

4136

4136

Form 504

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

State: *California*

11-5613

DESCRIPTIVE REPORT.

*Hyd* Sheet No. *4136*

LOCALITY:

*Humboldt Bay &*  
*Mossal Creek -*  
*Lydonia*

1919-20

CHIEF OF PARTY:

*Pagenhart, E. H.*

Signals---Humbolt Bay to Ussal Creek, California.

DESCRIPTION FROM SEAWARD OF THE SIGNALS USED ON THE  
HYDROGRAPHIC WORK IN 1919 - 1920. *Hyd sheet 4136*

Steamer LYBONIA

RAG - The highest point of a rounded, tree covered hill, rising from flat country south-east of Table Bluff, the first one and nearest to coast north from the Mendocino and Bear Ridge range. Located by Lukens - 1919.

BUNCH - A conspicuous bunch of trees on a low ridge south-east of Table Bluff. It is about 100 yards south-east from the apparent highest point of this tree covered ridge. Located by Lukens - 1919.

⊙ KNOB (Hydrographic Signal) - A dark colored, rounded knob 1/2 mile back from the coast and about 1 1/2 miles north from False Cape Rock. It has been burned over and has several snags on the northern side. There is a higher, larger and ragged knob 1/2 mile to the southward of knob. It is the second knob from the north (first prominent one); a little to the south is another pair of knobs. When False Cape Rock and the northern end of high, yellow bank are on range bearing about north-east KNOB is just shut out by this bank; is the first hill to show to the north of this range.

BEAR RIDGE - The highest point of the most prominent and highest hill northward from the Mendocino light house. It is grass covered and the slopes are easy to the highest point. There is timber on a prominent ridge quite well up its northern side; some timber on the lower slopes on the west; no timber on the south. From abreast False Cape Rock it is the highest point of the sky line.

MENDOCINO - The highest point of the ridge on which the light house is located and about 1/2 mile back from the light. From the southward the ridge is broadside and is slightly rounding, with an appreciable rise at the highest point. When the light house and Sugarloaf are on range, distant four miles, a station MENDOCINO appears as a conspicuous knob on the sky line with a sheer drop on the north side. A line from triangulation station MENDOCINO to the light house cuts just ~~####~~ inside the south edge of Sugarloaf Rock.

**Signals--Humbolt Bay to Ussal Creek, California.(cont.)**

① TIP - Is a small, prominent tip on the western slope of Mt. Banks. When viewed from off Punta Gorda it is conspicuous, not because of its elevation, for it is little higher than triangulation station MENDOCINO, but because of its shape. It is difficult to identify when not on the sky line; ~~###~~ when viewed from 1 mile south of the lightship it has a green background.

① HOLLOW - A low, rounded knob in the saddle between East Twins on the east and Mt. Banks on the west. Can easily be identified from off Punta Gorda.

JOEL FLAT - A prominent, sharp, bare peak across the valley to the north-west from TAYLOR. There is a slightly lower grassy peak about 1/2 mile south-west from JOEL. It is the highest and sharpest peak in the range and has a knob on the north slope near the top; it is timbered on the north-west side nearly to the top.

TAYLOR PEAK - An isolated, pyramidal peak with top rounded off and grassy; south side grassy well down; north-west side timbered nearly to the top where the timber ends in a well defined line with the grass above. There is a valley on the northwest and also on the southside. There is a low, grassy ridge to the eastward. TAYLOR PEAK is about 10 miles inland but base is visible from the south-westward.

MOORE HILL - The highest, well defined point of a prominent, grassy hill which rises abruptly from the coast in a cliff and then slopes evenly to the top. The hill is just north of the Mattole River. From the west and north-west the top appears as a prominent, small knob.

MATTOLE MT. - The highest of two timbered peaks. As viewed from the west and north-west the profile shows full, rounding top, rising from the south with the highest point on the northern end, dropping off quite abruptly on the north. The lower peak is CHAPARRAL MT. and is located about 1 mile to the westward of MATTOLE MT. All cuts taken on MATTOLE MT. indicated that the true position is about 150 meters to the north of that given in triangulation.

NORTH SLIDE - The north-westernmost of the bare, prominent peaks of the King Peak range. The ridge to the westward assumes a more even slope and is grass covered.

**Signals--Innabok Bay to Uman Creek, California; (cont.)**

**HADLEY PEAK** - A well defined hill with quite a definite top, rising up from the coast. It has a large scar (landslide) on the seaward face. The next spur running to the coast to the westward of HADLEY is grass covered. Immediately to the eastward of HADLEY is the creek valley separating it from SHUBRICK, which has the step near its base.

**SHUBRICK PEAK** - The definite tip of a timbered peak close to the coast; it is the first peak seen after clearing Punta Gorda when coming from the north. It is identified when abreast of the mountain by a well defined bench or step on its western slope. When seen from Gorda the seaward slope has a secondary tip  $3/4$  of the way up.

**ISLAND** - The prominent, rounded, brush covered and north-westernmost of several peaks (others are sharper) east from CALUNA CLIFF. These peaks, when viewed from seaward, are distinguished as the most prominent elevation between CHEMISE MT. and KINGPEAK range. When off Punta Gorda, or, when only one peak is visible, it is ISLAND.

**CALUNA CLIFF** - It is the highest point on the southern side of the sheer cliff, or slide, about 2 miles north of Pt. Delgada. The station is on the edge of the cliff. There is a higher point on the north-east side of the cliff.

**CHEMISE MT.** - A flat topped, prominent, brush covered ridge 3 miles south-east from Pt. Delgada; two small tips about 400 meters apart identify it from the seaward. Northern and slightly higher one is the signal. The station is about 5 meters west from steep east face and is about 2 feet lower. Station mark is covered by a pile of rocks 2 feet high. North, south and west, reference marks,  $1/4$  inch holes in flat rocks, are in place equidistant from the station. Reference mark:- a yellow, rounded tip 100 meters ~~#####~~ southerly, 25 meters lower than the station.

**BEAR HARBOR** - The southern and highest point of a low, bare, brown hill rising abruptly from the coast. As seen from Shelter Cove it appears as a sharp, prominent, rocky knob with land background.

## Signals---Humbolt Bay to Ussal Creek, California.(cont.)

TIMBER RIDGE - The first ridge running to the coast north from Ussal Creek; this sharp, timbered ridge ends at the coast in a steep cliff. The tip of the cliff was whitewashed and is the station. A rectangular, cleared field ~~is~~ on the seaward slope of a hill 1/2 mile inland lies between the station and the creek.

CHRIS ROCK - This is an arched rock.

FALSE CAPE ROCK - Highest point of the rock.

SUGAR LOAF - Highest point of sugar loaf rock off Mendocino Light House.

KING PEAK - The Southernmost and highest peak of the range.

The positions of all stations marked  $\odot$  are given below, as they were located by cuts from the ship.

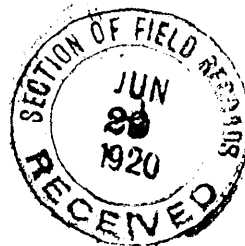
The positions of all others are found in appendicts 1 and 2, Triangulation in California, 1904 and 1910 respectively.

	Lat.	Long.
Rag	40° 40' 936 m	124° 10' 158.6 m
Bunch	40° 42' 1016.1 m	124° 11' 710.5 m
Tip	40° 25' 206.4 m	124° 20' 172.2 m
Hollow	40° 24' 1725.1 m	124° 20' 172.2 m
Island	40° 04' 314 m	124° 02' 538.6 m

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
WASHINGTON

FIELD RECORDS (C)

June 23, 1920.



Division of Hydrography and Topography:

Division of Charts:

\*Tidal reductions are approved in  
2 volumes of sounding records for

HYDROGRAPHIC SHEET 4136

Vicinity of Cape Mendocino, Coast of California  
E. H. Pagenhart in 1919-1920.

Plane of reference is  
Mean lower low water, reading

2.0 ft. on tide staff at N. Jetty Ldg., Humboldt Bay.  
5.6 ft. on tide staff at Presidio Wharf.

\*Allowance made for difference in tide at  
place of soundings.

Condition of records - unsatisfactory for the  
following reasons:

- (a) It is not clear as to whether soundings have  
been recorded in fathoms or in feet.
- (b) In many cases the time of soundings as to  
whether A.M. or P.M. is not entered in the proper  
column at the beginning of the day's work.
- (c) Soundings which have been corrected and  
checked in the field are found to be incorrect.

Chief, Section of Tides  
and Currents.

Forwarded:

Chief, Div. of Hyd'y and Top'y

# Steamer LYDONIA

4136

## Statistics Sheet No. 1.

Coast of California

vic. Cape Mendocino

Date	Letter	Vol	Positions	Soundings	Mi. (stat.)	Vessel
Nov 28 1919	A	1	14	14	27 <sup>3</sup> / <sub>4</sub>	Ship
Dec 1	B	1	12	11	30 <sup>1</sup> / <sub>2</sub>	"
Dec 3	C	1	29	30	40	"
Dec 4	D	1	18	18	33	"
Dec 13	E	1	14	14	23	"
Dec 14	F	1	14	17	19 <sup>1</sup> / <sub>2</sub>	"
Dec 15	G	1	20	20	30	"
Dec 16	H	1	25	25	59	"
Dec 17	I	1	48	69	58	"
Jan 12 1920	J	1	9	10	9	"
Jan 13	K	1	58	79	45	"
Jan 14	L	2	48	57	32 <sup>1</sup> / <sub>2</sub>	"
Jan 15	M	2	21	21	20 <sup>1</sup> / <sub>2</sub>	"
Jan 16	N	2	12	17	10 <sup>1</sup> / <sub>2</sub>	"
Jan 17	P	2	20	21	18	"
Jan 29	Q	2	28	28	17	"
Jan 30	R	2	4	6	25 <sup>3</sup> / <sub>4</sub>	"
Jan 31	S	2	18	29	90	"
Feb 1	T	2	17	17	82	"
Feb 2	U	2	56	61	61	"
Feb 3	V	2	52	64	36	"
			537	628	768	Total

Note: All soundings in records are in fathoms.

The auto-tide gauge to be used was located in Humboldt <sup>Bay</sup> records for which have been submitted to the office by Str. Wenonah. For that reason the soundings (for this sheet) have not been reduced for tide

A second auto tide gauge was installed at Shelter Cove, the time this was in commission (1st H.W. Dec 14 to 2nd H.W. Dec 20) is too short to be used for reduction of sdgs. (can be used as simultaneous obs. record)

C O P Y

June 23, 1920.

Division of Hydrography and Topography:

Division of Charts:

\*Tidal reductions are approved in  
2 volumes of sounding records for

HYDROGRAPHIC SHEET 4136

Locality: Vicinity of Cape Mendocino, Coast of California

Chief of Party: E. H. Pagenhart in 1919-1920.

Plane of reference is mean lower low water, reading

2.0 ft. on tide staff at N. Jetty Ldg., Humboldt Bay.  
5.6 " " " " " Presidio Wharf

\*Allowance made for difference in tide at place of soundings.

Condition of records: Unsatisfactory for the following reasons:\*\*

(Signed) G. T. Rude

Chief, Section of Tides and Currents.

\*\* (a) It is not clear as to whether soundings have been recorded  
in fathoms or in feet.

(b) In many cases the time of soundings as to whether A.M. or  
P.M. is not entered in the proper column at the beginning of the  
day's work.

(c) Soundings which have been corrected and checked in the  
field are found to be incorrect.

Forwarded:

(Signed) W. E. Parker

Chief, Div. of Hyd'y and Top'y.



C O P Y

July 15, 1920.

To: Chief, Division of Hydrography and Topography.  
From: Chief, Section of Tides and Currents.  
Subject: Memorandum Concerning Hydrographic Sheet No. 4136.

Referring to Hydrographic Sheet No. 4136, vicinity of Cape Mendocino, Coast of California, E.H.Pagenhart in 1919 to 1920, condition of records unsatisfactory for the following reasons:

(a) It is not made clear by the field party in all parts of the 2 volumes as to whether soundings have been recorded in fathoms or in feet. In some cases it is indicated that soundings are in feet in vicinities where it is known that the soundings should have been marked fathoms and feet instead of feet and tenths.

(b) In many cases the times of soundings as to whether A.M. or P.M. is not entered in the proper column. This is a serious omission on this class of hydrography, particularly at the beginning of a day's work.

(c) About five per cent of the soundings which had been corrected and checked in the field for a number of revolutions of drum in order to obtain correct soundings were found to be incorrect.

(Signed) G. T. Rude

Chief, Section of Tides and Currents.

Return to H. S. E.  
for filing under

1735  
1736

7-HOG

August 5, 1920.

To: Commanding Officer,  
Steamer LYDCNIA,  
202 Burke Building,  
Seattle, Washington.

From: The Director, Coast and Geodetic Survey.

Subject: Survey work in Cape Mendocino.

From an examination of your records pertaining to the survey work in the vicinity of Cape Mendocino during the winter of 1919-20, the following errors and omissions have been found:

(a) It is not made clear by the field party in all parts of the 2 volumes as to whether soundings have been recorded in fathoms or in feet. In some cases it is indicated that soundings are in feet in vicinities where it is known that the soundings should have been marked fathoms and feet instead of feet and tenths.

(b) In many cases the times of soundings as to whether A.M. or P.M. is not entered in the proper column. This is a serious omission on this class of hydrography, particularly at the beginning of a day's work.

(c) About five per cent of the soundings which has been corrected and checked in the field for a number of revolutions of drum in order to obtain correct soundings were found to be incorrect.

2. You will please call this matter to the attention of the officers now attached to the LYDCNIA and give such instructions for the work and supervision of the records as may be necessary in order to avoid similar errors in the future.

R. L. PARIS, ✓  
Acting Director.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

Washington, ....., 192

Respectfully referred to

100

I

- Correction should be for  
 $C_1$  = Total turns in use of 4 edg.  
 $C_2$  = turns left on drum after edg.
- Indicator edgs should make no difference in the  $C_1$  &  $C_2$  values, but should error only to give the number of turns paid out.
- ∴ Why correct for initial & final indicator edg, in itself?  
 Unless initial indicator reading serves to give total turns on drum at starting:  
 And final indicator edg serves to give turns left on drum after edg.
- note that "i.e. note" app. #1, direction chart, holds true for all cases.

B.H.C.

T Turns (lost) on deck

C = Cor. to reduce T

t = whole # turns in use on work reel

c = corresponding cor on curve

t' = # turns left on reel when sinker takes bot.

c' = corresponding cor on curve

$$t' = t - T$$

$$C = c - c'$$

\*  $T + C = \# \text{ fathoms out.}$

$c = k$  until wire lost @ added  
then new  $c$  for new  $t$

$$t = 2260$$

$$\text{or } c = 75$$

$$T = 1420$$

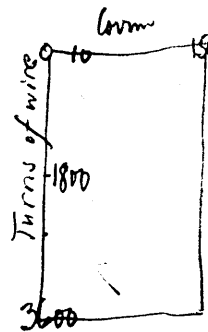
$$\checkmark t' = 840$$

$$\text{or } c' = 12$$

$$C = 63$$

$$T = 1420$$

$$\text{depth } S_g = 1483$$



2655  
3200  
 5855

2678  
2700  
 5378

2780  
2900  
 5680

2596  
127

~~4600~~  
~~3200 turns in drum~~

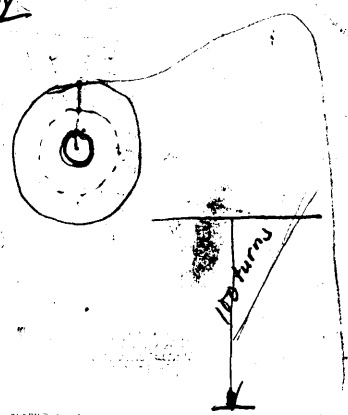
Combined rdg clarity = 00  
 Lead bottom = 2596

167    125  
40    25  
 127    99  
2596  
 2723 ✓

125 ✓  
23  
 102

167  
51  
 116

127



90 eq. turns  
 45 double.

On 3900 Inlet Rdg.

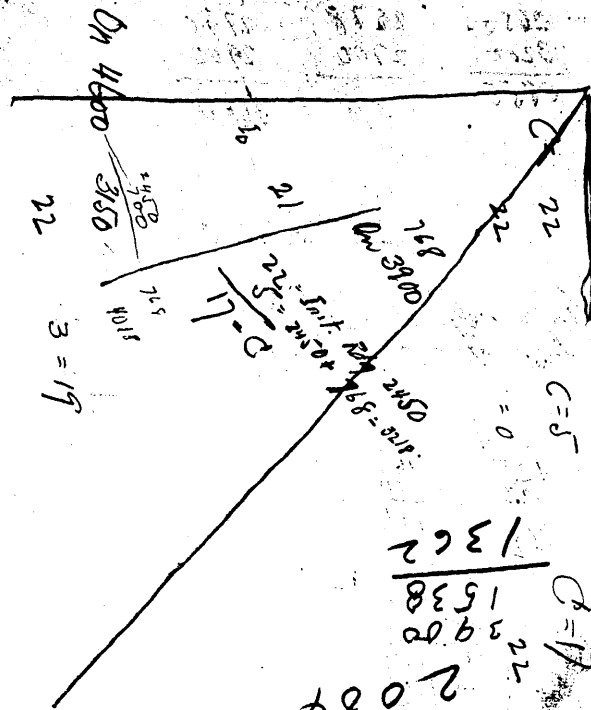
3450

Total turns out = Inlet + Turns

C = 5  
= 0

D = 17  
3900  
1538

2084  
2596  
4600



On 4600  
3450  
1150  
22  
3 = 19

Direction Sheet - Method used by Lydonia \*

1. Use "4600 Turns on drum-curve" as drawn in black ink.

Shows 0 correction with no turns left on drum	} i.e. greatest corr. per turn of drum when greatest amt. of wire (largest circum. is on drum).
" 126 " " 3900 " " " "	
" 167 " " 4600 " " " "	

2. Take Correction for initial rdg. of counter.

e.g. (a) 4600 turns on drum before sdg. & initial rdg. of counter = 0

Take from curve corr'n (for  $4600 - 0 = 4600$ ) Corr'n = 167.

e.g. (b) 3900 turns on drum before sdg. & initial rdg. of counter = 2450

Take from curve corr'n (for  $3900 - 2450 = 1450$ ) Corr'n = 21

3. Take Corr'n for final rdg. of counter

e.g. Data as above (2a): & turns pd. out = 2596 ∴ final counter rdg = 2596

Take from curve corr'n (for  $4600 - 2596 = 2004$ ) Corr'n = 40.

e.g. Data as above (2b): & turns pd. out = 768 ∴ final counter rdg =  $2450 + 768 = 3218$

Take from curve corr'n (for  $3900 - 3218 = 682$ ) Corr'n = 4

4. Combine Corr'ns. for init'l. & final rdgs. & apply (add) Total Corr'n. to turns pd. out. <sup>[to obtain corr'd sdg]</sup>

e.g. Data per 2a & in 3 (1<sup>st</sup> ex.)  $167 - 40 = 127 = \text{Total Corr'n}$

e.g. " " 2b & in 3 (2<sup>nd</sup> ex.)  $21 - 4 = 17 = \text{" "}$

5. Curve noted in 1 obtained by plottg data for "4600 turns of wire on drum" (Subtracting "Turns left on drum" from 4600 to obtain vertical values, & using given "Corr." as hor. vals.

See "i.e. note" opp. #1 above.

\* Method compiled by BHO. - no data in record book to explain their system, but the above directions evidently give the method used.

BHO.

CHECKING OF LYDONIA SOUNDINGS.  
RESULTS OF INVESTIGATION, AND RECOMMENDATION.

1. Work done in September 1919. Atlantic Ocean.

2. Data turned in to Office.

(a) Vol. 78004 has the heading "TURNS" under "Original Soundings". Evidently this means turns payed out because the values are added the corrections for reducing the soundings.

(b) Under "Reduced Soundings," in the column formerly headed "fath" ("fath" was crossed out) are given various values of "turns on drum". These are evidently the number of turns on the drum before starting any particular sounding - at least such is the deduction made in endeavouring to check the corrections. It may be that "turns on drum" means turns at some other period during any one sounding operation. The term is somewhat ambiguous.

(c) Trouble was encountered in checking "Reducers". Two tables are given in the back of the record: one for "4600 & one for 3900 turns <sup>of wire</sup> on the drum". Also under these tables the "Turns out" has been corrected to read "Turns left on reel." As noted on the direction sheet, it would appear that when the greatest amount of wire is on the drum (i.e. drum circumference is largest) there should be a greater correction per turn than when there is very little wire on the drum.

3 — A correction curve was constructed by the checker from the 4600 table & proper notes made on the direction sheet, concerning construction and use.

4. Tabulations have been made showing how it is believed the Lydonia reduced the soundings; & also giving values of reducers & reduced sds which are believed to be correct. These differ from the Lydonia values submitted.



5. It is known that to properly allow for varying circumferences due to varying amounts of wire on the drum, two corrections have to be made: one for wire on the drum before sounding, & the other for wire on the drum after reaching bottom.

(a) If the "amount of wire on drum before edg." is known the correction should be made for that amount. Then, after the lead has reached bottom the amount of wire left on the drum is known from counter readings. That is, turns of wire on the drum before edg. minus turns paid out gives turns left on drum. From the method deduced & shown on the direction sheet, it appears that the Lydonia corrections were incorrectly influenced by counter <sup>or indicator</sup> readings. As the indicator may be set to any desired initial reading, regardless of the turns on the drum, this method does not be correct. The indicator serves to give the number of turns payed out, but to correct for the counter reading, in itself, is not a proper procedure.

7. Recommendations. It is possible that this matter may be cleared up by correspondence, and it is suggested that an explanation be obtained from the field party giving in detail methods & results. (check checkers tabulation)

When convenient, one of the senior officers engaged on the work should be given the opportunity of checking the work at this Office.

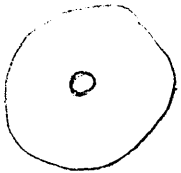
6. A study of the log book covering the period of sounding was made, but little assistance was given in the matter of wire lost @ other times

- which might afford a possible explanation of the  
method used.

L.H.O.

$$\begin{array}{l}
 \textcircled{1} \text{ Correction to } 2450 \text{ --- } (3900 - 2450 = 1450) \text{ --- } \text{Cor} = 21 \\
 \text{3211} \text{ " } 2450 + 768 \text{ --- } (3900 - 3218 = 682) \text{ --- } \text{"} = 4 \\
 \hline
 17 \text{ Total Cor.}
 \end{array}$$

$$\begin{array}{l}
 \textcircled{2} \text{ Cor. to } 2450 \text{ --- } = 21 \\
 \text{" " } 2450 + 1280 \text{ (3900 - 3730 = 270) --- } = 0 \\
 \hline
 21 \text{ Total Cor.}
 \end{array}$$



$$\begin{array}{l}
 \textcircled{5} \text{ Correction to } 0 = (4600 - 0 = 4600) \text{ --- } \text{Cor} = 167 \\
 \text{" " } 0 + 2596 = (4600 - 2596 = 2004) \text{ --- } \text{"} = 40 \\
 \hline
 127
 \end{array}$$

Drum. Wire in use	Wire out, or Used.	Drum. Wire left on reel	Cor. for wire in use.	Cor. for wire left on reel.
4600	4600	0	+ 167	> 0
	4500	100		> 0
	4400	200		> 0
	4300	300		> 0
	4200	400		1
	4100	500		2
	4000	600		3
	3900	700		5
	3800	800		7
	3700	900		9
	3600	1000		
	3500	1100		
	3400	1200	4	
	3300	1300		
	3200	1400		
	3100	1500		
	3000	1600		
	2900	1700		
	2800	1800		
	2700	1900		
	2600	2000		
	2500	2100		
	2400	2200		
	2300	2300		
	2200	2400		
	2100	2500		
	2000	2600		
	1900	2700		
	1800	2800		
	1700	2900		
	1600	3000		
	1500	3100		
	1400	3200		
	1300	3300		
	1200	3400		
	1100	3500		
	1000	3600		
	900	3700		
	800	3800		
	700	3900		
	600	4000		
	500	4100		
	400	4200		
	300	4300		
	200	4400		
	100	4500		
4600	0	4600	+ 0	167

See Inked Curve

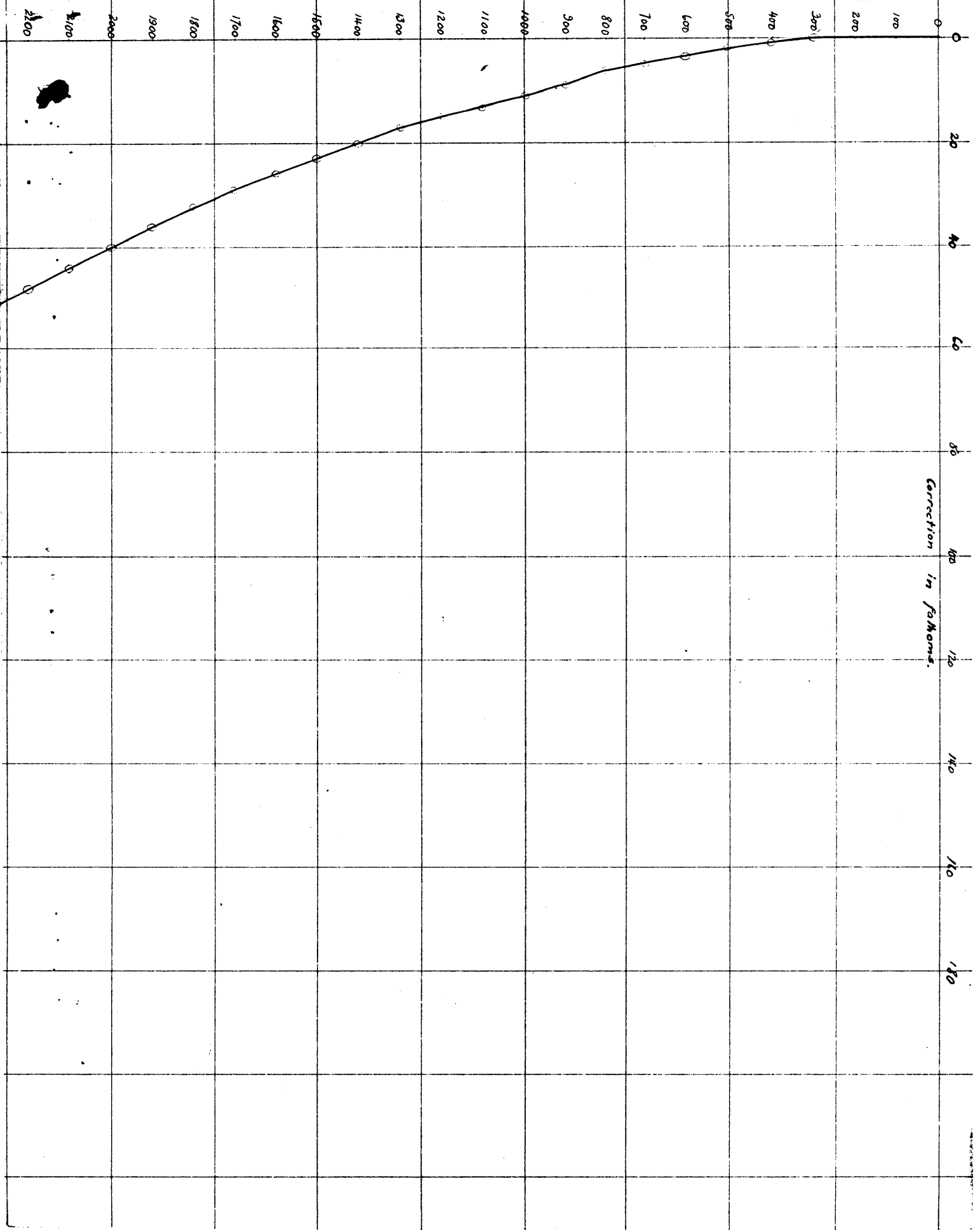
4 Note 5 Direction Sheet.

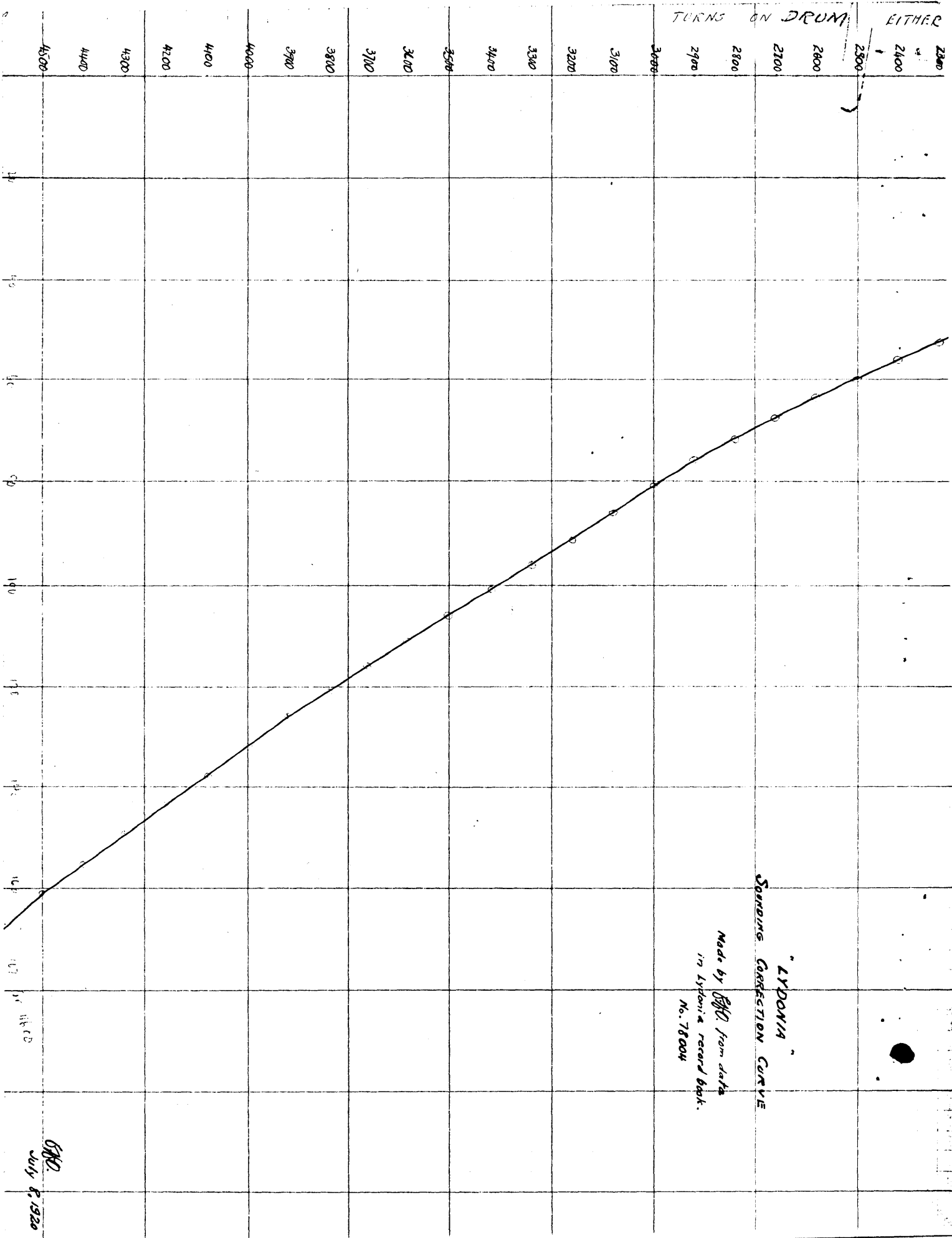
On Reel (4600)	Counter Rdg Starting	Reel Initial on reel	C Init.	Counter Rdg end.	WIRE RUNS Wire Run Out	Reel Counter Rdg end.	Ce	Cr	Rec.
4600	400	4200	143	3800	3400	800	6	137	137
3200	0	3200	91	2655	2655	545	3	88	70
2700	0	2700	68	2678	2678	22	0		70*
2900	0	2900	76	2780	2780	120	0	76	74*
2900	0	2900	76	2680	2680	220	0	76	70
2900	0	2900	76	2770	2770	130	0	76	74
4600	0	4600	167	2596	2596	2004	40	127	127
2600	0	2600	64	2048	2048	552	3	61	69
3900	0	3900	126	2328	2328	1572	26	100	99
3900	0	3900	126	2449	2449	1451	22	104	102
4600	0	4600	167	2380	2380	2220	50	117	115
4600	0	4600	167	2610	2610	1990	40	127	125
2500	0	2500	60	2808	2808	-308			?

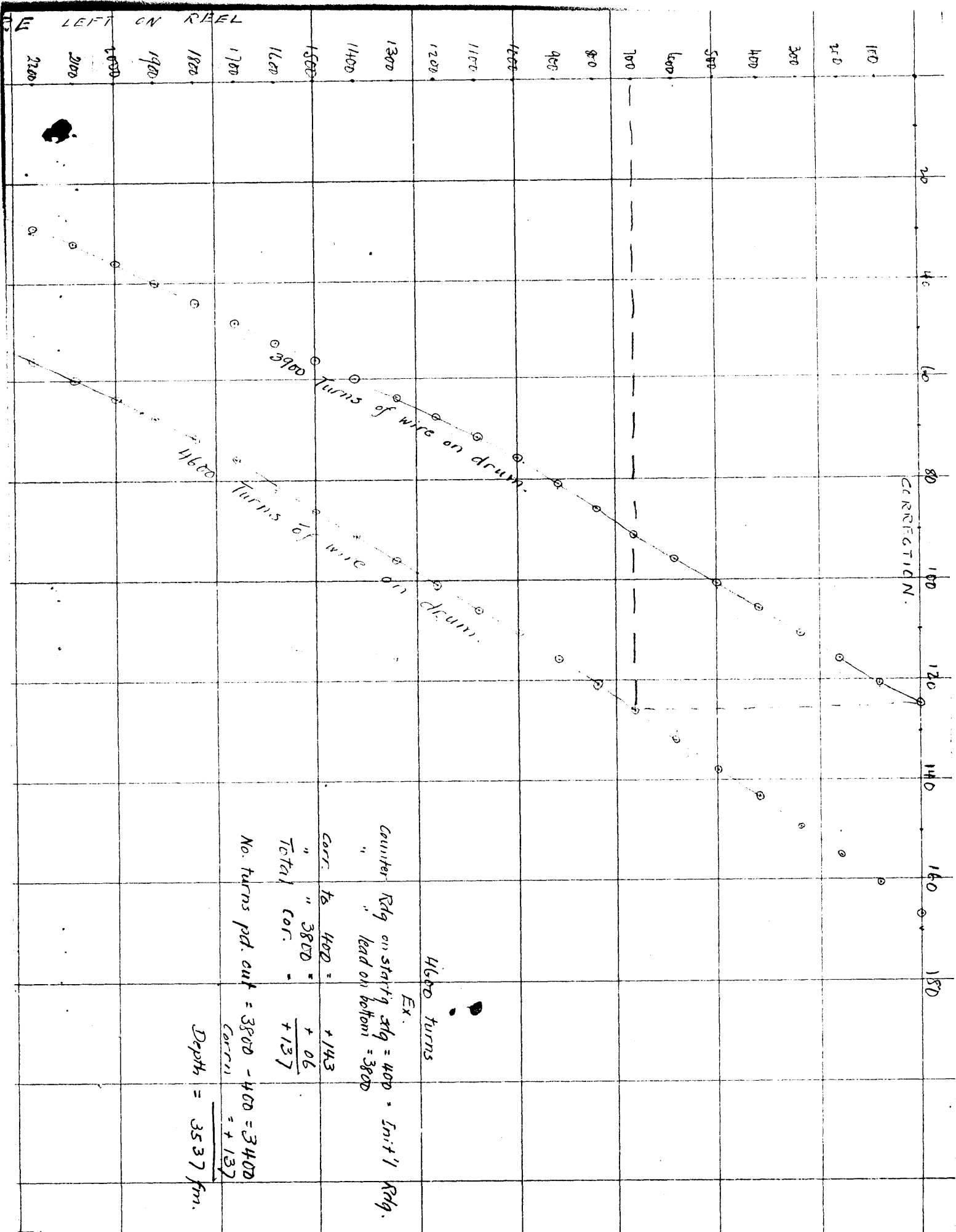
1	3900	2450	3900	126	$\frac{2450 + 768}{3218}$	768	$\frac{2450 + 768}{3132}$	88	34 15
2	3900	2450	3900	126	$\frac{2450 + 1230}{3730}$	1280	$\frac{3900 + 1230}{2620}$	65	61
1	3900	$2450 + 700 = 3150$	$3900 - 3100 = 800$	88	$\frac{3150 + 768}{3918}$	768	$\frac{3900 + 768}{2620}$	7	
2									

See combined days Sept 1-13  
 computed on one sheet.  
 ffd

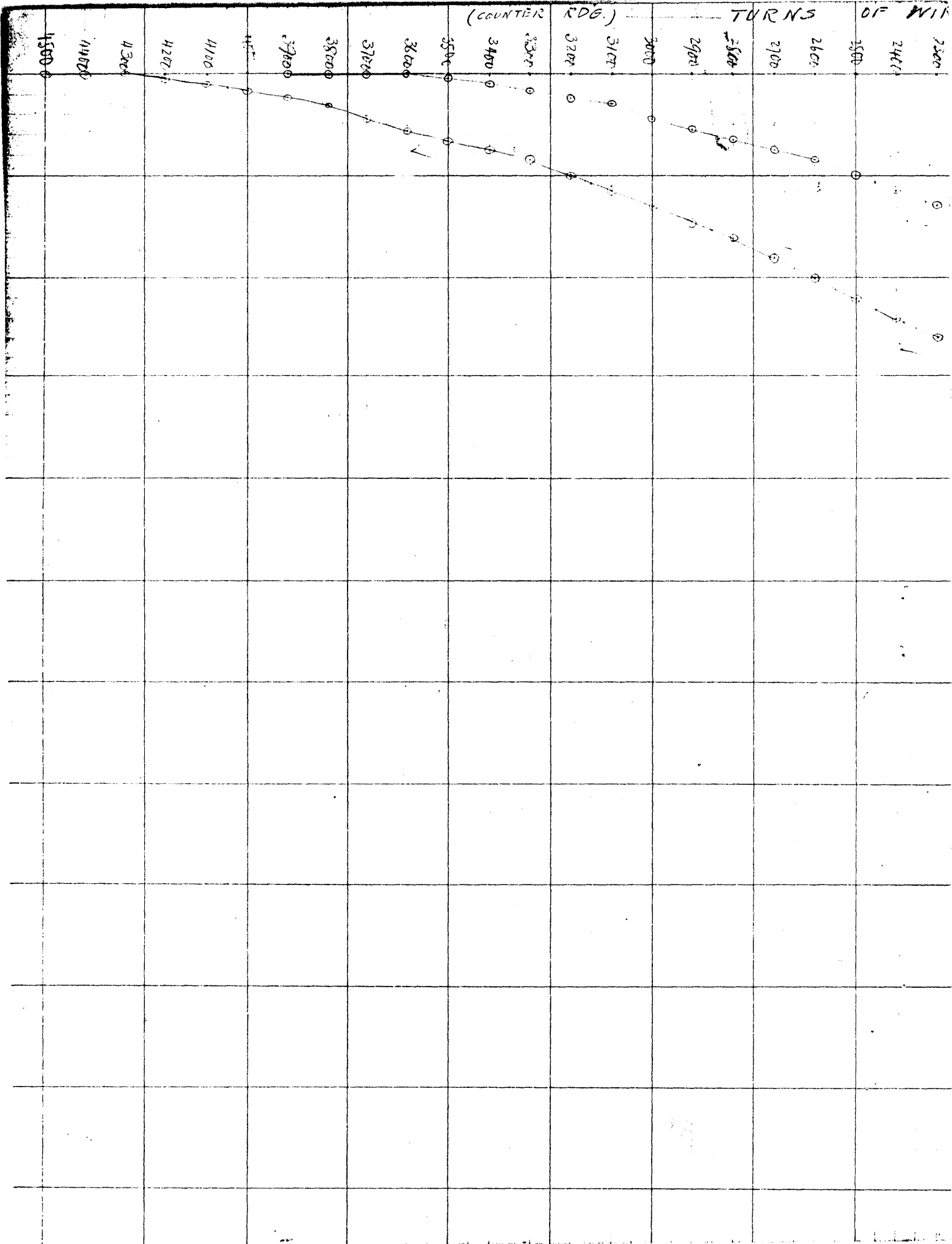
TOTAL TURNS ON DRUM ON STARTING, OR TURNS REMAINING ON DRUM AFTER REACHING BOTTOM.











LOWER HADLEY

1537	1537
(1395)	
142	
<del>510</del>	
663	
(510)	(1173)
1173	

1851 ✓
+ 31
<u>1820</u>
(968)
852 m.
1138 m.
(220)
<u>1358</u>
+ 61
<u>1419 ✓</u>

142 x 6 = 852 =

40° 10'

852 m.

663 x 6 = 3978 =

124° 12'

1138 m.

2840

1138

1395 x 6 = 7402  
8370 = (-) 4' - 968 m.

1358

+ 61

1419 ✓

510 x 6 = 3060 = 2' - 220 m

2840

220

9253.

1537 x 6 = 9222 = + 31

1173 x 6 = 7038 = + 61

7699

852 x 31 = + 3 m.

3978 x 61 = + 35 m.

7038

LOWER HADLEY

40° 10' 855 m.

124 12' 1173 m.

The following position are to be considered approx

(Degree of distortion was such that the <sup>scaled</sup> position should be considered approx only.)

PAN

$1528$   
 $(772)$   
 $756$   
 $253$   
 $(935)$   
 $1188$

$$756 \times 6 = 4536 \quad 3701. = 835 \text{ m.}$$

$$253 \times 6 = 1518 \quad 1420 = 98$$

$$40^\circ 08' - 835 \text{ m.}$$

$$(931) = 1766 + 85 = 1851 \checkmark$$

$$124 06' - 98 \text{ m.}$$

$$(1349) = 1447 - 26 = 1421 \checkmark$$

$$772 \times 6 = 4632 = (-12' - 931 \text{ m.})$$

$$935 \times 6 = 5610 = (-13' - 1349 \text{ m.})$$

$4261$   
 $-$   
 $9$

$$1528 \times 6 = 9168 = +85$$

$$1188 \times 6 = 7128 = -26 \text{ m.}$$

7102

$$\frac{4536}{9168} \times 85 = +42 \text{ m.}$$

$$\frac{1518}{7128} \times 26 = -6 \text{ m.}$$

PAN

$$40^\circ 08' \quad 877 \text{ m.}$$

$$124^\circ 06' \quad 92 \text{ m}$$

BACK

1/20000

$$\begin{array}{r} 623.0 \text{ m.} = \\ 414. \text{ m.} = \end{array} \begin{array}{r} \frac{1}{120000} \\ 3738 \text{ m.} \\ 2484 \text{ m.} \end{array}$$

$$39^\circ 47' - 38. \text{ m.} \quad (1724) = 1766 + 89 = 1855 \quad (-5 \text{ m.})$$

$$123^\circ 36' - 1056 \text{ m.} \quad (271) = 1327 + 101 = 1428$$

$$\begin{array}{r} \cancel{2484} \\ 2484 \\ \cancel{3700} \\ 1428 \\ \hline 1056 \\ \hline 5424 \\ 3700.5 \\ \hline \end{array}$$

check.

$$904.0 \times 6 = 5424 = 2' - 1724 \text{ m. } 1.6$$

$$759 \times 6 = 4554 = 3' - 271 \text{ m}$$

$$1527 \text{ m} \times 6 = \begin{array}{r} 4283 \\ 271 \\ 9251 \\ \hline 9162 \end{array} =$$

$$1173 \times 6 = \begin{array}{r} 7139 \\ 7038 \\ \hline 101 \end{array}$$

$$\% \quad \frac{3738}{9162} \times \overset{84}{(89-5)} = + 34 \text{ m.}$$

$$\frac{2484}{7038} \times (101) = + 36$$

BACK

$$\begin{array}{r} 39^\circ 47' \quad 72. \text{ m.} \\ 123 \quad 36 \quad 1092 \text{ m.} \end{array}$$

4136

(Additional Work)

C. & G. SURVEY  
U. S. A.  
DEC 1 - 1921

4136

(Additional Work)

Form 504  
DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY

State: *California*

11-5613

DESCRIPTIVE REPORT:

*Hydro* Sheet No. *4136*

LOCALITY:

*Northern Coast -*  
*Off Cape Mendocino*

*1021*

CHIEF OF PARTY:  
*E. H. Paynehart*

DISCRIPTIVE REPORT SHEET #4136

USS LYDONIA 1921.

Most of the work shown on this sheet was executed by the LYDONIA during the season 1919-20 . Some additional work has been done this season in filling in where seasons soundings were widely spaced. Well to the westward of Punta Gorda the work was extended to the 1000 fathom curve. Here the work extends beyond the limits of the sheet and is shown on a sub sheet.

All soundings are up and down casts except 1 line 1Q' to 20 Q' which has each alternate one a tube sounding.

No reliable current observations were made within this area.

During the summer there was noted a southerly set across the 200 fathom ridge west of Punta Gorda, with a drift of about one knot.

*W. St. Pagenboer*

EHP-C

## HYDROGRAPHIC STATISTICS

BOAT U.S.S. Lydonia.SHEET No. 4136

DATE	LETTER	VOLUME	MILES	SOUNDINGS	POS.	ANGLES	AREA
April 13, 1921	W	3	39.3	106	66	132	
" 14, "	X	3	36.0	107	106	212	
" 15, "	Y	3	46.2	115	<del>115</del>	230	
" 18, "	Z	4	34.3	55	55	110	
April Totals:			155.8	383	342	684	<del>575</del> 275
May 11, 1921	A'	4	19.3	29	29	65	
" 12, 1921	B'	4	9.9	41	28	59	
" 13, "	C'	4	44.0	22	22	58	
" 18, "	D'	4	18.0	43	43	90	
" 19, "	E'	4	26.0	34	34	89	
" 23, "	F'	4	12.0	14	14	32	
May Totals			129.2	183	170	394	106.0
June 3, 1921	G'	4	29.0	13	13	27	
" 4, "	H'	4	62.0	50	50	102	
" 7, "	J'	4+5	7.2	22	22	62	
" 8, "	K'	5	18.5	12	12		
" 9, "	L'	5	108.0	32	3	8	
" 10, "	M'	5	77.8	19	19	P.R. + Astro.	
" 11, "	N'	5	38.0	6	6	4	
" 17, "	P'	5	78.5	20	20	23	
June Totals			419.0	174	145	226	767.0
Fiscal Year (June 30, 1921) Totals.			704.0	740	657	1304	<del>780.5</del>

HYDROGRAPHIC STATISTICS

BOAT U.S.S. Lydonia.

SHEET No. 413C

DATE LETTER VOLUME MILES SOUNDINGS POS. ANGLES AREA

July 21, 1921	Q'	5	9.6	36	20	41	
July Totals.			9.6	36	20	41	10.0
			714	776	677	1345	910



U. S. G. SURVEY  
L. O. A.  
NOV 30 1921  
No. No.

ASTRONOMICAL OBSERVATIONS  
AND COMPUTATIONS TO ACCOMPANY SHEET 4136.

M' and N' DAYS.

USS LYDONIA.

*(Additional work)*  
1921

E.H. Pagenhart,  
Chief of Party.

4136

Astronomical observations  
and computations to  
accompany Sheet 4136,  
M' and N' Days.

Lydonic  
EHP

DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

OFFSHORE WORK, Pacific COAST

MARCO ST. HILAIRE METHOD: COSINE-HAVERSINE FORMULA

Formula:  $\text{Hav } Z = \text{Hav } (L \sim D) \text{ Cos } L \text{ Cos } D \text{ hav } t$   
 $= \text{Hav } (L \sim D) \text{ Hav } \theta$

Vessel U.S.S. Lydia Comdg. E.H. Payson  
 Position No. Between 1 & 2 M. Obs. No. \_\_\_\_\_ Time \_\_\_\_\_ Mer. 120° W  
 Ship's Time 4:27 Am. Date June 10<sup>th</sup>, 1921 Pat. Log \_\_\_\_\_  
 Body observed Venus Bearing by Standard Compass \_\_\_\_\_  
 Last position at Ship's Time \_\_\_\_\_ Date \_\_\_\_\_ Lat. \_\_\_\_\_ Long. \_\_\_\_\_  
 True course run \_\_\_\_\_ Dist. \_\_\_\_\_ DL \_\_\_\_\_ DLo. \_\_\_\_\_  
 Position by D.R. at time of this observation \_\_\_\_\_ Lat. 40° 27' N Long. 125° 31' W

Chron. <del>Watch</del> TIME.	ALTITUDES.	CHRON. COMPS.	Ship's Head
12 <sup>m</sup> 08 <sup>m</sup> 00	18° 34'	C. _____	True Bearing _____
17	36	W. _____	Comps. Bearing _____
35	40.5	C-W. _____	Comp. Error _____
57	43.5	C. _____	Charted Var. _____
		W. _____	Deviation _____
		C-W. _____	

SUN.	STAR.	MOON.	PLANET.	CHARACTER OF OBSERVATION.		
				VERY GOOD.	MOD. GOOD.	BARELY ACCEPTED.
W. T. _____	W. T. _____			Object _____		
C-W. _____	C-W. _____			Horizon _____		
C. T. _____	C. T. <u>12 08 27.2</u>			Value of observation _____		
C. C. _____	C. C. <u>+ 18 28.0</u>			Height of eye <u>20 ft</u>		
GMT _____	GMT <u>00 16 35.2</u>			Obs. alt. <u>18° 38.5</u>		
Eq. T. _____	R. A. M. S. <u>5 13 15.4</u>			Cor. (Table 46) <u>- 7.0</u>		
G. A. T. _____	G. S. T. <u>5 39 50.6</u>			True alt. <u>18° 31.5</u>		
Long. _____	Long. <u>8 22 04</u>					
	L. S. T. <u>21 17 46.6</u>					
	* R. A. <u>2 16 15.3</u>					
L. A. T. or t _____	* H. A. or t <u>4 58 28.7</u>			Log Hav t <u>9.56512</u>		
Lat. _____	Lat. <u>40° 27.0</u>			Log Cos L <u>9.86137</u>		
Dec. _____	* Dec. <u>+ 10 57.2</u>			Log Cos D <u>9.99202</u>		
				Log Hav $\theta$ <u>9.43851</u>		
				Nat Hav $\theta$ <u>27448</u>		
				Nat Hav L~D <u>06482</u>		
				Nat Hav Z <u>33930</u>		
L~D <u>29° 29.8</u>						
Z <u>71 15.1</u>						
Cal. alt. <u>18 44.9</u>						
True alt. <u>18 31.5</u>						
h diff. <u>13.4</u>	miles on bearing <u>88°</u>			Lo. Factor from Table 47 <u>.05</u>		
When cal. h is {greater} than obs. alt. measure h diff. {away from} observed body. {less} {towards}						
Definite point on position line accepted as mean fix at time of obs. {Lat.} {Long.}						

DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

OFFSHORE WORK, Pacific COAST

MARCO ST. HILAIRE METHOD: COSINE-HAVERSINE FORMULA

$$\text{Formula: Hav } Z \begin{cases} = \text{Hav } (L \sim D) \text{ Cos } L \text{ Cos } D \text{ hav } t \\ = \text{Hav } (L \sim D) \text{ Hav } \theta \end{cases}$$

Vessel V.S.S. Lydia Comdg. E.H. Pagenant  
 Position No. 5M Obs. No. \_\_\_\_\_ Time \_\_\_\_\_ Mer. 120° W  
 Ship's Time 9:04 am Date June 10, 1921 Pat. Log \_\_\_\_\_  
 Body observed ☉ Bearing by Standard Compass \_\_\_\_\_  
 Last position at Ship's Time \_\_\_\_\_ Date \_\_\_\_\_ Lat. \_\_\_\_\_ Long. \_\_\_\_\_  
 True course run \_\_\_\_\_ Dist. \_\_\_\_\_ DL \_\_\_\_\_ DLo \_\_\_\_\_  
 Position by D.R. at time of this observation Lat. 40° 15' N Long. 125° 30' W

Chro. <del>Watch</del> TIME.	ALTITUDES.	CHRON. COMPS.	Ship's Head
4 45 11	44° 54'	C. _____	True Bearing _____
31	57	W. _____	Comps. Bearing _____
50	59	C-W. _____	Comp. Error _____
		C. _____	Charted Var. _____
		W. _____	Deviation _____
		C-W. _____	

SUN.	STAR.	MOON.	PLANET.	CHARACTER OF OBSERVATION.		
				VERY GOOD.	MOD. GOOD.	BARELY ACCEPTED.
W. T. _____	W. T. _____			Object _____		
C-W. _____	C-W. _____			Horizon _____		
C. T. <u>4 45 31</u>	C. T. _____			Value of observation _____		
C. C. <u>+ 18 08</u>	C. C. _____			Height of eye <u>15 ft.</u>		
GMT <u>5 03 39</u>	GMT _____			Obs. alt. <u>44° 57'</u>		
Eq. T. <u>+ 50</u>	R. A. M. S. _____			Cor. (Table 46) <u>+ 11.3</u>		
G. A. T. <u>5 04 29</u>	Red. _____			True alt. <u>45° 08.3</u>		
Long. <u>8 22 00</u>	G. S. T. _____					
	Long. _____					
	L. S. T. _____					
	* R. A. _____					
L. A. T. or t <u>20 42 29</u>	* H. A. or t _____			Log Hav <u>t</u> <u>9.24173</u>		
Lat. <u>40° 15'</u>	Lat. _____			Log Cos <u>L</u> <u>9.88266</u>		
Dec. <u>+ 23 00</u>	* Dec. _____			Log Cos <u>D</u> <u>9.96402</u>		
				Log Hav <u>θ</u> <u>9.08841</u>		
				Nat Hav <u>θ</u> <u>1.2257</u>		
				Nat Hav <u>L~D</u> <u>1.02249</u>		
				Nat Hav <u>Z</u> <u>1.14506</u>		
L~D <u>17° 15'</u>						
Z <u>44 46.5</u>						
Cal. alt. <u>45 13.5</u>						
True alt. <u>45 08.3</u>						
h diff. <u>5.2</u> miles on bearing <u>96°</u> Lo. Factor from Table 47 <u>1.14</u>						
When cal. h is $\begin{cases} \text{greater} \\ \text{less} \end{cases}$ than obs. alt. measure h diff. $\begin{cases} \text{away from} \\ \text{towards} \end{cases}$ observed body.						
Definite point on position line accepted as mean fix at time of obs. $\begin{cases} \text{Lat.} \\ \text{Long.} \end{cases}$						

DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

OFFSHORE WORK, Pacific COAST

MARCO ST. HILAIRE METHOD: COSINE-HAVERSINE FORMULA

Formula:  $\text{Hav } Z = \text{Hav } (L \sim D) \text{ Cos } L \text{ Cos } D \text{ hav } t$   
 $= \text{Hav } (L \sim D) \text{ Hav } \theta$

Vessel V.S.S. Pydonia Comdg. E.H. Pagenhart  
 Position No. 16M'J Obs. No. \_\_\_\_\_ Time \_\_\_\_\_ Mer. 125° W.  
 Ship's Time 5:11 P.M. Date June 10<sup>th</sup>, 1921 Pat. Log \_\_\_\_\_  
 Body observed ☉ Bearing by Standard Compass \_\_\_\_\_  
 Last position at Ship's Time \_\_\_\_\_ Date \_\_\_\_\_ Lat. \_\_\_\_\_ Long. \_\_\_\_\_  
 True course run \_\_\_\_\_ Dist. \_\_\_\_\_ DL. \_\_\_\_\_ DLo. \_\_\_\_\_  
 Position by D.R. at time of this observation Lat. 40° 27' N Long. 125° 37' W.

Chron. <del>Watch</del> TIME.	ALTITUDES.	CHRON. COMPS.	Ship's Head
12 52 11	27° 52'	C. _____	True Bearing _____
53 02	41	W. _____	Comps. Bearing _____
53 32	37	C-W. _____	Comp. Error _____
54 00	32	C. _____	Charted Var. _____
		W. _____	Deviation _____
		C-W. _____	

SUN.	STAR.	MOON.	PLANET.	CHARACTER OF OBSERVATION.		
				VERY GOOD.	MOD. GOOD.	BARELY ACCEPTED.
W. T. _____	W. T. _____					
C-W. _____	C-W. _____					
C. T. <u>12 53 11.1</u>	C. T. _____					
C. C. <u>+ 18 07.0</u>	C. C. _____					
GMT <u>13 11 18.1</u>	GMT _____					
Eq. T. <u>46.0</u>	R. A. M. S. _____					
	Red. _____					
G. A. T. <u>13 12 04.1</u>	G. S. T. _____					
Long. <u>8 22 28</u>	Long. _____					
	L. S. T. _____					
	*R. A. _____					
L. A. T. or <u>4 49 36.1</u>	*H. A. or <u>t</u>					
Lat. <u>40° 27'</u>	Lat. _____					
Dec. <u>+ 23 02.2</u>	*Dec. _____					
L~D <u>17° 24.8</u>						
Z <u>62 14.9</u>						
Cal. alt. <u>27 45.1</u>						
True alt. <u>27 50.5</u>						
h diff. <u>5.4</u>	miles on bearing <u>278</u>					
	Lo. Factor from Table 47 <u>18</u>					
When cal. h is $\left\{ \begin{smallmatrix} \text{greater} \\ \text{less} \end{smallmatrix} \right\}$ than obs. alt. measure h diff. $\left\{ \begin{smallmatrix} \text{away from} \\ \text{towards} \end{smallmatrix} \right\}$ observed body.						
Definite point on position line accepted as mean fix at time of obs. $\left\{ \begin{smallmatrix} \text{Lat.} \\ \text{Long.} \end{smallmatrix} \right\}$						

DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

OFFSHORE WORK, Pacific COAST

MARCO ST. HILAIRE METHOD: COSINE-HAVERSINE FORMULA

Formula:  $\text{Hav } Z = \text{Hav } (L \sim D) \text{ Cos } L \text{ Cos } D \text{ hav } t$   
 $= \text{Hav } (L \sim D) \text{ Hav } \theta$

Vessel U.S.S. Lydonia Comdg. E.H. Ragenhart  
 Position No. Between 167 174 Obs. No. \_\_\_\_\_ Time \_\_\_\_\_ Mer. 120° W.  
 Ship's Time 6:15 P.M. Date June 10, 1921 Pat. Log \_\_\_\_\_  
 Body observed ☉ Bearing by Standard Compass \_\_\_\_\_  
 Last position at Ship's Time \_\_\_\_\_ Date \_\_\_\_\_ Lat. \_\_\_\_\_ Long. \_\_\_\_\_  
 True course run \_\_\_\_\_ Dist. \_\_\_\_\_ DL \_\_\_\_\_ DLo. \_\_\_\_\_  
 Position by D.R. at time of this observation \_\_\_\_\_ Lat. 40° 13' N. Long. 125° 41' W.

Chron. <del>WATCH</del> TIME.	ALTITUDES.	CHRON. COMPS.	Ship's Head
1 56 06	15° 52' 30"	C. _____	True Bearing _____
56 38	45 00	W. _____	Comps. Bearing _____
57 12.5	39 30	C-W. _____	Comp. Error _____
57 46	35 00	C. _____	Charted Var. _____
58 12	31 00	W. _____	Deviation _____
		C-W. _____	

SUN.	STAR.	MOON.	PLANET.	CHARACTER OF OBSERVATION.			
					VERY GOOD.	MOD. GOOD.	BARELY ACCEPTED.
W. T. _____	W. T. _____			Object _____			
C-W. _____	C-W. _____			Horizon _____			
C. T. <u>1 57 10.9</u>	C. T. _____			Value of observation _____			
C. C. <u>+ 18 07.5</u>	C. C. _____			Height of eye <u>20 ft. i.c. + 2'</u>			
GMT <u>14 15 18.4</u>	GMT _____			Obs. alt. <u>15° 40.6</u>			
Eq. T. <u>+ 0 46.4</u>	R. A. M. S. _____			Cor. (Table 46) <u>+ 10.3</u>			
G. A. T. <u>14 16 03.8</u>	Red. _____			True alt. <u>15 50.9</u>			
Long. <u>8 22 44.0</u>	G. S. T. _____						
	Long. _____						
	L. S. T. _____						
	* R. A. _____						
L. A. T. or t. <u>5 53 19.8</u>	* H. A. or t. _____			Log Hav t <u>9.68614</u>			
Lat. <u>40 13</u>	Lat. _____			Log Cos L <u>9.88287</u>			
Dec. <u>+ 23 02.4</u>	* Dec. _____			Log Cos D <u>9.96390</u>			
				Log Hav $\theta$ <u>9.53291</u>			
				Nat Hav $\theta$ <u>34112</u>			
L~D <u>17° 10.6</u>				Nat Hav L~D <u>02230</u>			
Z <u>74 08.8</u>				Nat Hav Z <u>36342</u>			
Cal. alt. <u>15 51.2</u>							
True alt. <u>15 50.9</u>							
h diff. <u>0.3</u> miles on bearing <u>287°</u> Lo. Factor from Table 47 <u>40</u>							
When cal. h is $\begin{cases} \text{greater} \\ \text{less} \end{cases}$ than obs. alt. measure h diff. $\begin{cases} \text{away from} \\ \text{towards} \end{cases}$ observed body.							
Definite point on position line accepted as mean fix at time of obs. $\begin{cases} \text{Lat.} \\ \text{Long.} \end{cases}$							

DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

OFFSHORE WORK, Pacific COAST

MARCO ST. HILAIRE METHOD: COSINE-HAVERSINE FORMULA

Formula:  $\text{Hav } Z = \text{Hav } (L \sim D) \text{ Cos } L \text{ Cos } D \text{ hav } t$   
 $= \text{Hav } (L \sim D) \text{ Hav } \theta$

Vessel U.S.S. Lydonia Comdg. E.H. Pagenhart  
 Position No. 17 M' O Obs. No. \_\_\_\_\_ Time \_\_\_\_\_ Mer. 120° W.  
 Ship's Time 8:07 P.M. Date June 10, 1921 Pat. Log \_\_\_\_\_  
 Body observed Jupiter Bearing by Standard Compass \_\_\_\_\_  
 Last position at Ship's Time \_\_\_\_\_ Date \_\_\_\_\_ Lat. \_\_\_\_\_ Long. \_\_\_\_\_  
 True course run \_\_\_\_\_ Dist. \_\_\_\_\_ DL \_\_\_\_\_ DLo. \_\_\_\_\_  
 Position by D.R. at time of this observation \_\_\_\_\_ Lat. 40° 20' N Long. 125° 15' W.

Chron. <del>Water</del> TIME.	ALTITUDES.	CHRON. COMPS.	Ship's Head
3 47 41	47° 34'	C. _____	True Bearing _____
48 22	29	W. _____	Comps. Bearing _____
48 53.5	23	C-W. _____	Comp. Error _____
49 27	19	C. _____	Charted Var. _____
49 55.5	14	W. _____	Deviation _____
		C-W. _____	

SUN.	STAR.	MOON.	PLANET.	CHARACTER OF OBSERVATION.		
				VERY GOOD.	MOD. GOOD.	BARRELY ACCEPTED.
W. T. _____	W. T. _____			Object _____		
C-W. _____	C-W. _____			Horizon _____		
C. T. <u>3 48 51.8</u>	C. T. _____			Value of observation _____		
C. C. <u>+ 18 08.0</u>	C. C. _____			Height of eye <u>20ft.</u>		
GMT <u>4 06 59.8</u>	GMT <u>4 06 59.8</u>			Obs. alt. <u>47° 23.8'</u>		
Eq. T. _____	R. A. M. S. <u>5 15 50.0</u>			Cor. (Table 46) <u>-5.2</u>		
	Red. _____			True alt. <u>47° 18.6'</u>		
G. A. T. _____	G. S. T. <u>9 22 48.8</u>			Log Hav $t$ <u>9.89863</u>		
Long. _____	Long. <u>8 21 00</u>			Log Cos $L$ <u>9.88212</u>		
	L. S. T. <u>13 01 48.8</u>			Log Cos $D$ <u>9.99503</u>		
	* R. A. <u>10 51 04.9</u>			Log Hav $\theta$ <u>8.77578</u>		
L. A. T. or $t$ _____	* H. A. or $t$ <u>2 10 44.9</u>			Nat Hav $\theta$ <u>.05968</u>		
Lat. _____	Lat. <u>40° 20'</u>			Nat Hav $L \sim D$ <u>.07452</u>		
Dec. _____	* Dec. <u>+ 8 39</u>			Nat Hav $Z$ <u>.13420</u>		
$L \sim D$ <u>31° 41'</u>						
$Z$ <u>42 58.8</u>						
Cal. alt. <u>47 01.2</u>						
True alt. <u>47 18.6</u>						
$h$ diff. <u>17.4</u> miles on bearing <u>231</u> °. Lo. Factor from Table 47 <u>1.06</u>						
When cal. $h$ is $\begin{cases} \text{greater} \\ \text{less} \end{cases}$ than obs. alt. measure $h$ diff. $\begin{cases} \text{away from} \\ \text{towards} \end{cases}$ observed body.						
Definite point on position line accepted as mean fix at time of obs. $\begin{cases} \text{Lat.} \\ \text{Long.} \end{cases}$						

DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

OFFSHORE WORK, Pacific COAST

MARCO ST. HILAIRE METHOD: COSINE-HAVERSINE FORMULA

Formula:  $\text{Hav } Z \begin{cases} = \text{Hav } (L-D) \text{ Cos } L \text{ Cos } D \text{ hav } t \\ = \text{Hav } (L-D) \text{ Hav } \theta \end{cases}$

Vessel U.S.S. Lydia Comdg. E.H. Papahat  
 Position No. 17M Obs. No. \_\_\_\_\_ Time \_\_\_\_\_ Mer. 120° W  
 Ship's Time 8:26 a.m. Date June 10, 1921 Pat. Log \_\_\_\_\_  
 Body observed Vega Bearing by Standard Compass 42°  
 Last position at Ship's Time \_\_\_\_\_ Date \_\_\_\_\_ Lat. \_\_\_\_\_ Long. \_\_\_\_\_  
 True course run \_\_\_\_\_ Dist. \_\_\_\_\_ DL. \_\_\_\_\_ DLo. \_\_\_\_\_  
 Position by D.R. at time of this observation \_\_\_\_\_ Lat. 40° 20' N Long. 125° 15' W

Chro. <del>Watch</del> TIME.	ALTITUDES.	CHRON. COMPS.	Ship's Head
4 06 55	31° 15'	C.	True Bearing
08 06	32	W.	Comps. Bearing
08 36	36	C-W.	Comp. Error
09 14.5	41	C.	Charted Var.
		W.	Deviation
		C-W.	

SUN.	STAR.	MOON.	PLANET.	CHARACTER OF OBSERVATION.		
				VERY GOOD.	MOD. GOOD.	BARELY ACCEPTED.
W. T. _____	W. T. _____			Object _____		
C-W. _____	C-W. _____			Horizon _____		
C. T. _____	C. T. <u>A 08 13.4</u>			Value of observation _____		
C. C. _____	C. C. <u>+ 18 08</u>			Height of eye <u>20 ft.</u>		
GMT _____	GMT <u>4 26 21.4</u>			Obs. alt. <u>31 31'</u>		
Eq. T. _____	R. A. M. S. <u>5 15 54.2</u>			Cor. (Table 46) <u>- 6</u>		
	Red. _____			True alt. <u>31° 25'</u>		
G. A. T. _____	G. S. T. <u>9 42 15.6</u>					
Long. _____	Long. <u>8 21 00</u>					
	L. S. T. <u>13 21 15.6</u>					
	* R. A. <u>18 34 16.8</u>					
L. A. T. or t _____	* H. A. or t <u>5 13 01.2</u>			Log Hav t <u>9.60013</u>		
Lat. _____	Lat. <u>40° 20'</u>			Log Cos L <u>9.88212</u>		
Dec. _____	* Dec. <u>+ 38 42.6</u>			Log Cos D <u>9.89227</u>		
				Log Hav $\theta$ <u>9.37452</u>		
				Nat Hav $\theta$ <u>.23487</u>		
				Nat Hav L-D <u>.00020</u>		
				Nat Hav Z <u>.23707</u>		
L-D <u>1° 37.4</u>						
Z <u>58 16.4</u>						
Cal. alt. <u>31 43.6</u>						
True alt. <u>31 25</u>						
h diff. <u>18.6</u> miles on bearing <u>64°</u> Lo. Factor from Table 47 <u>.64</u>						
When cal. h is $\begin{cases} \text{greater} \\ \text{less} \end{cases}$ than obs. alt. measure h diff. $\begin{cases} \text{away from} \\ \text{towards} \end{cases}$ observed body.						
Definite point on position line accepted as mean fix at time of obs. $\begin{cases} \text{Lat.} \\ \text{Long.} \end{cases}$						



DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

OFFSHORE WORK, Pacific COAST

MARCO ST. HILAIRE METHOD: COSINE-HAVERSINE FORMULA

Formula:  $\text{Hav } Z \begin{cases} = \text{Hav } (L-D) \text{ Cos } L \text{ Cos } D \text{ hav } t \\ = \text{Hav } (L-D) \text{ Hav } \theta \end{cases}$

Vessel U.S.S. Lydia Comdg. E.H. Pagenhart  
 Position No. 17M Obs. No. \_\_\_\_\_ Time \_\_\_\_\_ Mer. 120° W.  
 Ship's Time 8:18 P.M. Date June 10, 1921 Pat. Log \_\_\_\_\_  
 Body observed Arcturus Bearing by Standard Compass 120°  
 Last position at Ship's Time \_\_\_\_\_ Date \_\_\_\_\_ Lat. \_\_\_\_\_ Long. \_\_\_\_\_  
 True course run \_\_\_\_\_ Dist. \_\_\_\_\_ DL \_\_\_\_\_ DLo. \_\_\_\_\_  
 Position by D.R. at time of this observation \_\_\_\_\_ Lat. 40° 20' N Long. 125° 15' W.

CHRON. WATCH TIME.	ALTITUDES.	CHRON. COMPS.	Ship's Head
3 58 36	65° 30'	C. _____	True Bearing _____
59 15	35	W. _____	Comps. Bearing _____
59 54	39.5	C-W. _____	Comp. Error _____
4 00 37	43.0	C. _____	Charted Var. _____
01 12.5	48.0	W. _____	Deviation _____
		C-W. _____	

SUN.	STAR.	MOON.	PLANET.	CHARACTER OF OBSERVATION.		
				VERY GOOD.	MOD. GOOD.	BARELY ACCEPTED.
W. T. _____	W. T. _____			Object _____		
C-W. _____	C-W. _____			Horizon _____		
C. T. _____	C. T. <u>3 59 54.9</u>			Value of observation _____		
C. C. _____	C. C. <u>7 18 08</u>			Height of eye <u>20 ft.</u> <u>1.C. + 3'</u>		
GMT _____	GMT <u>16 18 02.9</u>			Obs. alt. <u>65 39.1</u>		
Eq. T. _____	R. A. M. S. <u>5 15 51.0</u>			Cor. (Table 46) <u>- 2.8</u>		
	Red. _____			True alt. <u>65 37.3</u>		
G. A. T. _____	G. S. T. <u>21 33 53.9</u>			Log Hav t <u>8.21956</u>		
Long. _____	Long. <u>8 21 40</u>			Log Cos L <u>9.88212</u>		
	L. S. T. <u>13 12 53.9</u>			Log Cos D <u>9.97408</u>		
	* R. A. <u>14 12 04.8</u>			Log Hav $\theta$ <u>8.07576</u>		
L. A. T. or t _____	* H. A. or t <u>0 59 10.9</u>			Nat Hav $\theta$ <u>.01191</u>		
Lat. _____	Lat. <u>40 20</u>			Nat Hav L~D <u>.03238</u>		
Dec. _____	* Dec. <u>+ 19 35.9</u>			Nat Hav Z <u>.04429</u>		
L~D <u>20° 44.1</u>						
Z <u>24 17.9</u>						
Cal. alt. <u>65 42.1</u>						
True alt. <u>65 37.3</u>						
h diff. <u>4.8</u> miles on bearing <u>143</u> ° Lo. Factor from Table 47 <u>.99</u>						
When cal. h is $\begin{cases} \text{greater} \\ \text{less} \end{cases}$ than obs. alt. measure h diff. $\begin{cases} \text{away from} \\ \text{towards} \end{cases}$ observed body.						
Definite point on position line accepted as mean fix at time of obs. $\begin{cases} \text{Lat.} \\ \text{Long.} \end{cases}$						

DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

OFFSHORE WORK, Pacific COAST

MARCO ST. HILAIRE METHOD: COSINE-HAVERSINE FORMULA

Formula:  $\text{Hav } Z = \text{Hav } (L-D) \text{ Cos } L \text{ Cos } D \text{ hav } t$   
 $= \text{Hav } (L-D) \text{ Hav } \theta$

Vessel U.S.S. Lydia Comdg. E.H. Bagenhart  
 Position No. 17M Obs. No. \_\_\_\_\_ Time \_\_\_\_\_ Mer. 120° W.  
 Ship's Time 8:32 P.M. Date June 10, 1921 Pat. Log \_\_\_\_\_  
 Body observed Spica Bearing by Standard Compass 165°  
 Last position at Ship's Time \_\_\_\_\_ Date \_\_\_\_\_ Lat. \_\_\_\_\_ Long. \_\_\_\_\_  
 True course run \_\_\_\_\_ Dist. \_\_\_\_\_ DL \_\_\_\_\_ DLo. \_\_\_\_\_  
 Position by D.R. at time of this observation \_\_\_\_\_ Lat. 40° 20' Long. 125° 15' W.

Chron. TIME.	ALTITUDES.	CHRON. COMPS.	Ship's Head
4 11 42	39° 09'	C.	True Bearing
12 42.5	10	W.	Comps. Bearing
13 18.5	10	C-W.	Comp. Error
13 54.2	07	C.	Charted Var.
14 19.0	06	W.	Deviation
14 49.5	07	C-W.	

SUN.	STAR.	MOON.	PLANET.	CHARACTER OF OBSERVATION.		
				VERY GOOD.	MOD. GOOD.	BARELY ACCEPTED.
W. T. _____	W. T. _____			Object _____		
C-W. _____	C-W. _____			Horizon _____		
C. T. _____	C. T. <u>4 13 27.6</u>			Value of observation _____		
C. C. _____	C. C. <u>+ 18 08.0</u>			Height of eye <u>20 ft. 1.5 - 2'</u>		
GMT _____	GMT <u>4 31 35.6</u>			Obs. alt. <u>39° 08.2</u>		
Eq. T. _____	R. A. M. S. <u>25 15 55.2</u>			Cor. (Table 46) <u>- 7.6</u>		
G. A. T. _____	Red. _____			True alt. <u>39 00.6</u>		
Long. _____	G. S. T. <u>9 47 30.6</u>					
	Long. <u>8 21 00.</u>					
	L. S. T. <u>13 26 30.8</u>					
	* R. A. <u>13 21 00.1</u>					
L. A. T. or t _____	* H. A. or t <u>0 05 30.7</u>			Log Hav t <u>6.16011</u>		
Lat. _____	Lat. <u>40° 20'</u>			Log Cos L <u>9.88212</u>		
Dec. _____	* Dec. <u>- 10 45.1</u>			Log Cos D <u>9.99231</u>		
				Log Hav $\theta$ <u>6.03454</u>		
				Nat Hav $\theta$ <u>.00011</u>		
				Nat Hav L~D <u>.18591</u>		
				Nat Hav Z <u>.18602</u>		
L~D <u>51° 05.1</u>						
Z <u>51 06</u>						
Cal. alt. <u>38 54</u>						
True alt. <u>39 00.6</u>						
h diff. <u>6.6</u> miles on bearing <u>180</u> °. Lo. Factor from Table 47 _____						
When cal. h is { greater / less } than obs. alt. measure h diff. { away from / towards } observed body.						
Definite point on position line accepted as mean fix at time of obs. { Lat. / Long. }						

DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

OFFSHORE WORK, Pacific COAST

MARCO ST. HILAIRE METHOD: COSINE-HAVERSINE FORMULA

Formula:  $\text{Hav } Z \begin{cases} = \text{Hav } (L-D) \text{ Cos } L \text{ Cos } D \text{ hav } t \\ = \text{Hav } (L-D) \text{ Hav } \theta \end{cases}$

Vessel V.S.S. Lydia Comdg. E.H. Pagenhart  
 Position No. 4N' Obs. No. \_\_\_\_\_ Time \_\_\_\_\_ Mer. 120° W.  
 Ship's Time 8:53 Am. Date June 11, 1921 Pat. Log \_\_\_\_\_  
 Body observed ☉ Bearing by Standard Compass \_\_\_\_\_  
 Last position at Ship's Time \_\_\_\_\_ Date \_\_\_\_\_ Lat. \_\_\_\_\_ Long. \_\_\_\_\_  
 True course run \_\_\_\_\_ Dist. \_\_\_\_\_ DL \_\_\_\_\_ DLo. \_\_\_\_\_  
 Position by D.R. at time of this observation \_\_\_\_\_ Lat. 40° 10' N. Long. 125° 25' W.

WATCH TIME.	ALTITUDES.	CHRON. COMPS.	Ship's Head
_____	_____	C. _____	True Bearing _____
_____	_____	W. _____	Comps. Bearing _____
_____	_____	C-W. _____	Comp. Error _____
_____	_____	C. _____	Charted Var. _____
_____	_____	W. _____	Deviation _____
_____	_____	C-W. _____	_____

SUN.	STAR. MOON. PLANET.	CHARACTER OF OBSERVATION.		
		VERY GOOD.	MOD. GOOD.	BARELY ACCEPTED.
W. T. _____	W. T. _____	Object _____		
C-W. _____	C-W. _____	Horizon _____		
C. T. <u>4 35 22</u>	C. T. _____	Value of observation _____		
C. C. <u>+ 18 08</u>	C. C. _____	Height of eye <u>20 ft.</u>		
GMT <u>4 53 30</u>	GMT _____	Obs. alt. <u>43° 12' 36"</u>		
Eq. T. <u>+ 0 44.0</u>	R. A. M. S. _____	Cor. (Table 46) <u>+ 10 27</u>		
G. A. T. <u>4 54 14</u>	Red. _____	True alt. <u>43 23 03</u>		
Long. <u>8 21 40</u>	G. S. T. _____			
	Long. _____			
	L. S. T. _____			
	* R. A. _____			
L. A. T. or t. <u>20 32 34.0</u>	* H. A. or t. _____	Log Hav t <u>9.281 480</u>		
Lat. <u>40° 10'</u>	Lat. _____	Log Cos L <u>9.883 191</u>		
Dec. <u>+ 23 02.9</u>	* Dec. _____	Log Cos D <u>9.963 870.</u>		
		Log Hav $\theta$ <u>9.128 541</u>		
		Nat Hav $\theta$ <u>.13444</u>		
		Nat Hav L-D <u>.02215</u>		
		Nat Hav Z <u>.15659</u>		
L-D <u>17° 07.1</u>				
Z <u>46 37.2</u>				
Cal. alt. <u>43° 22.8</u>				
True alt. <u>43 23.1</u>				
h diff. <u>0.3</u> miles on bearing <u>95°</u> Lo. Factor from Table 47 <u>11</u>				
When cal. h is $\begin{cases} \text{greater} \\ \text{less} \end{cases}$ than obs. alt. measure h diff. $\begin{cases} \text{away from} \\ \text{towards} \end{cases}$ observed body.				
Definite point on position line accepted as mean fix at time of obs. $\begin{cases} \text{Lat.} \\ \text{Long.} \end{cases}$				

Hyd. Sheet No. 4136

This sheet consists of two seasons work plotted on a scale of one to one hundred and twenty thousand. It covers considerable area and is controlled by fixes when the signals were visible and by dead reckoning when out of sight of land.

The dead reckoning work is shown just as it is plotted by the field party, as it is stated it had been considerably adjusted. Mr. Eynon has made notes in the record on these lines and there is also a note on the face of the sheet, giving those lines which were considered doubtful.

Soundings on all of these questioned lines were left in pencil except the soundings on pos 4, 5 & 6 N'day which were inked because the record states that the line is considered good.

The sounding at pos. 25C is not inked because it was questioned in the record.

This sheet is joined by Hyd. sheets nos. 4183, 4184 and 4185. The soundings from Hyd. 4185 were transferred to this sheet and the soundings from this sheet were enlarged and transferred to Hyd. 4183 but Hyd. 4184 was not available for this purpose as it was being retracted.

R. L. Johnston

**C O P Y**

January 17, 1922.

Division of Hydrography and Topography:

Division of Charts:

Tide reducers are approved in  
3 volumes of sounding records for

HYDROGRAPHIC SHEET 4136a

Locality: Vicinity of C. Mendocino - Shelter Cove, California

Chief of Party: E. H. Pagenhart in 1921

Plane of reference is mean low water, reading

\*4.0 ft. on tide staff at North Jetty Landing, Humboldt Bay.

\* Allowance made for difference in tide at place of soundings.

For reduction of soundings.  
Condition of records satisfactory except as checked below:

1. Locality and sublocality of survey omitted.
2. Month and day of month omitted.
3. Time meridian not given at beginning of day's work.
4. Time (whether A.M. or P.M.) not given at beginning of day's work.
5. Soundings (whether in feet or fathoms) not clearly shown in record.
6. Leadline correction entered in wrong column.
7. Field reductions entered in "Office" column.
8. Location of tide gauge not given at beginning of each day's work.
9. Leadline corrections not clearly stated.
10. Kind of sounding tube used not stated.
11. Sounding tube No. entered in column of "Soundings" instead of "Remarks".
12. Legibility of record could be improved.
13. Remarks.

(Signed) G. T. Rude

Chief, Division of Tides and Currents.

DEPARTMENT OF COMMERCE  
U. S. COAST AND GEODETIC SURVEY  
WASHINGTON

SECTION OF FIELD RECORDS.

REPORT ON HYDROGRAPHIC SHEET No. 4136.

Surveyed in 1919, 1920,  
and 1921.

Chief of Party: E. H. Pagenhart. Protracted and soundings plotted by  
field party.  
Surveyed by Party of Steamer LYDONIA. Verified and inked by R. L. Johnston.

1. The records are defective in the following respects:

- (a) The deviation table is for the standard compass, while recorded ships' courses are for the steering compass, the deviation of which is not known. As a considerable proportion of the work is based upon dead reckoning, the failure to furnish reliable information about the compass courses is serious.
- (b) The bottom abbreviation gr. is used. As it can not be determined whether green or gray is intended these gr. bottoms are valueless.
- (c) The sounding lines on several days were run by dead reckoning. Practically none of the distances were logged, the revolution of the shaft being relied upon. As the records do not furnish a rating for the revolutions the distance covered is indeterminate and the sounding lines were rejected.
- (d) The first six hours of P' day were based on dead reckoning with five observations on the sun to check. The record fails to note the point of departure and none of the data of the sun's observations were transmitted to the office. This portion of P' day was not plotted by the field party nor is there any mention of the reason for the omission. The information is not sufficient for plotting it in the office.
- (e) The following defects in the sounding records were noted by Division of Tides:  
"It is not made clear by the field party in all parts of the 2 volumes as to whether soundings have been recorded in fathoms or in feet. In some cases it is indicated that soundings are in feet in vicinities where it is known that the soundings should have been marked fathoms and feet instead of feet and tenths.

In many cases the times of soundings as to whether A.M. or P.M. is not entered in the proper column. This is a serious omission on this class of hydrography, particularly at the beginning of a day's work.

About five per cent of the soundings which had been corrected and checked in the field for a number of revolutions of drum in order to obtain correct soundings were found to be incorrect."

2. The plan and character of development fulfill the requirements of the General Instructions.
3. The plan and extent of development satisfies the specific instructions. It should be noted that a considerable portion of the work is outside of the 1000 fathom curve, to which the work should have been carried.
4. The sounding line crossings are adequate.
5. The information is sufficient for drawing the usual depth curves.
6. The field plotting was completed to the extent prescribed in General Instructions with the exception of 18 soundings representing  $24\frac{1}{2}$  hours run of the vessel, all of which were beyond the limits of the sheet. All of these soundings are deeper than 1100 fathoms. (S oundings beyond limits of sheet are 1 to 5 M', 14 to 18 M', 1 to 3 N', 1 to 5 P').
7. Much of the dead reckoning work was partially discredited by the field, and the attempt to plot it in the office caused a waste of time.
8. The junctions with adjacent sheets are satisfactory.
9. No further surveying is required within the limits of the sheet.
10. The work on the shoaler areas is satisfactory although the records are poor. All of the dead reckoning work is poor, none of the rules laid down in special publication No. 73 being followed.
11. Reviewed by E. P. Ellis, May, 1922.

*Christman*

# HYDROGRAPHIC TITLE SHEET

The finished Hydrographic Sheet is to be accompanied by the following title sheet, filled in as completely as possible, when the sheet is forwarded to the Office.

U. S. Coast and Geodetic Survey.

Register No. 4136 (Additional work)

State California 4136

General locality Northern Coast California Offshore  
G. Yigcaino to C. Mendocino

Locality Off Cape Mendocino, Bear Harbor, Table Bluff.

Chief of party P. H. Regenbort

Surveyed by Sydonia

Date of survey Nov 28, 1919 - and April 13 - July 21, 1921  
(Feb 2, 1920)

Scale 1:120,000

Soundings in athoms

Plane of reference M.L.D.W.

Protracted by (M.H. 1919) R.P.E. 1920. Soundings in pencil by (M.H. 1919) R.P.E. 1921

Inked by . . . . . Verified by . . . . .

Records accompanying sheet (check those forwarded):

Des. report, . . . . . Tide books, . . . . . Marigrams, . . . . . Boat sheets,

5 . . . . . Sounding books, . . . . . Wire-drag books, . . . . . Photographs.

Data from other sources affecting sheet . . . . .

Remarks: *This sheet was made by Sydonia in 1919 containing work from Nov 28, 1919 to July 3, 1920. It was returned by the office for additional work by Sydonia in 1921.*