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Memo # 110
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Memorandum on Proposed Locations for a Loran Station on Nantucket Island

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Observations on the radio frequency fields received from the Loran stations at Fenwick, Baccaro and Deming were made on October 19 and 20, 1942, on Nantucket Island. The pulse signals were received on a vertical antenna 10 meters high, and were compared with the 400 cycle modulated output of a signal generator. It is believed that the voltages measured at the receiver input are accurate within $\pm 20\%$.

From the south-easternmost part of Nantucket (near the village of 'Sconset) Baccaro and Deming bear approximately 55° true, and Fenwick bears approximately 235° . The three stations are nearly on a great circle which is tangent to Nantucket Island at a point which is in latitude $41^\circ 15' 00''$ N. and longitude $69^\circ 58' 15''$ W.

When received within a hundred yards of the eastern shore at 'Sconset, the signal from Baccaro is about 1300 microvolts (total receiver input) and that from Deming is about 150 microvolts. At a corresponding point on the south side of the island, about three miles west-southwest of 'Sconset, the input from Fenwick is about 700 microvolts. (For comparison the signals at the Montauk station are: Fenwick 1100 microvolts; Baccaro 40 microvolts; and the Deming signal is too weak to measure.)

At 'Sconset the signal from Fenwick is about 300 microvolts, while at the point mentioned on the south side of the Island the Baccaro signal is 280 microvolts and the Deming signal only 11 microvolts.

The tangent point, mentioned in the first paragraph, lies between these two locations. It was impossible to approach within about 1000 feet of the shore at this point. At the nearest accessible position the fields were:

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Fenwick - 400 microvolts; Baccaro - 850 microvolts; Deming - 100 microvolts.
All fields would have been somewhat greater at the beach.

At Tom Never's Head, a fifty foot bluff about a mile west-southwest of the tangent point, the fields were:

Fenwick - 450 microvolts; Baccaro - 620 microvolts; Deming - 58 microvolts.

Since it is believed that the power radiated from Baccaro is greater than that from Fenwick, it seems that the true "balance point" for these two signals is near or between the tangent point and Tom Never's Head. It will be noted that the Fenwick signal at these points is less than half that received at Montauk, but the Baccaro signal is 15 or 20 times as great as the signal at the Montauk station, and is, in fact, three or four times as great as the signal received at any point of Long Island.

It was roughly determined that satisfactory synchronization between two Loran stations can be expected (with the Nantucket noise level) if the distant station provides a signal of 40 microvolts from the reference antenna in the daytime and 400 microvolts at night.

It appears, therefore, that either the tangent point or Tom Never's Head would be a satisfactory site for a Loran station from the standpoint of signal strength.

The tangent point may be approached from the village of Sconsset via about 0.5 mile of very poor dirt road. The site itself is then about 1200 feet from the road across a sandy "beach" about 8 to 10 feet above the water line. There is evidence that the sea breaks over this "beach" from time to time. It is not recommended that the station buildings be erected far from the road, so that the antenna should be placed near the shore and fed by about a thousand feet of transmission line. Erection of a permanent antenna and ground structure may be expected to be difficult. Electric power and telephone lines are found at the

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beginning of the dirt road, and therefore, must be extended about half a mile. Temporary accommodations can be found within ten minutes' walk of the site. The region including the site is believed to be public domain.

At Tom Never's Head the approach is made via 1.5 miles of fair dirt road, from the tar road connecting Nantucket and 'Sconset. Construction of a station on the Head would be easy, but power and telephone lines would have to be brought along the shore road from 'Sconset, a distance of about 1.7 miles. A building about half a mile west of the Head might be used for temporary quarters, but is not large enough to be of interest for permanent use. The ownership of the property on the Head is not known.

It was noticed that an extensive job of grading and tarring the Nantucket airport is in progress under Government auspices. It is believed that the equipment in use on this project may be made available for improvement of either road.

The choice between the two suggested sites is referred to the Loran Coordination Committee.

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MLM

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c/c to

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- LMH ✓
- DGF
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