

4166

C. & G. SURVEY

MAY 6 1921

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ADD. NO.

Form 504

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

State: FLORIDA

11-5813

DESCRIPTIVE REPORT.

Hydrographic Sheet No. 4166
Field No. 3

LOCALITY:

Florida Reefs

~~South of Marquesas Keys~~
Southern Approach to
Boca Grande Channel

~~and Boca Grande Key.~~

1919 & 1920

CHIEF OF PARTY:
C. H. Ober, G. C. Mattison &
F. B. T. Siems.

4166

Descriptive Report
to accompany
Hydrographic Sheet
Field No. 3.

Locality: The hydrography covers the area in the vicinity of Key West, Florida, South of Marquesas Keys, Boca Grande Channel and Boca Grande Key to and including the reefs bordering on the Straits of Florida.

The larger part of the work on this sheet was performed by the party of G. C. Mattison in 1919, and the sheet was completed a year later by the party of F. B. T. Siems as indicated by the sounding lines shown in red ink on the main boat sheet. This report principally covers the work as executed by the latter party.

Methods: Sounding lines were generally spaced 100 meters and crossed by lines 400 meters apart. The ship was used for practically all of the work on account of using distant signals. It was difficult to run these lines with the ship, in places of variable currents, and numerous split lines were necessary to maintain the minimum spacing of 100 meters. Where the shoals were not distinctly visible, that in north of the outer reefs, they were further developed by additional parallel lines. The outer reefs bordering along the Florida Straits were developed by running short lines over the shoalest appearing parts. The ship was maneuvered to drift or proceed slowly over these places resulting in the discovery of numerous uncharted shoal soundings as indicated on the main boat sheet. Also several coral heads were sighted, and if it was found necessary a boat was lowered and the least sounding over the same were obtained. Uncharted shoal soundings were reported from time to time to the Washington Office.

General Description: Except along the outer reefs, the area covered by this sheet is generally of uniform depth, and most of the shoals extend over a considerable area, with no marked variation in depth. These shoals consist principally of coral sand between outcropping levelledges of gray coral rock of slightly shoaler depth, as ascertained by the great number of soundings taken. The shoals are not easily discernable, except on a ^{calm} cloudless day and when the water happens to be very clear. The few shoal places of very small extent found between the outer reefs and the keys with depths of about 4 to 5 fathoms are difficult to see under the best conditions. The reefs on the edges of the Florida Straits, are generally readily seen by virtue of the decided contrast in color between them and the deeper water nearby. From a short distance they appear as a dark yellow streak on the surface of the water.

Upon nearing them the abrupt shoaler parts will stand out as light yellow patches in the coral rock. The shoalest water was generally found directly along the abrupt edges of the reefs except for Coral heads or boulders which are mostly decidedly yellow in color, others appear as shadowy circular patches.

Control:

In addition to the triangulation stations on Marquesas and Boca Grande Key, three water signals were erected and located by theodolite and sextant triangulation, two of these stations were located on Coalbin and Cosgrove shoals respectively, and the third between Marquesas and Boca Grande Key. On account of the detailed hydrography required the larger scale used: 1/15,000, it was thought advisable to use fixed signals located by their coordinates of latitude and longitude to insure a more even distribution of the sounding lines where it was necessary to change objects in obtaining fixes on a distorted boat sheet. One buoy signal with a short scope of line, yet adequately anchored, had to be used to obtain positions for a small amount of work along the southeast part of the sheet.

Plotting:

The positions for the development of Cosgrove Reef were obtained by a vertical distance angle between the top and base of triangulation station Grove and by a horizontal direction angle between this signal and the distant signal South, as fully explained in the sounding record.

A well seasoned smooth sheet should be used for the plotting. It should comprise the area shown on the main boat sheet except that it may be extended further to the westward as otherwise the soundings will plot very close to the west edge.

Harbors:

The channel along the west side of Boca Grande Key can be used by vessels drawing 7-1/2 ft. it extends to a well protected basin surrounded by reefs roughly about 3/4 mile N.N.E. of Boca Grande Key; the 7 ft. soft bottom channel at M.L.W. leading from the main channel directly to the basin is narrow and has some sharp turns, yet if properly marked it would be practicable to use it. The Hydrographer anchored at the head of the main channel, and intended to use the basin as a refuge in case of hurricane weather, entering the same at high water, see hydrographic sheet (Field No. 2) There is considerable tidal current in the main channel.

Tides:

Tides were observed at Marquesas and Boca Grande Keys.

Respectfully submitted



F. B. T. Siems

Chief of Party, C. & G. S.

STATISTICS SHEET NO. - 2 -

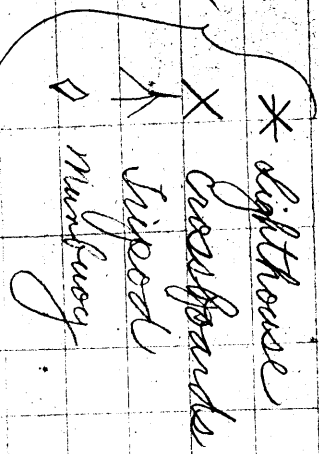
Date, 1919.	Letter	Vol ume.	Posi- tions.	Sound- ings.	Miles Statute.	Vessels.
April 17	A	1	6	44	1.1	Ship.
May 19	B✓	1	28	168✓	5.2	"
" 20	C✓	1	76	379✓	10.6	"
" 21	D✓	1	76	422✓	12.1	"
" 27	E✓	1	101	606✓	17.8	"
" 27	E✓	2	22✓	126✓	3.4	"
" 28	F✓	2	133✓	730✓	22.8	"
June 9	G✓	2	119✓	622✓	23.1	"
" 10	H✓	2	53✓	293✓	11.0	"
" 10	H✓	3	63✓	390✓	13.5	"
" 12	J✓	3	4✓	16✓	.5	"
" 16	K✓	3	142✓	725✓	34.2	"
" 17	L✓	3	87✓	483✓	19.25	"
" 18	M✓	3	26✓	148✓	6.6	"
" 18	M✓	4	20✓	115✓	4.0	"
" 19	N✓	4	94✓	515✓	20.2	"
" 20	P✓	4	188✓	940✓	40.0	"
" 23	Q✓	4	48✓	214✓	9.6	"
" 23	Q✓	5	17✓	85✓	3.5	"
" 24	R✓	5	201✓	926✓	40.0	"
" 25	S✓	5	200	966✓	43.6	"
" 26	T✓	6	212✓	1002✓	44.0	"
July 10	U✓	8✓	29✓	140✓	5.1	"
" 11	V✓	6✓	183✓	810✓	33.2	"
" 17	W✓	7✓	137✓	705✓	30.1	"
" 18	X✓	7✓	155✓	864✓	34.5	"
August 5	Y✓	7✓	27✓	165✓	6.6	"
" 6	Z	7	81	476	18.7	"
" 6	Z	8	9	57	1.6	"
" 7	A'✓	8✓	152✓	859✓	35.2	"
" 12	B'✓	8✓	146✓	304✓	36.0	"
" 13	C'✓	8✓	32✓	156✓	7.4	"
" 13	C'✓	9✓	131✓	720✓	32.0	"
" 14	D'✓	9✓	164✓	900✓	41.0	"
" 15	E'✓	9✓	110✓	650✓	27.8	"
" 15	E'✓	10✓	63✓	355✓	14.2	"
" 20	F'✓	10✓	119✓	811✓	27.0	"
" 25	G'✓	10✓	114✓	404✓	20.1	"
" 26	H'✓	10✓	84✓	411✓	20.2	"
" 26	H'✓	11✓	64	349✓	15.4	"
" 27	J'✓	11✓	130✓	670✓	31.0	"
" 28	K'	11	157	845	40.0	"
" 29	L'	12	105	517	27.4	"
July 19, 1920.	M'✓	12✓	38✓	76✓ ¹⁹⁴	7.8	"
" 20	N'✓	12✓	87✓	445	16.7	"
" 21	P'	12	153	833	37.9	"
" 22	Q'✓	13✓	151✓	781✓	28.9	"
" 23	R'✓	13✓	190✓	925✓	34.5	"
" 27	S'✓	13✓	104✓	577✓	19.6	"
" 29	T'	14	69	426	12.5	"
" 30	U'	14	191	1301	37.0	"
Aug. 3	V'	14	108	644	23.0	"

STATISTICS SHEET NO.--3--

Date, 1920.	Letter	Volume.	Positions.	Soundings.	Miles statute	Vessels
August 2,	V ⁱ	15	112	747	18.0	Ship
" 4,	W ⁱ ✓	15✓	154✓	811	25.5	"
" 5,	X ⁱ ✓	15✓	125✓	661	21.2	"
" 5,	X ⁱ	15	59	231	9.0	"
" 6,	Y ⁱ	16	87	445	11.6	"
" 9,	Z ⁱ	16	46	211	6.0	"
" 10,	A ⁿ	16	7	43	.7	"
" 11,	B ⁿ	16	128	739	23.3	"
" 13,	C ⁿ	17	54	389	9.5	"
" 16,	D ⁿ	17	85	460	19.7	"
" 17,	E ⁿ	17	148	839	22.5	"
" 18,	F ⁿ	18	155	1128	28.5	"
" 19,	G ⁿ	18	122	776	11.5	"
" 20,	H ⁿ	19	97	748	7.5	"
" 24,	J ⁿ	19	45	305	8.7	"
" 25,	K ⁿ	19	90	512	12.0	"
" 26,	L ⁿ	19	37	270	3.5	"
" 26,	L ⁿ	20	70	373	6.5	"
" 27,	M ⁿ	20	58	429	11.6	"
" 30,	N ⁿ	20	57	298	6.1	"
" 31,	P ⁿ	20	134	742	26.0	"
" 31,	P ⁿ	21	5	32	3.0	"
Sept. 1,	Q ⁿ	21	143	828	19.6	"
" 2,	R ⁿ	21	132	802	17.5	"
" 3,	S ⁿ ✓	22✓	121✓	810✓	17.3	"
" 8,	T ⁿ ✓	22✓	57✓	281✓	6.3	"
" 9,	U ⁿ ✓	22✓	103✓	316✓	16.2	"
" 10,	V ⁿ ✓	23✓	20✓	129✓	3.2	"
1919						Launch
June 7,	a✓	1✓	58✓	338✓	12.2	Mandalay.
June 20,	b✓	1✓	111✓	536✓	19.7	"
June 24,	o✓	1✓	153✓	1078✓	23.7	"
June 24,	c✓	2✓	2✓	8✓	.3	"
June 25,	d✓	2✓	159✓	960✓	25.5	"
June 26,	e✓	2✓	153✓	922✓	23.0	"
Aug. 5,	f✓	3✓	75✓	552✓	13.0	"
Aug. 6,	g✓	3✓	151✓	691✓	13.5	"
Aug. 7,	h✓	3✓	171✓	620✓	18.0	"
Aug. 8,	j✓	4✓	159✓	746✓	18.7	"
Aug. 9,	k✓	4✓	60✓	246✓	5.0	"
Aug. 13,	l✓	4✓	146✓	623✓	14.7	"
Aug. 14,	m✓	4✓	76✓	414✓	7.0	"
Aug. 14,	n✓	5✓	55✓	455✓	6.3	"
Aug. 15,	N✓	5✓	138✓	1145✓	17.2	"
Aug. 25,	p✓	5✓	113✓	417✓	8.7	"
Aug. 26,	q✓	6✓	97✓	406✓	7.2	"
Aug. 27,	r✓	6✓	123✓	511✓	8.6	"
Aug. 28,	s✓	6✓	170✓	797✓	19.0	"
Aug. 29,	t✓	7✓	22✓	86✓	2.0	"
Total.			8842	53097	1726.75	
			3842	33892	1726.75	

Sheet #3

Object and desc.	Method of marking	date	89m	89p	Remarks	Height	Reference	Height of object
19 Mat tower	OT	24-33	1011	82-09	1395			Height of tower
20 Tree	584	24-33	1053	88-09	1365	located with		Height of tree
21 Pole	OT	24-33	1134	82-09	1087			Height of pole
22 Pine	OT	24-33	1467	82-09	1437			Height of pine
23 Sol orange tree	OT	24-33	1515	83-09	1189			Height of sol
24 Bank	OT	24-33	1045	82-10	58			Height of bank
25 Bank 0mg7	584	24-30	1306	82-05	1245	Bank		Height of bank



Legend

- X Lighthouse
- X Crossroads
- X Tipost
- ◇ Munifuey

From Party of
G.C. Mattson, 1919.

Height of tower
Height of tree
Height of pole
Height of pine
Height of sol
Height of bank

Object	Material	Location	Date	SN	Weight	Remarks	Kind of wood	Specimen
Wagon Fly Box	Wood	Box						
Sheet	Sheet	#3						
1. In	5A	0 H	24-29	164	82-05	135	Pair - 77-00	Pair 76-51
2. Ant	5A	0 H	24-29	22	82-04	1260	Pair - 76-58	Pair 23-51
3. Ring	5A	0 H	24-28	35282-05	660	Pair - 58-26	Pair 35-56	
4. Wreck	5A	0 H	24-27	843	82-09	1582	Pair - 58-26	Pair 58-17
5. Box	5A	0 H	24-28	1449	82-10	705	Pair - 45-05	Pair 45-05
6. Box	5A	0 H	24-29	774	82-09	675	Pair - 109-52	Pair 109-52
7. Saw	5A	0	24-32	18050	82-06	16306	Pair - 16306	Pair 16306
8. Near	5A	0	24-32	18349	82-07	16827	Pair - 16827	Pair 16827
9. Old	5A	0	24-33	279	82-08	270	Pair - 270	Pair 270
10. Saw	5A	0 H	24-33	45	82-08	1596	Pair - 1596	Pair 1596
11. Saw	5A	0 H	24-32	1363	82-09	357	Pair - 357	Pair 357
12. Saw	5A	0 H	24-32	162	82-09	78	Pair - 78	Pair 78
13. Saw	5A	0	24-32	1634	82-09	1631	Pair - 1631	Pair 1631
14. Saw	5A	0 T	24-32	1660	82-09	1198	Pair - 1198	Pair 1198
15. Saw	5A	0 T	24-32	1740	82-09	1339	Pair - 1339	Pair 1339
16. Saw	5A	0 T	24-33	85	82-09	1491	Pair - 1491	Pair 1491
17. Saw	5A	0 T	24-33	1053	82-09	1053	Pair - 1053	Pair 1053
18. Saw	5A	0 T	24-33	173	82-09	173	Pair - 173	Pair 173

Kind of wood
Slight
Specimen

Pair 6719
Pair 76-51
Pair 117-31
August 1919

From Party of
G. C. Mattson 1919

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

May 6, 1922.

Verification of Hydrographic Sheet No. 4166.
By A. L. Shalowitz, Cartographer.

In verifying this sheet it was found at the outset that the sheet had undergone considerable distortion and owing to the great distance of the signals used, the checked positions did not agree with the positions as protracted. This introduced considerable difficulty, as the difference between the old position and the new position depended upon the distance of the signals and their relative positions. No constant correction could therefore be applied to any one position. What had to be resorted to was this: When the location of a position appeared doubtful it was replotted but with it several other positions usually in the same line where the same set was used. The difference between the old and the new position was thus measured and this distance laid off in the proper direction from the new location of the doubtful position. This naturally delayed the work quite a bit as so many more positions had to be replotted. It is estimated that fully 1000 positions were reprotracted.

The protracting was very good, although frequent errors were made by using the right angle one degree different from the recorded angle. Many doubtful places were left unsolved by the plotter and hence had to be caught up by the verifier. The plotter was careful to join the end of one line with the beginning of the next line by a dotted line. This is very good practice as it saves considerable time in searching for the location of a line. The soundings were excellently plotted, the time intervals being strictly adhered to. In every case the shoalest sounding was plotted which was of valuable aid to the inker. Taken as a whole the plotting of the sheet was very well executed, particularly when one considers that not a small amount of positions had to be protracted with a double extension on the protractor.

The records were good, particularly those of G. C. Mattison, and the recording of O. D. Meany and A. Lucas is worthy of special mention. In both cases the general instructions for records were adhered to and the figures were clear and legible. In the portion of the work executed by F. B. T. Siems the records were not so well kept. The recording of C. A. Gandolfo was a little careless and

oftentimes the figures were somewhat doubtful. A practice which the writer thinks should be discouraged is the use of the word "same" for similar objects used. It is plainly evident that an error made in the initial set would be carried on through. This is not only true of the field work but of the office work as well. The plotter might on his original set use one wrong signal. Bearing that used set in mind he would plot all subsequent positions with the same wrong object. The result is obvious.

In Gandolfo's recording he often neglected to make his remarks complete. For instance between positions 123 and 124 P' (ship) no note was made as to the kind of buoy passed. Again, between positions 133 and 134 P' (ship), the records simply noted that Boca Grande buoy was abeam but no mention made whether on port or starboard side. Further at 47 U' (ship) mention is made of a rock on starboard side but no distance was given. When shoal soundings were encountered in deep water which appeared somewhat doubtful they should have either been checked or else marked O. K. and initialed in the record. In all cases where soundings appeared somewhat doubtful as to existence it was inked in on the sheet, the controlling idea being that the nature of the bottom in that locality was such as to make anything possible. For the same reason crossings which appeared doubtful were accepted. On "D" day (ship) where the soundings appeared too shoal at crossings it was concluded after a close study that the discrepancies were due to the choppy sea and the fact that the soundings on this day were taken on the weather side of the ship while those on the cross lines were mainly taken on the lee side. In general the field work is to be considered very good and while the development from a hydrographic standpoint is more than adequate, as closer lines could hardly have been run over the shoals, yet drag work will have to be done before any positive statement can be made as to the least water on the shoals. With this in view it seems to the writer that much time was lost in attempting too close a development, this also being true of the open area where the bottom is fairly uniform and where it is believed that 200 meter lines would have served the purpose just as well.

The positions of E"^{day} (ship) around A Grove taken by a vertical distance angle were not inked in on the sheet as they were too close to the signal and moreover no shoaler soundings were found on this day than were already obtained on "S" day (launch).

Hydrographic signals that were temporary in character, such as a boat anchored in the morning, located, and then taken in at night, were not inked in on the sheet. For any future examination these daily

positions can be plotted as the angles are usually recorded at the beginning of the day. No record could be found for the location of © Back, so the boat sheet position had to be used.

It may not be entirely amiss to mention a word or two about the rate of progress made in the verification of this sheet.

Work begun on sheet February 11, 1922.

Sheet completed May 2, 1922.

Total number of days on sheet including overtime - 61.

Number days overtime - 6.

Soundings actually inked - 52,000 ±

Approximate number of days spent in studying various problems that presented themselves, which were not taken care of by the plotter - 7.

Number of positions actually reprotracted - 1,000 ± or about 4 days work.

This leaves about 50 days actually spent in verifying and inking 52,000 soundings, or an average of 1050 soundings per day.

The inking of soundings varied from 600 to 2200 per day.

Attention is called to the fact that Z day (ship work) and A' to L' inclusive (ship work) were verified and inked by A. Baer, and that J", K" and P" (ship work) were verified and inked by H. E. MacEwen, during the writer's absence.

In view of the rapid progress made in the verification of this sheet, it is not to be thought that any accuracy was sacrificed for speed. The writer confidently feels that had he devoted twice the time to the sheet, the same degree of accuracy would have resulted.

In conclusion it might be said that much time was saved the inker and he feels sure the plotter by the field parties using, in the main, uniform time intervals between positions. The writer feels that particular pains should be taken in training the recorder to use uniform intervals where possible, as the saving in time on the office work is tremendous.

A. L. Shalowitz

A. L. Shalowitz,
Cartographer, C. & G. Survey.

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

July 6, 1923.

SECTION OF FIELD RECORDS

Report on Hydrographic Sheet No. 4166

Vicinity of Marquesas Key, Florida Reef

Surveyed in 1919-20

Instructions dated Dec. 28, 1918 and Jan. 11, 1919.

Chiefs of Parties: C.H.Ober, G.C.Mattison and F.B.T.Siems.

Surveyed by C.H.Ober, G.C.Mattison, F.B.T.Siems and O.M.Straube.

Protracted and soundings plotted by J. D. Torrey.

Verified and inked by A.L.Shalowitz and Alois Baer.

1. The records conform to the requirements of the General Instructions. See verification report of A. L. Shalowitz.
2. The plan and character of development fulfill the requirements of the General Instructions.
3. The plan and extent of development satisfy the specific instructions.
4. The sounding line crossings are adequate.
5. The information is sufficient for drawing the usual depth curves.
6. The plotting of the sheet was done entirely in the office.
7. The junction with H. 4138 on the east is excellent, except near Vestal Shoal Buoy where H. 4166 shows marked shoaling. On the southern edge it joins H. 4169b. Most of the soundings on the latter sheet are tube soundings which have been rejected. As a result large gaps south of H. 4166 remain unsurveyed.. There are no indications of dangers however in this area.

2 - Report on Hydrographic Sheet No. 4166 (Cont.)

8. With the exception of this area on the southern edge the area covered by this sheet is completely surveyed, insofar as it may be done with the lead. All indications of shoals were closely developed, but as it is very probable that some of the coral heads escaped detection the entire area should be dragged.
9. The statistics of this sheet show that 9842 positions were determined and 53097 soundings taken, making it one of the most complete surveys made by the Coast and Geodetic Survey. In view of the necessity of dragging the entire area the advisability of spending so much time on supplementary development is questioned.
10. The character and scope of the surveying are excellent.
11. Reviewed by E. P. Ellis, July, 1923.

DEPARTMENT OF COMMERCE
U. S. COAST AND GEODETIC SURVEY

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. 4166 Field No. 3

State . . . Florida
General locality Florida Reefs, Vicinity of Key West ^{Marquesas Key}
Locality Southern Approach to Boca Grande Channel
~~Marquesas Keys to Boca Grande Key~~

Chief of party C. H. Ober, G.C. Mattison and F.B.T. Siems.

Surveyed by Ober, Mattison, Siems, and Straube.

Date of survey . April 17, 1919 to September 10, 1920.

Scale . 1:15,000

Soundings in

Plane of reference

Protracted by J.D. Torrey . Soundings in pencil by J.D. Torrey

Inked by A.L. Shalowitz & A. Baer Verified by A.S. & A.B.

Records accompanying sheet (check those forwarded):

✓ Des. report, 4 ^{Boca Grande & Marquesas Keys.} Tide books, _____ Merigrams, 2 Boat sheets,
✓ 30 Sounding books, 0 ^{Angle Books} ~~Wire drag books~~, 0 Photographs.

Data from other sources affecting sheet Triangulation, 1920, 1911.

Remarks: No smooth sheet projection made, see Descriptive Report under plotting.

H-4166

GEOGRAPHIC POSITIONS

H4166

Ship *Ship*

2

Locality *Florida Reefs, vicinity of Marquesas Keys.*

Datum.

State *Florida*

STATIONS.	LATITUDE AND LONGITUDE.			SECONDS IN METERS.	AZIMUTH.			BACK AZIMUTH.			TO STATIONS.	DISTANCE. METERS.	LOGARITHMS.
	°	'	"		°	'	"	°	'	"			
<i>Pass</i>	24	32	13.424	413.0	97	19	27.6	277	16	46.9	<i>Saw</i>	10975.9	4.040441.
	82	00	31.121	875.9									
<i>Saw</i>	24	32	58.766	1808.0									
	82	06	57.937	1630.6									
<i>Wat. (water signal) destroyed.</i>	24	37	50.16	1543.3	314 27 32 35	22 207 31 25	05 134 24 42				<i>South Pass</i>	10317.8	4.013587.
	82	06	47.28	1329.7	314 - 22 - 05	134	24	42				14810.7	4.170574.
<i>Pole (water signal) destroyed</i>	24	31	15.81	486.4	123	08	45	303	07	33	<i>Saw Pass</i>	5794.9	3.763047.
	82	04	05.54	155.9	253	37	12	73	38	41		6290.3	3.798670.
<i>Bin (water signal) destroyed.</i>	24	27	08.23	253.2	145	14	10	325	12	22	<i>South Pass</i>	12906.8	4.110817.
	82	05	15.32	431.1	220	25	16	40	27	14		12336.8	4.091201.
<i>Grav (water signal) destroyed.</i>	24	27	28.30	871.0	193	53	32	13	54	08	<i>South Bin</i>	10285.0	4.012204.
	82	11	04.55	128.2	273	34	12	93	36	37		9855.3	3.993670.

Calculated

4/1/57 Chart 584 - added 10 fm curve west of long. 82°00. N. Rogers