BIKINI, MARSHALL ISLANDS, GEODETIC REPORT

CHARTS OF BIKINI

1. Jap No. 458, 1:50,000, 1926, origin Jap astro ENIIRIKKU ISLAND being 11°29'49" NORTH, 165°20'22" EAST.

2. H.O. No. 6032, 1:50,000, 1944, copy of Jap 458. This chart was prepared at H.O. by photo transfer of Jap #458 to blue line duco plate and inked by draftsmen to H.O. standards for symbols, border, etc. Everything was accepted as given on Jap original and no additions or corrections from air photographs or other charts was made. Jap origin (1 above) was retained and appears in the title of 6032. Later editions, March 1946, Jan. 1947 and June 1948, were published with minor changes only.

3. H.O. field charts 55, 55A, 56 and 57 were published April 1946 aboard USS BOWDITCH and USS SUMNER while in the survey area. Details are tabulated below.

TITLE				NO, SCALE	ORIGIN			
Bikini Atoll. Eastern Part				55 1/50000	BN.A Scaled from H.O. 6032			
"	"	"	"	55A1/50000	BN.A Scaled from H.O. 6032			
"	"	N.E. Part		56 1/30000	BN.C	"	"	"
"	"	S.E. Part		57 1/30000	BN.A	"	"	"

4. H.O. Misc. 11860, 1946 approx. 1:25,000/. Origin at BN.A 11°30'42".6 NORTH, 165°33'32".6 EAST which is the same as H.O. field charts 55, 55A and 57 listed above.

5. It is evident that the datum of all charting in the area is based on a scaled value from Jap chart #458 and which is used also for origin of surveys in the area.

SURVEY OF BIKINI

1. Japanese hydrographic and geodetic survey, 1919. A trig list of 15 stations is available but it is not known whether other Jap control exists. Jap chart #458, 1926, was no doubt constructed from results of this survey. Jap #458 shows triangulation station symbols,"△", and a check on their plotted position shows agreement of the chart with their 1919 survey. Japanese astronomical station, ENIIRIKKU ISLAND , 1919, is the origin of the Japanese survey and appears in the title of Jap 458 and H.O. 6032.

2. U.S.H.C. survey of BIKINI was carried out by the USS SUMNER and USS BOWDITCH. Their dates were

	Arrived	Departed
USS SUMNER	Jan. 1946	March 1946
USS BOWDITCH	Feb. 1946	Oct. 1946

The SUMNER measured an inver base NORTH-SOUTH and observed a stellar Azimuth of line BIK to MON. Astronomic position was not observed. The origin

of the survey was BIK as plotted by topographic features on H.O. 6032 and coordinates then scaled and used for both SUMNER and BOWDITCH work. This unusual procedure was necessary because no Jap stations were recoverable and the trig stations shown on the chart were therefore of no value. The senior survey officer on the BOWDITCH stated that construction work could have destroyed Jap stations. None were found.

The BOWDITCH measured an invar base, BASE-LINE, and observed a solar azimuth of line KANS to GELL. Astronomic position was not observed. Due to a question of accuracy of triangulated distances brought up by photographers, a remeasure of the SUMNER base line was decided upon. NORTH-SOUTH (SUMNER) could not be remeasured due to higher tides and the BOWDITCH then established a new base, BASE-LINE, and the necessary triangulation to tie it to the existing net. The length check between the two bases disclosed no discrepancy and a further check placed the error on the mis-measurement of focal length by the photographers. An extension of the control from WIIRIKKU ISLAND northwest to BOKORORVIRU ISLAND was carried out by the BOWDITCH using ship-shore method.

COMPUTATION AND ADJUSTMENT

1. Examination of the triangulation schemes shows three stations; AIR, SOUTH and FNYU, are common to both SUMNER and BOWDITCH nets. The computation and least squares adjustment was made in two parts having a junction with each other by the triangle formed by these three stations. The first part (SUMNER) was adjusted for angle and side conditions and computed using the SUMNER base and stellar azimuth. This fixed the length of sides of the junction triangle for subsequent adjustment and computation of the BOWDITCH net. The second part (BOWDITCH) was likewise adjusted for angle and side conditions, and also length conditions arising from holding both, the fixed junction sides and the BOWDITCH base. The length closure between fixed AIR-SOUTH and BASE-LINE was 1 part in 24,399. Between AIR-FNYU and BASE-Line it was 1 part in 36,805. After angle and side conditions were satisfied the closures were 1 in 21,216 and 1 in 56,853 respectively. No adjustment was made between the SUMNER stellar azimuth BIK to MON (118°43'55".5) and BOWDITCH solar azimuth KANS to GELL (118°34'20".5). SUMNER stellar azimuth was used for BOWDITCH geodetic computations. The solar azimuth was observed for comparison purposes as shown following:

KANS-GELL, COMPUTED GEODETIC AZIMUTH 118°3-' '' '
KANS-GELL, OBSERVED SOLAR AZIMUTH   118°34'20".5
                      DIFFERENCE
STATISTICS SHOWING ACCURACY OF TRIANGULATION

	SUMNER	BOWDITCH
TOTAL NUMBER OF TRIANGLES	8	18
TRIANGLES HAVING PLUS CLOSURE	3	11
TRIANGLES HAVING MINUS CLOSURE	3	7
TRIANGLES CONCLUDED	2	0
AVERAGE TRIANGLE CLOSURE WITHOUT REGARD	+3".1	+4".6
MAXIMUM CLOSURE OF A TRIANGLE	+7".2	+9".9
MEAN ERROR OF AN ANGLE	+2".3	+3".1
PROBABLE ERROR OF AN OBSERVED DIRECTION	+1".7	+1".4