

# 2875

## WIRE DRAG

C. & G. SURVEY  
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APR 15 1914  
Acc. No. ....

Diag. Cht. No. 1251-2 & 1251-2

Department of Commerce and Labor COAST AND GEODETIC SURVEY
<u>C. H. Tittman</u> Superintendent.
State: <u>FLORIDA.</u>
DESCRIPTIVE REPORT.
<u>Sydney</u> Sheet No. <u>2875.WD</u>
LOCALITY: <u>Approaches to Key West:</u> <u>West and Southwest Channels</u>
<u>1914.</u>
CHIEF OF PARTY: <u>N. H. Heck,</u> Assistant.
11-4645

2875  
WIRE DRAG

Sheet No. 2875.

FLORIDA.

Approaches to Key West.

West and Southwest Channels.

Wire Drag Survey Continued From 1913.

1914.

January 16 ----- March 24.

N. H. Heck,	Assistant, Chief of Party.
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J. A. Daniels,	A i d . .
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Geo. Olsen,	Watch Officer.
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Harry Leypoldt,	A I D .
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E. W. Eickelberg,	" .
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W. H. Clark,	" .
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Maurice E. Levy,	" .
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Carl E. Risvold,	Deck Officer .
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Scale:- 1/15000.

Tide Gauge,- Key West Automatic.

The work on this sheet included dragging of area outside of the outer reef to develop ridges and the completion of areas missed in last season's work.

In describing shoals, depths are in feet at Mean Low Water, directions are given as azimuths from true north and distances are in meters

Outside of outer reef. Shoals, pinnacles or ridges found.

A ridge running east-west  $220^\circ$ , 1800 meters from Vestal Shoal buoy with least depth of 31 feet.

A ridge 3000 feet in length with depths of 36 to 38 feet extends from a point Western Dry Rocks En.  $248^\circ$ , 3350 m to  $186^\circ$  1200 m. Least depth on the ridge is 32 feet  $193^\circ$ , 1100 m from same beacon.

A 35-foot shoal ridge was found 200 m outside of previously found ridge off of Sand Key, Sand Key Light House  $200^\circ$ , 1600 m. No shoals were found between Sand Key L. H. and the Main Ship Channel on the outer ridge.

Areas previously missed.

West Channel. In the vicinity of buoy nun no. 8. In dragging several small areas previously missed, a piece of wreckage with least depth of 26 feet was found, Eastern Triangle En.  $275^\circ$ , 4300 m. A small area was not covered because the buoy was temporarily out of place and on one of the areas. The position of the buoy was reported to the Local Inspector who proposed to replace it in charted position at the first opportunity.

A number of small areas were covered in West Channel, and two shoals were found; Signal Vote  $190^\circ$ , 2700 m, 23 feet, and  $211^\circ$ , 3700 m, 25 feet.

Inner Reef: Vicinity of Middle Ground.

Pinnacle 18 ft Mid.  $39^\circ$ , 1425 m.

13 "  $314^\circ$ , 600 m.

14 "  $351^\circ$ , 550 m.

15 "  $260^\circ$ , 1750 m.

15 "  $244^\circ$ , 1900 m.

In each case less than  
charted

An 18 foot pinnacle was found 281°, 3300 m, from Middle Ground Bn.

Several shoals were found on the south side of Parsonage Shoal. Three shoals were found, Western Dry Rock Bn 335°, 3300 m, 26 ft.  
347°, 3600 m, 19 ft.  
352°, 3500 m, 28 ft.

Outer Reef:-

A depth of 15 feet was found on 16 ft. charted shoal 1500 m west of Main ship Channel Entrance Range.

Shoals were found as follows:-

From Eastern Rocks Bn,	16°, 2900 m, 17 ft. (	In each case less than Charted.
	21°, 2950 m, 18 ft.)	
	26°, 2875 m, 18 ft. (	
From Satan Shoal Buoy,	70°, 975 m, 22 ft.	
	72°, 1600 m, 21 ft.	
	95°, 950 m, 21 ft.	

The last named 21 ft. shoal was not found by sounding as the drag slipped off before it was located. The location given is the best available without further examination and the depth is one foot less than the effective depth of the drag.

A small area previously missed in the entrance of Southwest Channel was dragged but no new shoals were found.

Note that in a number of cases buoys were used as signals. They were in every case carefully located by at least three angles and checked from time to time.

For new system of plotting depths see Description of Long Wire Drag 1914.

A celloloid scale for plotting drag curve is attached to sheet.

Florida Reefs,  
Key West, Florida.

S T A T I S T I C S .

Sheet No. 2875- 1914.

Date.	Day.	Vol.	Angles.	Miles	Drag Length	Soundings.		Remarks.
						Number	Angles	
Jan. 16	A	1	166	3.2	2700	2	4	
19	B	1	108	2.0	2700	7	14	
20	C	1	120	2.0	2700	5	10	
21	D	1	138	2.0	2700	5	10	
28	E	1	246	5.5	3000	3	8	
Feb. 4	F	1	228	5.5	3000	2	6	
7	G	1	84	1.0	3000	2	7	
14	H	1	102	3.0	3000	7	13	
19	J	2	264	5.50	3000	3	10	
27	K	2	168	4.0	3000	14	29	
Mar. 3	L	2	132	3.6	3000	0	0	
4	M	2	144	2.5	3000	7	15	
9	N	2	114	2.0	2400	6	17	
24	C	2	78	1.0	1800	2	7	
			2092	42.8		65	150	

Summary.

Total No. Angles, -----	2242
" No. Miles, -----	42.8
" No. Soundings, -----	65
" No. Square Miles, -----	16.9

E. M.

VEC  
May 16, 1913

HYDROGRAPHIC SHEET 2875

Approaches to Key West, Florida, by Assistant  
N.H.Heck in 1913.

TIDES.

	Key West ft.
Mean low water, or plane of reference on staff	4.1
Lowest tide observed " "	2.8
Highest " " " "	7.5
Mean range of tide	1.2

Sound and Sounding Survey  
MAY 16 1913  
TIDAL DIVISION

Hyd. Sheet # 2875

Work of 1914.

### Approaches to Key West

The work of 1914 includes the dragging outside of the outer reef and the completion of the small areas missed by the drag during the last season.

A number of shoals were located, the description of which is given in the Descriptive Report of the Chief of the party.

Plotting was done in the field and then verified in the office. The work was then arranged and a tracing made, which shows by a colored scheme the max. eff. depth, to which the partial areas have been dragged. A number of small areas have been missed by the drag and on the tracing are indicated by means of arrows.

Attention might be called to a few inaccuracies in plotting:

Position 3D, using left angle  $24^{\circ}07'$  as recorded does not plot very well. The left  $\angle$  is probably  $20^{\circ}07'$ , the way it was plotted by the party.

On page 8<sup>th</sup> of the sounding record there is a note stating, that  $V_9$  &  $V_9$  were taken to check  $V_5$  of 1913. The plotting of  $V_5$  in the office did not agree with the plotting in the field, and the drag line run to find the 20 ft. shoal

proved that  $VJ$  as plotted on the smooth sheet is in error.  
Now  $VJ$  as plotted in the office is in accord with the angles as recorded in the sounding book of 1913. The discrepancy is, probably, due to an error in taking or recording the angles.

Day "A" position 4, A change in the length of the uprights started at "N" and ended at buoy "5". Plotted as if the change started with buoy "5" and ended with "N"

Day G position 7. A change in the length of uprights made. Previous to the change the eff. depth of the drag was 19 ft. Plotted, as if the eff. depth of drag to start with was 14 ft. instead of 19 ft.

Day "H" position 3, A change in the drag depth started at buoy "3" at 12:25 and ended at buoy "6" at 12:29. Plotted as if the entire change was completed at 12:25;

Day "J". The drag set at an eff. depth of 17 ft. passed over a spot, which at 4"N" was sounded and found to be 15 ft.

Day "N" positions 12 & 13. Left angle recorded is  $\Delta$  Sand, plotted with  $\Delta$  Rock Key. This error throws the area dragged in the wrong locality and necessitated replotting.

A number of sdgs. of lesser depths than those found in the present survey were obtained during the previous surveys (See Hyd = 2649, 2671, 2683) but as extensive dredge work was done in the channel by the U.S. Eng. those sdgs. were not transferred to the sheet.

On the whole the plotting was very carefully done, the records systematically arranged and kept in very good order. J.B. Shklar.



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# 2875

Department of Commerce and Labor  
COAST AND GEODETIC SURVEY

*C. F. S. Mann*  
Superintendent.

State: *Florida*

## DESCRIPTIVE REPORT.

*Hydrographic Sheet No. 2875*

LOCALITY:

*Approaches to Key  
West, West and  
Southwest Channels  
Survey with Wire Drag*

1907

CHIEF OF PARTY:

*J. H. Hecox*

U. S. C. & G. SURVEY.  
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JUN 21 1907  
Acc. No.

2875

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U. S. C. & G. SURVEY,  
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JUN 21 1907  
Ess. No.

Descriptive Report

Projection 3'

Entrances to Key West, Fla.

Chief of Party, N. H. Heck

March 21 to May 9, 1907.

2875

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DESCRIPTIVE REPORT.

Projection no. 3'

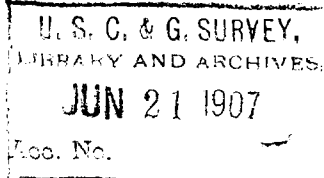
Vicinity of Key West, Fla.

Area covered. This sheet includes the dragging of about 2/3 of the area of the West Channel where depth is 35 feet or over, a small part of the eastern end of the West Channel to the depth of 30 feet, and a small part of the Southwest Channel to the depth of 35 feet.

A. West Channel between long.  $81^{\circ}56' & 59'$ . Five shoals were found in this area, with depths from 32 to 35 feet.

B. West Channel between  $81^{\circ}53' & 56'$  No uncharted shoals were found in this section, but on north side of channel at long.  $81^{\circ}55'.5$  the drag struck while under way/ Least water found was 38.5 feet but further development will undoubtedly result in finding less than 35 feet' .

A<sup>o</sup> indicated by the chart furnished me at beginning of season defining areas of work , but not on the original sheet there appeared a line of three shoals (not on chart 469) with the following positions. One in lat. 24 29.8, long. 81 55.0 and the other two on a line in a Southeast direction from it, with depths of 31, 34 and 33 feet respectively. Thourough dragging to a depth of not less than  $36 \frac{3}{4}$  ft., gave no evidenc of the existence of these shoals/. I have made a thorough investigation of the original sheets and find that these all appear on one line on the original sheet of the region but do not appear on two resurveys, one with, and one without the pipe drag/ There is no doubt that the position of these shoals was in error and that they were probably plotted too far to the



southward.

C. Two shoals and an uncharted anchor were found on the eastern part of the West Channel. This anchor had 29 1/2 feet of water on it, in soft bottom 35 feet in depth. One shoal had 22 feet of water and is in mid channel for vessels using the west channel. This channel has been used by vessels drawing 23 feet. Lat/ of shoal 24 31 Long. 81 49.6.

D. One line was run from the West Channel out through the West Channel to the outer reef. This line showed a clear channel through the inner reef in vicinity of the Southwest Channel. On the outer reef about midway between tSatan and Vestal shoals an uncharted shoal was found partly closing the entrance charted there. There is a clear entrance at this point not more than 400 feet in width.

2. The principal result of this survey is to show that aside from the shoals here described the part of the West Channel dragged is free from obstructions and is an excellent anchorage for large naval and merchant vessels. There is also a clear passage through the inner reef with a greater depth than 35 feet. There is every indication that an excellent 35 foot channel could be made by widening the opening through the outer reef at a less cost than a 30 foot channel at any other point in the vicinity of Key West.

3. All soundings taken are the result of at least half an hour's sounding with launch and small boat except where it is noted in the record that further development is required. All soundings are given in the records of the launch "Blanche" and the effective depth of the drag while under way also. Only

(3)

where stated in the records in red or blue pencil is the grounding of the drag to be taken as an indication of an uncharted shoal, as in all other cases the drag struck bottom because of coming to rest in insufficient depth. All soundings on sheet are underscored in soft black pencil.

4. The width of the drag should be considered as 150 meters unless the distance between the lines is less in which case the width of the drag is the same or a little greater than that of the plotted lines. The greater distance between the lines is due to the 15 fms. of towline which was found necessary in order to handle the boats. This distance of 150 meters should be spaced equally between the two lines.

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JUN 1-1909

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Department of Commerce and Labor  
COAST AND GEODETIC SURVEY

O. H. Tittmann  
Superintendent.

State: Fla.

DESCRIPTIVE REPORT.

Hyd. Sheet No. 2875

LOCALITY:

Coast of Florida

Approaches to Key West

190 9

CHIEF OF PARTY:

N. H. Heck, Assistant

2882

2875

Sheet 2875

Continuation of previous wire drag work

Jan. 9- May 12, 1909

2875

## DESCRIPTIVE REPORT WITH TABLES

Hyd. Sheet 2875 Coast of Fla.

## Wire Drag Party

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JUN 1 - 1909  
Acc No.

The sheet is accompanied by a celluloid sheet on which the effective depths given in the records are shown. The scheme of colors used is as follows: below 20 feet, blue; 20-29 feet, green; 30-39, red; In each case the figure indicates the foot. Thus green 3 = 23 feet.

A tracing also accompanies the sheet on which all the areas covered and missed from the beginning of the work to the present time are shown. Both of these should be kept with the sheet as they form a part of the permanent record.

The West Channel was dragged from the limits of the work on Hyd. sheet 2933 and previous work on sheet 2875 to the 18 ft. curve on the north side of the channel. A number of areas missed in previous work were covered. The shoals in this channel were developed and while nothing was found that affects in an important manner the navigable depths in this channel, a large number missed in previous work were located.

In so far as possible the area was dragged to within two feet of bottom- the irregular contours making this impossible in every case. The plan was carried out sufficiently to develop the safe navigable depths.

A 15 foot shoal lies about 1 1/4 miles S 29° E from the signal Woman.

The extensive shoal area lying about 2 miles SE of Woman Key was thoroughly developed.

Previous experience was confirmed by the results obtained where the effective depth in some cases was greater than the true depth. This occurred where the bottom was soft and the resistance was uniform. In general it may be stated that the charted soundings are either correct or a little less than the true depth, -As- the except on rocky shoals where they are very seldom correct. In the cases where they are less the difference is not sufficient to affect navigation.



An important shoal was found lying 1 mile N 10° E from Middle Ground Beacon No. 3, near the entrance course of the Southwest Channel. with 19 ft. at M.L.W. ✓

A passage through the inner reef between the beacon just referred to and Parsonage Shoal was uninvestigated. Two charted shoals shown on chart 584 with depths of 26 and 29 feet lying respectively 760 and 700 meters NE and ENE from the charted position of the HS buoy were found not to exist there being no less than 33 feet at this place. A shoal having a least depth of 21 feet at M.L.W. was found 150 meters west of the position of the 23 foot shoal shown 300 meters north of the HS buoy.

The region lying between Parsonage Shoal and Red Buoy N2, Southwest Channel is very rocky. It was found to be impracticable to carry a line with the depth of 35 feet across this area and complete development will require considerable time. The work in this locality is restricted to the best weather owing to the distance from the base and the open water which makes work impossible in a breeze of more than moderate strength.

The investigation of the entrance over the outer reef of the Southwest Channel, and its vicinity was begun. A shoal with a depth of 18 feet was found on the reef west of Satan shoal and while the work was not completed, the channel is rendered dangerous for drafts of 18 feet and over. A line of 25 1/2 feet depth was carried across the reef to the westward of this shoal, and another of 27 feet still further westward. Both of these are narrow and crooked and of little use as channels. It is probable that somewhat greater depth could be taken through these channels but without improvement the increased depth would be useless. In case a deep southwest channel is ever required this seems to be the best place to cross the outer reef.

Work was begun in a channel joining the Southwest and West channels north of the channel over the outer reef just discussed. The shoals were found to be of gr

greater extent than charted. The northern end of this channel and the west channel in the same vicinity were found to have a navigable safe depth of not more than 30 feet although greater depths exist, on account of a number of shoals of this depth found in addition to those already charted. For purposes of navigation or anchorages of the largest vessels the channel buoy in the west channel represents the western limit.

An area was dragged south of Sand Key and the existence of a ridge having a depth of 28 ft. and greater depths was discovered. This has been reported by me and is now shown on Chart 584.

The planigraphic system was adopted on and after April 1 and all work done after this date was plotted by the new method. The distances between the buoys were scaled off the sheet. A correction was applied to these for the distance in the direction of the drag between the large buoy and weight. It is proposed hereafter to take into account the effect of changes of width on the drag depth., although further experience will be necessary in order to get perfect results.

For the positions of the water signals used west of Parsonage Shoal during the season., the following taken from the records will be of assistance to the draftsman:

Hyd: Signal "Wet" was first established on Feb. 20 in 28 feet of water. It consisted of three large drag buoys supporting a pole with flag and target and anchored with a very short scope. Stormy weather followed and the signal was

Position on Feb. 20:	:	not used till March 15,. It was used on the 16
Mid Woman	:	th and then taken up for repairs. On April 2
72 55	:	it was set out again, and used on that date, its
Man	:	position not being exactly thesame. About April
51 52	:	15 it was taken up in a sinking condition and not
Boca	:	replaced.
15 25	:	
Far	:	
139 30	:	
Sand	:	
51 13	:	
Mid	:	
29 04	:	

	Position on March 15	March 16
	Woman Boca	Woman Boca
	67 21	67 20
	Far	Far
	139 06	139 11
	Sand	Sand
	51 20	51 24
	Woman	Woman
	102 18	102 14

Signal "Hub" was a similar signal to signal "Wet" but further to the westward. It was used on April 19, 20 and 26, and checked twice each day.

Position on April 19	20	26
Mid Woman	Mid Woman	Mid Woman
62 00	61 51	62 00
Man	Man	Man
51 44	51 41	51 46
Boca	Boca	Boca
21 40	21 55	
Far Sand	Far Mid	
39 48	64 17	
Mid		
24 30		

For work on April 28-29 Black Buoy C3, north side of Southwest Channel was used, called "Black". Its position was taken three times on each day

but no appreciable change was noted.

For its position see records:

Launch 1, vol. 6, angle 1 x, 33 x

" 3, " 5, " 1 t, 19 t, 1 u, 46 u.

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OCT 6 - 1909

Acc. No.

Hyd. Sheet No. 2875

Sept. 24, 1908.

The records were well kept and the soundings plotted correctly.

A tracing has been prepared to show the dugged area and depth to which it was dugged.

H. L. Simons

C. & G. SURVEY,  
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OCT 6 - 1909

Acc No.

Hyd Sheet No 2875

June 22 09

There are several places on this sheet  
where the drag touched and no examination  
was made with the lead and also several  
places where the drag struck at an effective  
depth less than the least water found with the  
lead

H. L. Simons

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2875

2875

Department of Commerce and Labor  
COAST AND GEODETIC SURVEY

O. H. Tittmann  
*Superintendent.*

State: Fla.

DESCRIPTIVE REPORT.

Hyd. Sheet No. 2875

LOCALITY:

Florida Reefs

Western Approaches to  
Key West

191<sup>3</sup>

CHIEF OF PARTY:

N. H. Heck

Descriptive Report Hyd. Sheet No. 2875

The wire drag examinations on this sheet were made for the purpose of finding the least depth in several channels recommended in the Coast Pilot, also to leave the sheet in the best possible condition for extending the work another season.

The accomplishment of these purposes was much interfered with by the extremely unfavorable weather, and the plans first adopted had to be ~~first~~ modified from time to time to complete as much as possible in the allotted time.

In discussing the results, the shoals located and the state of the dragging will be considered for different regions as follows:

1. Inner reef, to Parsonage Shoal.
2. Area between inner and outer reef.
3. Channels crossing outer reef.
4. West Channel.

1. Inner reef.

The area dragged on this sheet extends from a point about a mile west of the Eastern Triangles Beacon to the Middle Ground, and from the Middle Ground to Parsonage Shoal. The channels crossing the reef are the Rock <sup>Key,</sup> Sand Key, and South-west Channels.

The shoals found in this region consist of numerous heads extending eastward from the Middle Ground, and a continuous line of shoals extending from the Middle Ground to Rock Key. The heads have from 12 to 19 ft. over them where 15 to 23 ft. are charted, and extend about 2 miles east of the Middle Ground (on this sheet), being scattered over this area for about a mile in a north and south direction. Several heads with as little as 13, 14 and 15 ft. are directly in the sailing lines of Rock Key Channel and East Sand Key Channel. The shoals near the inner reef that form part of the chain extending to Rock Key consist of 12 to 16 ft. spots directly in East Sand Key Channel and Rock Key Channel where much greater depths are charted.



2. Area between inner and outer reef.

Between the inner and the outer reef the principal finds are the chain of shoals from the Middle Ground to Rock Key, and a number of heads north of the line from Western Dry Rocks to Sand Key. The depths on the chain of shoals vary from 14 to 20 ft. in this region, and are much less than is charted near them. These shoals cross the northern end of East Sand Key Channel, and extend across the middle of Rock Key Channel. About a mile southeast of the Middle Ground there is a 15 ft. shoal directly in the sailing line of Rock Key Channel where the least depth charted is 26 ft. The heads to the westward lie mostly in the sailing line of West Sand Key Channel. The least water on these, 19 and 20 ft., is several ft. less than is charted.

*There are two 17ft heads in Rock Key Channel  
EXN from M.d. Ground Bn.*

3. Channels crossing the outer reef.

The channels crossing the outer reef are Rock Key, East Sand Key, West Sand Key, and Southwest Channels.

13 ft. can probably be carried through Rock Key Channel in smooth water; but on account of the shoals northwest of Rock Key mentioned under 2, and two 14 ft. spots on either side of the entrance on the south, it seems safer to call this a 12 ft. channel.

East Sand Key Channel can be used for 14 ft.; but near the northern end some 12 and 13 ft. spots either in or very near the sailing line make it appear that 12 ft. is about the safe maximum draft for this channel. Two heads of 16 and 17 ft. are directly in the entrance where 19 and 20 ft. are charted.

West Sand Key Channel is good for vessels drawing as much as 16 ft; but two coral heads of 15 ft. depth found, one on each side of the entrance and about 1/3 mile apart, will require very careful navigation to take this draft into the channel. Besides these 15 ft. heads at the entrance there are two others of 16 and 16 1/2 ft. depth at the entrance still nearer the middle of the channel than the 15 ft. ones,

and only about 1/4 mile apart. The presence of these heads in the entrance make it appear that 14 ft. is the safe maximum draft for this channel when the sea is anything other than very smooth. It should be noted that the area for 400 yards on each side of the sailing line as given by the Coast Pilot has been covered.

The examination of the entrance to the Southwest Channel is not complete as yet, but it seems probable that there is no less depth than charted between Satan Shoal and the 18 ft. shoal to the westward. Further examination is necessary. There is now, however, a continuous line the whole length of the channel except possibly at the entrance, with depths of 23 f<sup>+</sup>. An important find in the northern part of this channel is a 16 ft. shoal at the junction with the West Channel, where 21 ft. is charted. This shoal is about 1/4 mile southwest of N6 buoy.

On the outer reef there are numerous heads extending from Rock Key to Western Dry Rocks having depths of 14 to 20 ft., all of which are less than charted. The most important of these are mentioned in connection with the channels affected by them. *see also page 4.*

#### 4. West Channel.

The dragging in the West Channel disclosed the 16 ft. shoal southwest of N6 buoy at the junction of the West and Southwest Channels, mentioned above. Also, 20 ft. was found on the shoal 1/4 of a mile northeast of N8 buoy where 22 ft. is charted; and 14 ft. was found near N8 buoy where 18 ft. is shown. When the weather prevented work elsewhere, dragging was done between the 12 and 18 ft. curves south of Kingfish Shoals and West Crawfish Key, which resulted in the finding of a number of heads with depths of 11 to 13 ft. between these curves.

It is not believed that any more specific descriptions of these shoals is advisable, because in order to bring the chart up to date it will be necessary to place on it all the soundings obtained.

*The remarks on pages 3 + 4 (beginning at bottom of p. 3) of Descriptive Report for Sheet 2932 Apply also to this sheet*

Statistics Hyd. Sheet 2875 Vicinity of Key West, Fla.

Date	Day	Vol	angles	miles	drag	Soundings	Remarks
91366	666	666	666	666	666	666	666
					Length	Number	Angles
2-21	A	1	24	1/4	2100	5	10
3-1	B	1	114	2 1/4	2100	6	12
5	C	1	126	2 1/4	2700	8	16
7	D	1	18	1/4	2700	7	14
12	E	1	78	1 1/2	2400	18	36
20	F	1	162	3 1/2	2400	14	28
21	G	1	24	1/2	2700	1	2
28	H	1	168	2 1/2	2700	12	24
29	J	1	234	4 1/2	2700	15	30
31	K	2	174	1 1/4	3000	3	6
4-1	L	2	198	4	2700	14	28
5	M	2	246	3 1/2	2700	11	22
12	N	2	144	2	2700	6	12
14	O	2	192	3 1/2	2700	4	8
18	P	2	228	4	2700	9	18
28	Q	3	408	8 1/2	2700	2	4
29	R	3	378	6	2700	2	4
Total			2916	50 1/4		139	278

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 MAY 10 1913  
 Acc. No.

Total Angles 3070  
 Miles 50  
 Soundings 139  
 Sq. Miles 14

Tides - Automatic Tide gauge Key West, Fla.  
 R. H. Sands - Observer

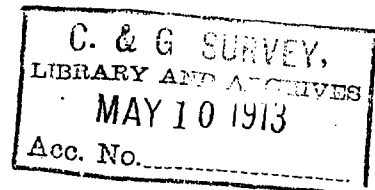
Continuation of Wire Drag work  
 on Sheet 2875.

## Towline Base Table.

Length of Upright For buoy	Base Meters
12-17	62
18-23	61
24-27	60
28-30	59
31-33	58
34-37	57

2000

The 11 ft. shoal charted  $\frac{1}{2}$  mile westward of Sand Key L. H. on the outer reef was proved not to exist. An effective depth of  $13\frac{1}{2}$  feet was taken over it. The least sounding found was  $15\frac{1}{2}$  feet and no less depth was visible though the water was very clear.



Object  
Stump.

Distance  
From west Crawfish Key  
meas. one way, 406.30M.  
Meas. other way, 406.34  
Mean, 406.32

Direction  
At west Crawfish key  
from Sand Key L.H.  
+ 69° 21'

Vote  
(Signal)

From Vote(sta) 11.395M.

At Vote(sta) from Sand  
Key L.H. + 72° 24'

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