL SPILL BURIAL SITE

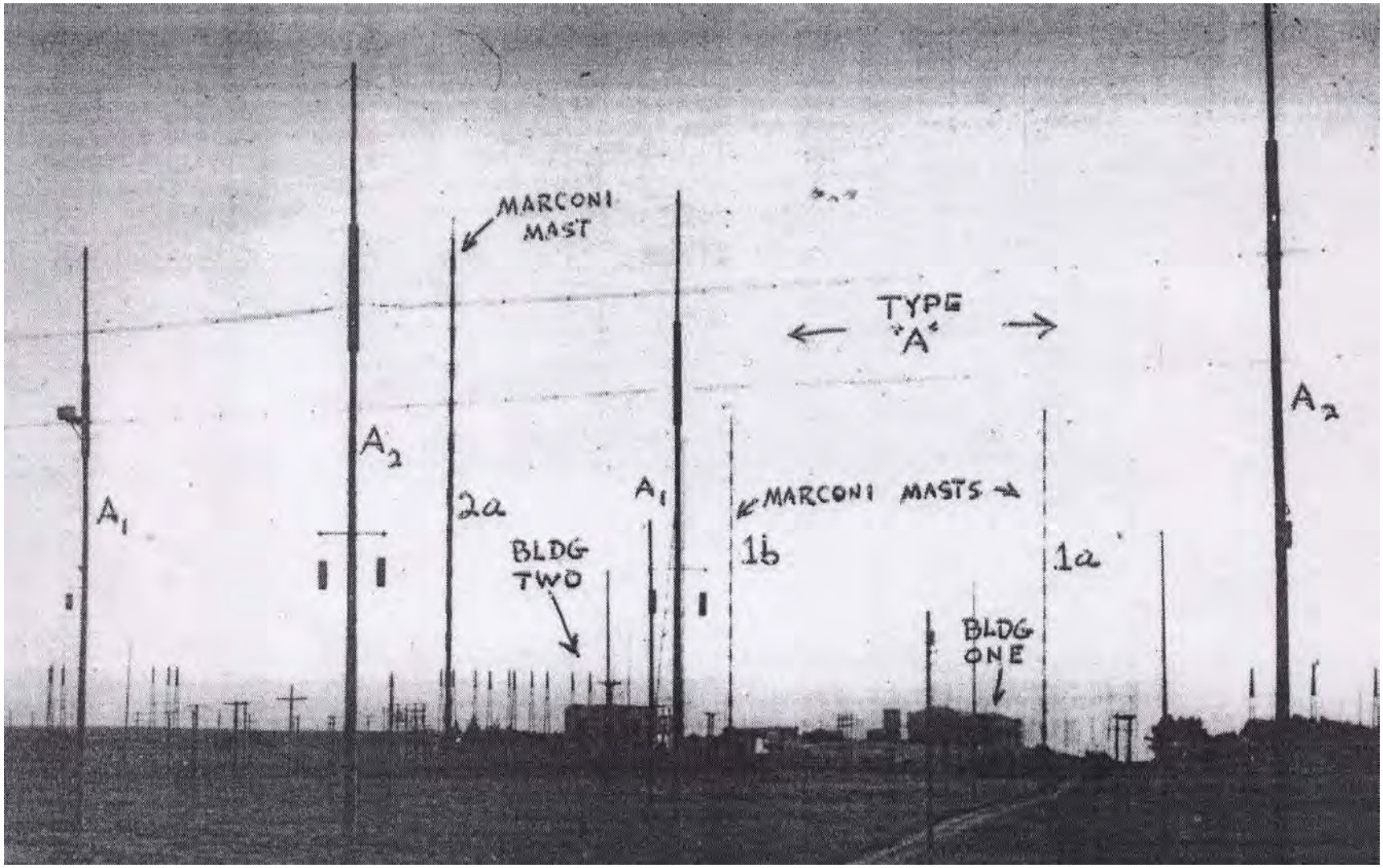


1-1 Bolinas Transmitter Site: Marconi Building (1940 photo)

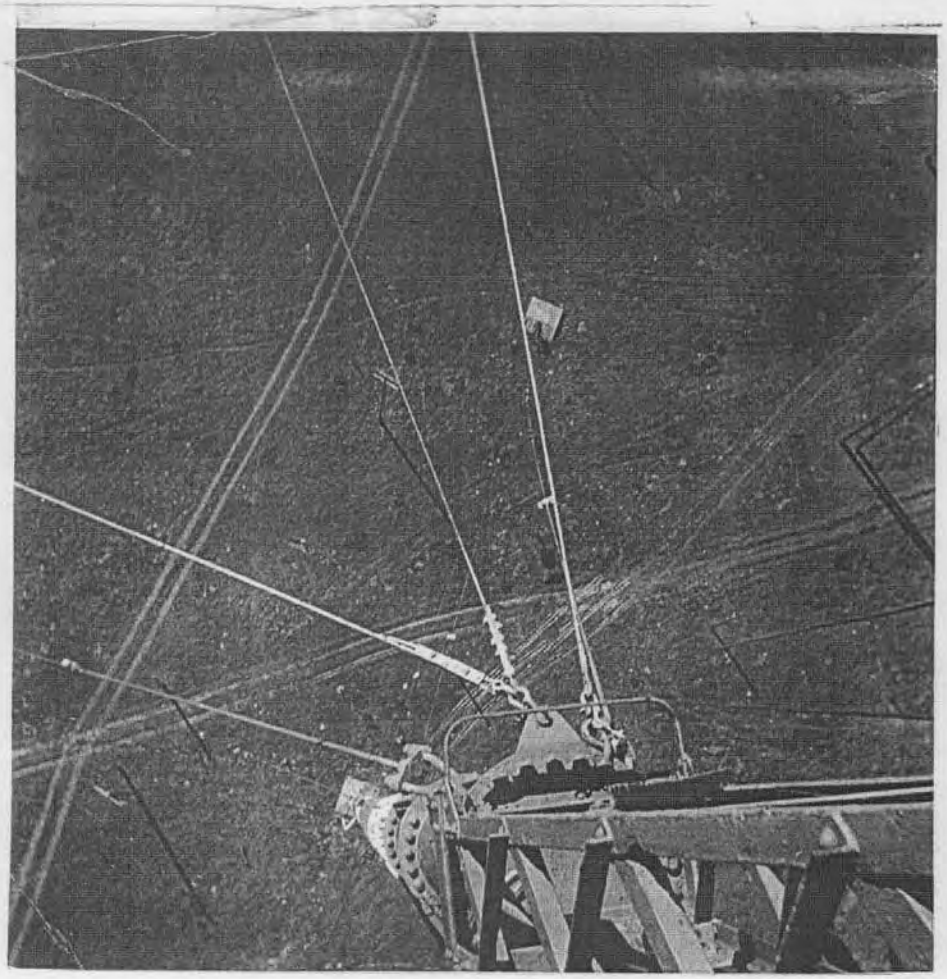





Stewart
BOLINAS
RES
MILL
MESA
400
Water
Tank
ROAD
RADIO
TOWERS
Beacon
160
80
12
9



Bolinas Site



8-16 Top of Mast (U.S.N. 1940) looking down (see tire-tracks below)

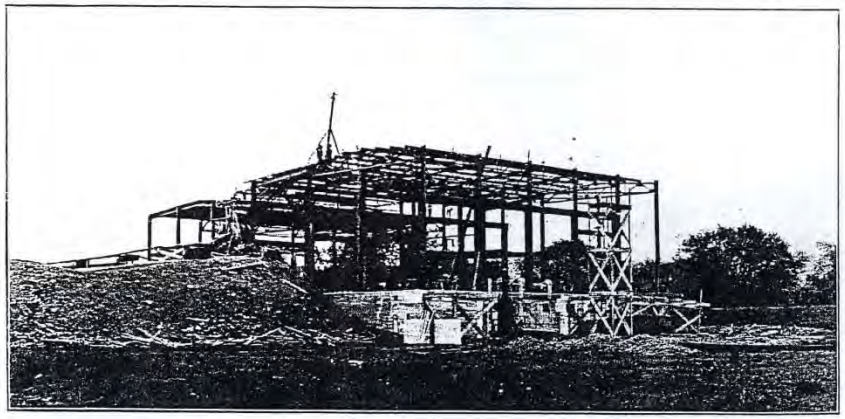
TOP OF MAST
U.S.N.
1940
(MAST 1-C)

Top of Masts

Trans-Pacific Wireless Telegraphy.

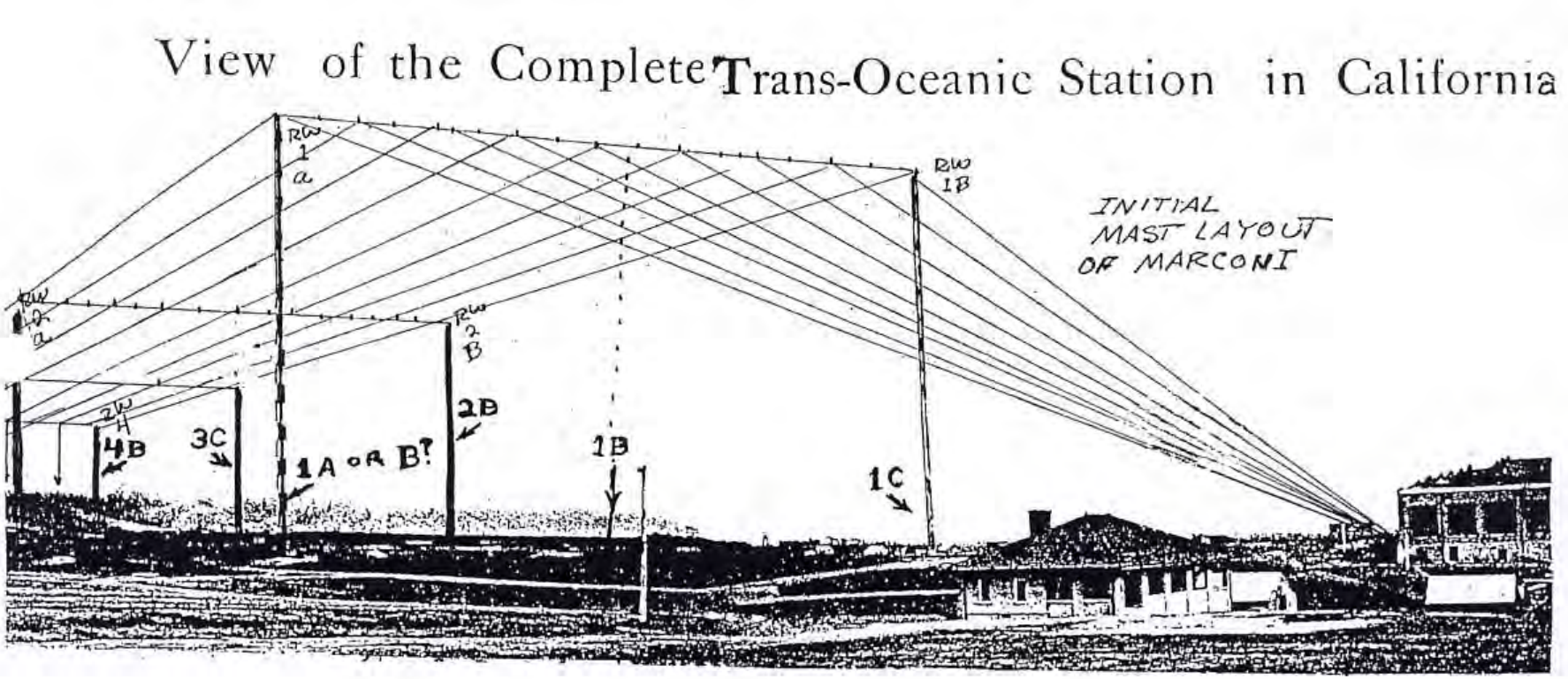
Marconi Stations in California Nearing Completion.

THE Marconi high-power stations in California are rapidly nearing completion. These stations will be made up of the transmitting plant at Bolinas Point, eighteen miles north-west of San Francisco, and the receiving station, near the town of Marshalls, about eighteen miles further north on Tomales Bay. Despite the difficulties attending the transportation of building material, the progress on the California sites has been satisfactory. Most of the material for erection purposes—steelwork and machinery, as well as all mast sections and the wire rope—is being made in the East. It is sent from New York by boat to the Isthmus of Panama, across the isthmus by rail and thence by water again to San Francisco.



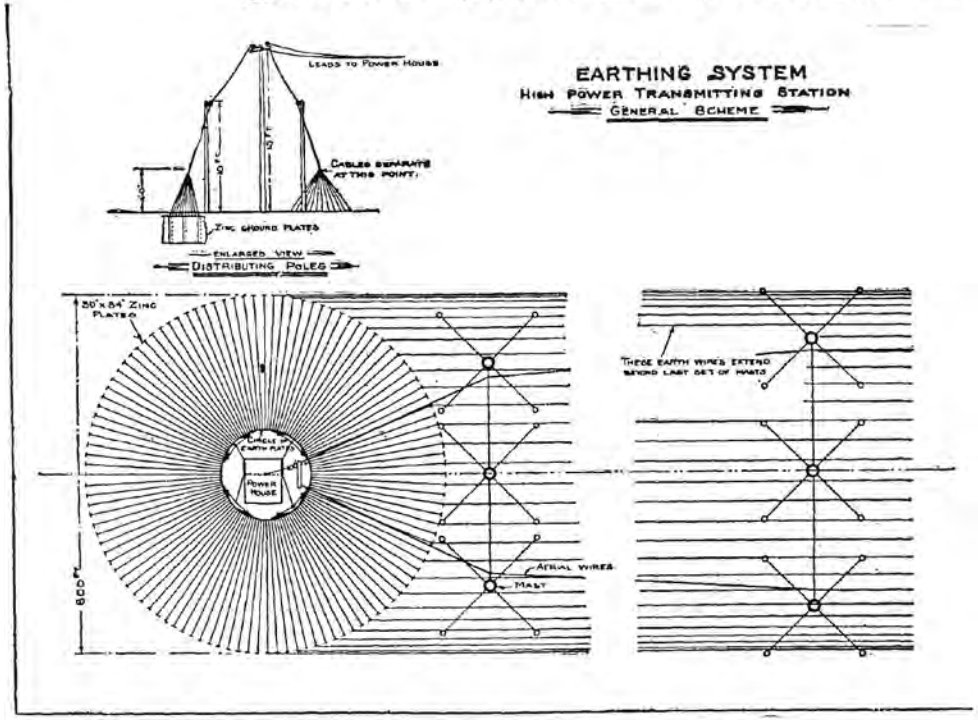
Bolinas Power House in Course of Construction.

The site at Bolinas is not advantageously located for bringing in heavy loads of material. The rough roads leading to it are at least four miles distant from the highway regularly used for traffic. There is no railway available, and it is necessary to send the material by water from San Francisco, unload it at the wharf at Bolinas Bay, and haul it to the site. Across the mouth of the bay is a shallow sand bar which makes it impossible for a boat of any size to get to or from the wharf except at high tide, and the coast is so dangerous to shipping that owners of vessels are reluctant to have their craft navigated in and out of the bay. As a matter of fact, only one small schooner enters the bay, and she makes the trip only when there is enough material to warrant it. The construction work has strained to the utmost the schooner capacity of 100 tons and overloaded the wharf. A larger derrick has been installed to unload the heavier pieces and the area of the wharf has been extended to give greater space for materials. The fear of winter storms and consequent impassable roads has stimulated the men in



8-1 View of the Complete Trans-Oceanic Station in California

GROUND WIRES AROUND POWERHOUSE



1-24 General Scheme of Earth Connections for High Power Stations

239. Condensed List of High Power Stations.—Some of the long distance transmitting stations of the Marconi Company, their locations, systems and power are shown in the following table:

Location	System	Power	Wave Length in Meters
Carnarvon, Wales	Continuous and discontinuous waves	100-300 K.W.	6,000 to 10,000
Clifden, Ireland	Discontinuous waves	75-150 K.W.	5,500
Glace Bay, Nova Scotia	Discontinuous waves	75-150 K.W.	8,000
Stavanger, Norway	Continuous waves	150 K.W.	?
Marion, Mass.	Continuous waves	150 K.W.	?
New Brunswick, New Jersey	Continuous and discontinuous waves	150-300 K.W.	8,000 to 15,000
Bolinas, California	Discontinuous waves	300 K.W.	6,000 to 10,000
	Discontinuous waves	300 K.W.	6,000 to 12,000
Kahuku, Hawaii	Discontinuous waves	300 K.W.	6,000 to 12,000

1-25 Condensed List of High Power Stations (Marconi Company)

Grounding System

PTB/Fig. 32A: ground stud 1 inch copper

8-68 Ground Stud 1-inch Copper (PTB/Fig. 32A)

Ground Stud

EINSTEIN

STEINMETZ

1-17 "Tesla Erased" from New Brunswick Photo (and from history

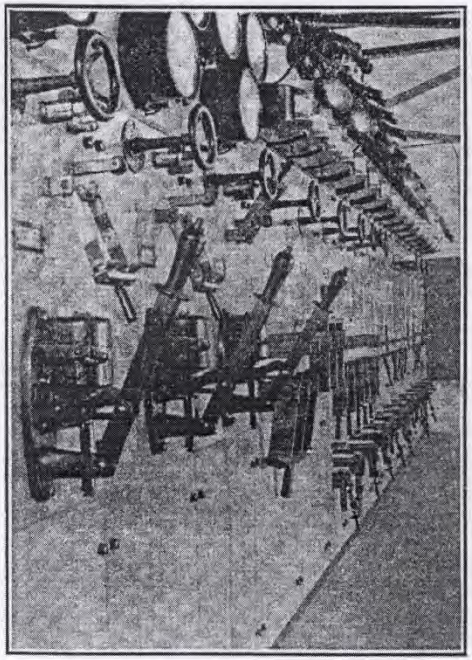
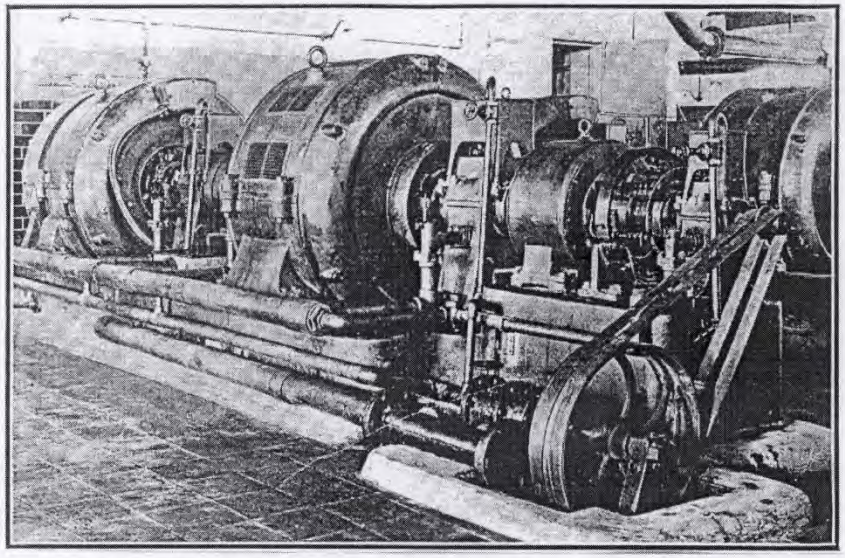


Fig. 308—The Switchboard of the New Brunswick High Power Transoceanic Station.

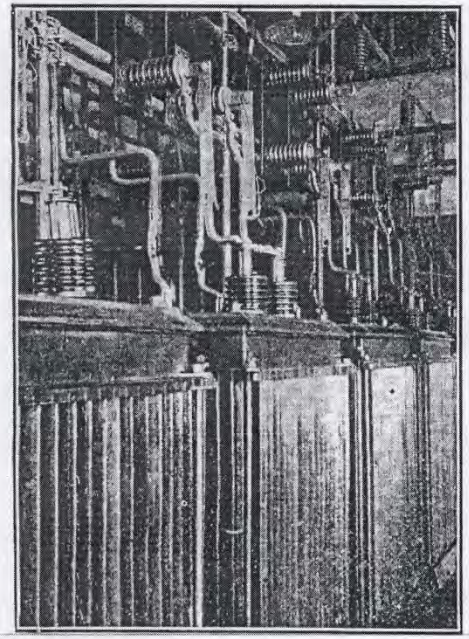
1-18 Switchboard, New Brunswick

EQUIVILENT TO BOLINAS ITEMS



1-19 300 KW 150-cycle Generators at Carnarvon Station

Alexanderson System



1-26 Bank of High Voltage Transformers at Kahuku (example)

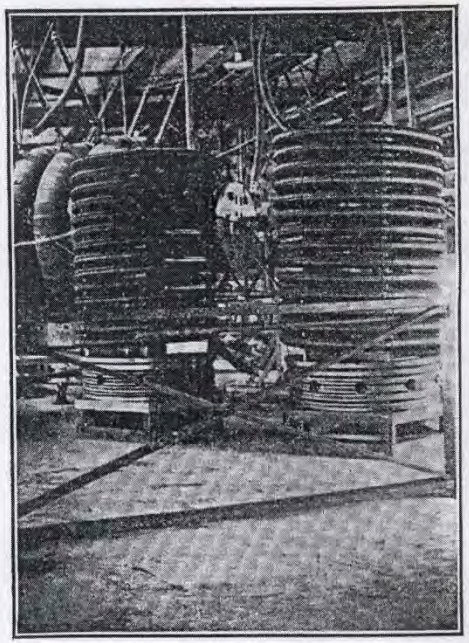


Fig. 321—The Aerial Tuning Inductances at Kahuku High Power Station.

1-27 Aerial Tuning Inductances at Kahuku (example)

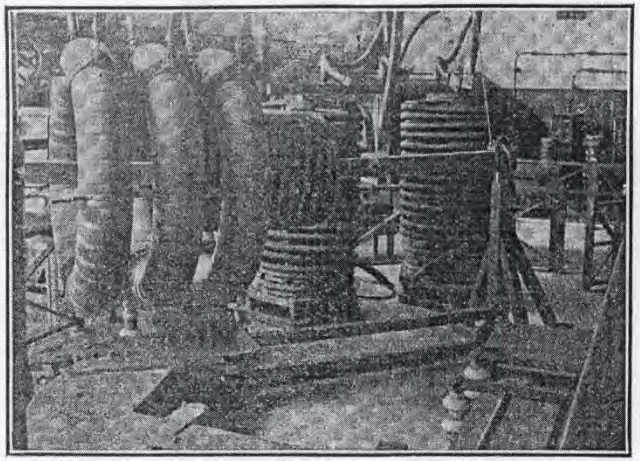
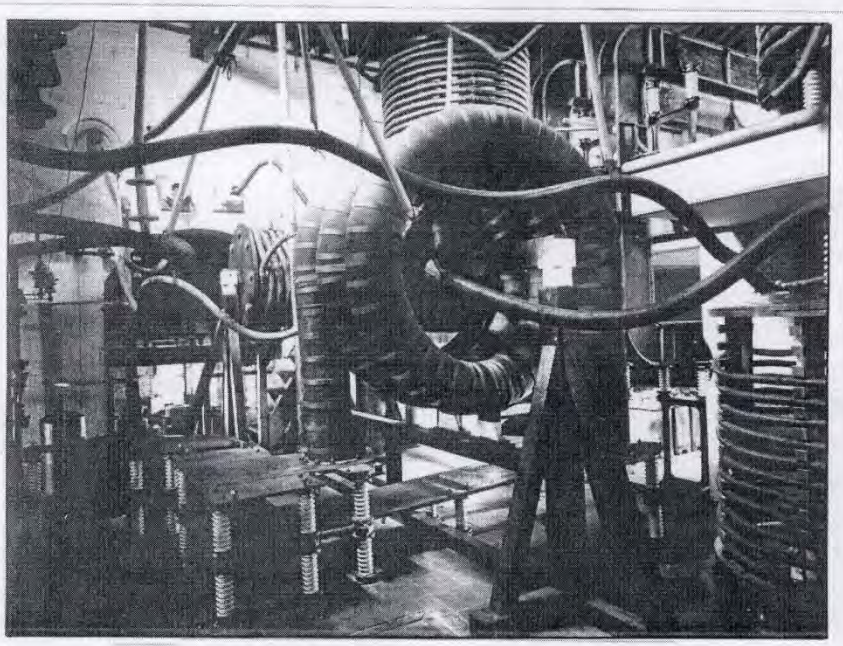


Fig. 318—The 300 Kilowatt Oscillation Transformer Installed at the Marconi High Power Station at Kahuku, Hawaiian Islands.

1-28 300KW Oscillation Transformer at Kahuku (example)

EQUIVALENT TO BOLINAS SITE

Big Electrical Equipment



1-34 Oscillation Transformer

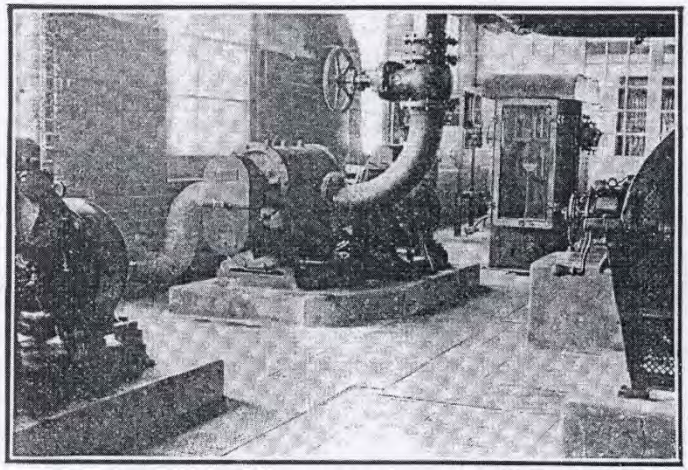
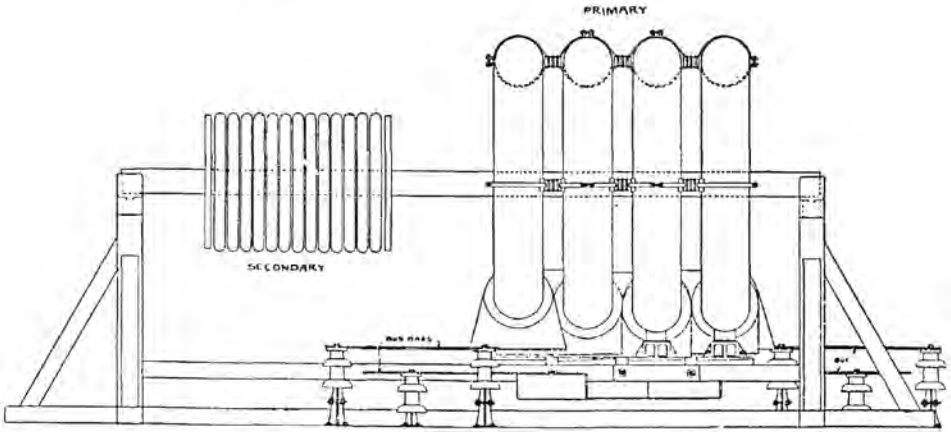


Fig. 304—Motor Blowers at Carnarvon Station.

1-35 Spark Gap Air Blast

Oscillation Transformer



1-29 Side View of 300KW Oscillation Transformer

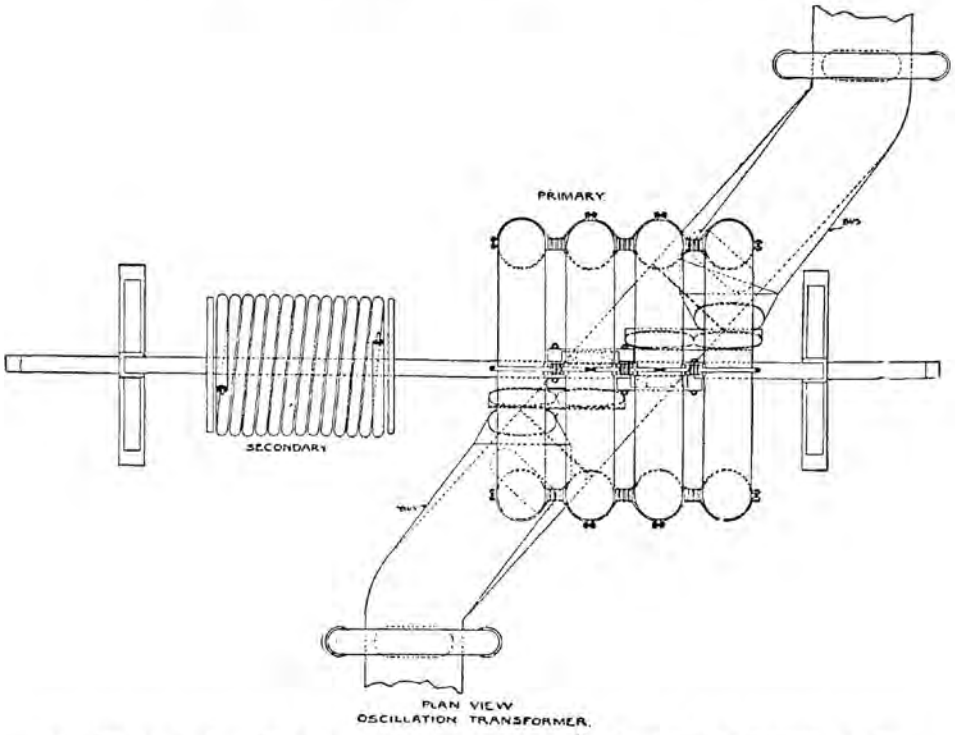


Fig. 317—Plan View 300 Kilowatt Oscillation Transformer Showing High Tension Bus-Bar.

1-30 Plan View of 300KW Oscillation Transformer

Oscillation Tranformers