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Introduction.

In the spring of 1914, the United States Bureau of Fisheries Steamer Albatross was detailed to make a thorough investigation of the "halibut banks" reported off the Oregon coast for the purpose of developing their location and extent and supplying definite information as to the character of the fishing grounds, especially those for halibut, the abundance of fish thereon and the season at which they occur.

In order that an intensive ~~investigation~~<sup>survey</sup> could be made, the region ~~covered~~<sup>investigated</sup> was restricted to that section of the coast lying between the Columbia River on the north and Necota Banks on the south. "The information available was to the effect that the banks or grounds began some distance south of Yaquina Bay and extended, probably with interruptions, to a point north of Tillamook Bay and possibly to the mouth of the Columbia River." This area was later extended northward to <sup>a point</sup> off Grays Harbor and to the southward <sup>so as</sup> to include a section of the coast off Coos Bay.

This is practically the same region covered by the Albatross in her survey of the off shore fishing grounds of the Pacific coast in 1888-89, and by various and sundry fishing ventures both prior to that time and up to the inception of the present investigation, which

~~The present investigation~~ as conducted by the Bureau of Fisheries includes, first, <sup>a</sup> ~~the~~ preliminary reconnaissance ~~mentioned above~~, made by Mr. E. C. Johnston of the scientific staff of the Albatross in July of 1913; second, three pros-

pecting trips with the Steamer Albatross over the region under discussion, as follows: April 27 to May 16, May 25 to June 1, Aug. 27 to September 10, 1914; third, a visit to the various fishing ports along the coast in the latter part of June by Mr. Driscoll, expert fisherman in the employ of the Bureau; and fourth, a series of trials, July 11 to August 17, conducted out of Newport, Oregon, from a launch chartered for the purpose.

Following a resumé of the history of these "banks" and a brief narrative of the 1914 Albatross cruise, the various "results" are set forth. These are embodied in two charts and five tables, giving weather conditions during the days present on the "banks", the results of the various "sets" for fish, the trials for scallops, the yield of the banks since the beginning of the investigation, and the hydrographic stations made, together with an explanation or discussion of each.

The principal chart, No. I, it is hoped, will prove one of the most valuable results of the cruise in portraying the topography and character of the bottom in what is considered the most readily understandable way by means of contour lines and color washes.

Halibut fishermen, in particular, desire to know the depth and conditions of the bottom with which they have to deal. This chart is an attempt to satisfy this demand on their part. It is hoped that it is to be but one of a series covering the waters visited by American offshore fishermen, from southern California northward to include the Bering Sea.

The second chart, No. II, gives the location of all soundings made in the course of the survey and together with the fifth table presents all hydrographic data obtained.

To Lieut. L. B. Porterfield, U. S. N., in command of the Albatross during the entire cruise, the most grateful acknowledgements are due. His unflinching zeal and interested cooperation made possible the results herein obtaining. Of his skill as a navigator, frequently called upon in our many trying experiences, too much cannot be said.

The efficient cooperation of Messrs. E. C. Johnston and E. P. Rankin, respectively, fishery expert and general assistant, of the the Albatross staff, in securing the data upon which this report is based, justly entitles them consideration as joint authors. The same recognition has been accorded Mr. Edward Driscoll in view of his, at all times, valuable advice.

An appreciation is here expressed of the able assistance rendered by the officers and crew of the Albatross, of the efficient service of the Seattle fishermen employed, Michael Burke, John J. Carrol, Richard Gladney, Richard Keough, and Samuel Driscoll, who took the place of Carrol toward the conclusion of the survey; of the information so generously and freely furnished by Capt. Quinn, of the Idaho, Johansen, of the Chicago, Johnson, of the Daisy, Edwards, of the Helgoland, and Churchill, of the New England Fish Co.; and of the many courtesies extended by Mr. Edward Cuninghame, of the Pacific Net and Twine Company of Seattle.

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V. SUMMARY.

In brief, the investigation as detailed above, developed quite a "nice" run of fish during a period of at least two months, August and September, covering an area of approximately 250 square miles of a small bank lying off Newport, Oregon.

This run yielded catches totalling over 850,000 pounds of fish in 21 trips, for which a value of \$23,646.25 was received. Average trips of 40,000 pounds can be picked up in 4 days or less. The fish averaged within  $1/10$ <sup>hundred</sup> of 27 pounds.

Mushy fish occur to the extent of 30 to 40 percent of the total catch, but in view of certain returns from Alaska during the same year (1914), this proportion does not seem excessive.

The run attained its maximum in August and September, but doubtless can be profitably fished in June and July, and in certain suggested spots the fishery might possibly be engaged in as early as the latter part of April.

Irrespective of the abundance of fish, though, the season by reason of weather conditions and lack of shelter is restricted to the summer months, April to September.

Fish may be expected to a much more limited extent off Coos Bay on a considerably smaller and less developed patch of bottom. Possibly off Grays Harbor fish may be taken at some season of the year. A good piece of bottom was located in that vicinity, although not a single halibut was caught thereon. With respect to halibut and halibut bottom, the section of the coast lying off Tillamook seems to be the least favorable.

On the other hand, through<sup>out</sup> practically the entire reach of the Oregon coast, there seems to be an untold wealth of the

smaller flat fishes. Other species such as red-cod, dogfish and doubtless black cod occur in great abundance.

Scallops apparently are to be found over a wide range of territory and doubtless in some places form beds thickly enough populated to warrant fishing, though the depth at which they would have to be worked will no doubt render the cost of fishing them prohibitive.

In conclusion, the harbor facilities and those of market equipment, bait and transportation, to say nothing of cold storage, are too limited and uncertain apparently to enable any of the Oregon coast ports to become fishing centers of any great consequence. The limitation of the fishing season by weather conditions is possibly the greatest handicap when compared to Seattle and its proximity to the vast, year around Alaskan fishery resources.

No doubt the "Newport Bank" will prove a valuable addition to the available supply of halibut, and the greater part of the Oregon coastal region a future source of supply of at present less marketable fish, flounders, sole, red and black-cod.

WEATHER CONDITIONS ENCOUNTERED OFF OREGON

DURING HALIBUT INVESTIGATION.

Date 1914	Time	Wind Direction	Force	State of Weather	Temperature	State of Sea
April 28	8 am	W	2	C	53	L
	Noon	NW	3	C	53	L
	4 pm	"	2	C	53	L
	Mdnt	N by W	4	C	51	M
" 29	8 am	N by E	4	C	54	L
	Noon	do	4-5	C	53	L
	4 pm	do	6	C	53	R
	Mdnt	NNW	7	B	53	"
" 30	8 am	"	4	CF	52	"
	Noon	"	5-6	CG	54	"
	4 pm	NW	7	C	54	"
	Mdnt	NNW	7	CG	50	"
May 1	8 am	"	6-7	CG	52	"
	Noon	"	4	OP	52	M
	4 pm	"	6	OD	50	"
	Mdnt	N by W	5-5	C	51	"
" 2	8 am	NNW	4	C	51	"
	Noon	"	4	F	54	"
	4 pm	N by W	2-3	OZ	53	"
	Mdnt	do	1	CM	50	"
" 3	8 am	NW by W	2	OZ	51	C
	Noon	do	4-5	"	56	L
	4 pm	WNW	3	Z	55	L
	Mdnt	"	2	C	51	L
" 4	8 am	Calm	0	C	55	L
	Noon	NW by N	1	C	61	L
	4 pm	NW by W	2-3	OZ	54	L
	Mdnt	NNE	3	C	49	L
2 5	8 am	N by E	2	OZ	57	C
	Noon	NNW	3	Z	58	L
	4 pm	NW by W	4	Z	68	"
	Mdnt	N	2	Z	52	"
" 6	8 am	Calm	0	Z	61	S
	Noon	S by W	2	ZF	53	S
	4 pm	S by E	4-5	C	54	S
	Mdnt	S	3	C	49	S
" 7	8 am	SE by E	2	C	54	M
	Noon	E	3	OD	54	"
	4 pm	SE	3	M	55	O
	Mdnt	SSW	1	C	54	L
" 8	8 am	E	1	C	55	L
	Noon	SSE	2-3	CM	57	M
	4 pm	SE	3-4	OP	54	O
	Mdnt	SE by S	4	OPM	53	M
27	8 am	W	3	OP	50	L
	Noon	SW	3	CL	55	"
	4 pm	W by N	2	"	56	"
	Mdnt	NW	2	C	53	"



Date 1914	Time	Wind Direction	Force	State of Weather	Temperature	State of Sea	
May	28	8 am	NW	3	C	57	L
		Noon	NE	3	C	55	"
		4 pm	NW	5	Z	55	"
"	29	Mant	N	6	C	49	R
		8 am	NNW	6	C	56	"
		Noon	"	5	CZ	58	"
		4 pm	NW	6	"	59	"
		Mant	NNW	6	"	52	"
	30	8 am	NNW	6	"	56	"
		Noon	"	6	CZ	60	"
4 pm		NW	6	ZG	58	"	
	Mant	"	7	"	55	"	
31	8 am	NNW	5-6	CZ	54	"	
	Noon	NW	5	"	57	M	
	4 pm	"	4	"	59	"	
	Mant	W	3	"	53	"	
Aug	28	8 am	Calm	0	MF	53	"
		Noon	NNW	1	C	68	"
		4 pm	W	1	OCF	68	"
		Mant	NE	3	C	52	"
	29	8 am	N	3	OM	53	C
		Noon	NW	2	OF	52	"
		4 pm	NNW	4	OM	53	M
		Mant	"	3	C	49	G
	30	8 am	NW	3	C	55	M
		Noon	"	3-4	C	62	"
		4 pm	N by W	3	C	60	"
		Mant	60	3	C	53	"
31	8 am	NNW	1	C	54	G	
	Noon	"	1	C	59	G	
	4 pm	"	1	C	62	G	
	Mant	NW	2	OF	53	G	
Sept	1	8 am	SW	1	O	58	G
		Noon	NE	1	O	59	M
		4 pm	"	1	C	60	M
		Mant	Calm	0	O	52	G
	2	8 am	SE	1	OM	54	G
		Noon	"	1	"	56	G
		4 pm	"	1	CZ	58	G
		Mant	S by W	1	OF	55	G
	3	8 am	SE	1	"	53	G
		Noon	"	1	C	57	G
		4 pm	"	1	C	60	G
		Mant	S by E	2	C	55	G
4	8 am	S by W	1	O	57	G	
	Noon	SW	2	O	56	G	
	4 pm	W by N	2	O	57	G	
	Mant	NW	2	C	51	G	
5	8 am	NW	2-3	C	56	M	
	Noon	"	1	CZ	62	G	
	4 pm	"	2	"	68	M	
	Mant	Calm	0	"	55	G	

SYMBOLS  
used in the weather-record.

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Weather	Force of Wind
B.....clear sky	1.....8 miles
C.....cloudy	2.....13
D.....drizzly	3.....18
F.....foggy	4.....23
G.....dark, gloomy	5.....28
M.....misty	6.....34
O.....overcast	7.....40
P.....passing showers	8.....48
Z.....hazy	

# Table I

## WEATHER CONDITIONS ENCOUNTERED OFF OREGON DURING HALIBUT INVESTIGATION.

Date 1914	Time	Wind		State of Weather	State of Sea.
		Direction	Force miles per hr.		
April 28	8 am	W	13	Cloudy,	Long rolling sea
	Noon	NW	18	"	" " "
	4 pm	"	13	"	" " "
	Mdnt	N by W	23	"	Moderate.
29	8 am	N by E	23	"	Long rolling sea.
	Noon	"	23-28	"	" " "
	4 pm	"	34	"	Rough,
	Mdnt	NNW	40	Clear	"
30	8 am	"	23	Cloudy, foggy,	"
	Noon	"	28-34	Cloudy, dark,	"
	4 pm	NW	40	Cloudy,	"
	Mdnt	NNW	40	Cloudy, dark,	"
May 1	8 am	"	34-40	Overcast, dark,	"
	Noon	"	23	Overcast,	Moderate,
	4 pm	"	34	Overcast, drizzly,	"
	Mdnt	N by W	23-28	Cloudy,	"
2	8 am	NNW	23	Overcast,	"
	Noon	"	23	Foggy,	"
	4 pm	N by W	13-18	Overcast, hazy,	"
	Mdnt	"	8	Cloudy, misty,	"
3	8 am	NW by W	13	Cloudy, hazy,	Calm,
	Noon	"	23-28	" "	Long rolling sea,
	4 pm.	WNW	18	Hazy,	" " "
	Mdnt	"	13	Cloudy,	" " "
4	8 am	Calm	0	"	" " "
	Noon	NW by N	8	"	" " "
	4 pm	NW by W	13-18	Cloudy, hazy,	" " "
	Mdnt	NNE	18	Cloudy,	" " "
5	8 am	N by E	13	Cloudy, hazy,	Calm
	Noon	NNW	18	Hazy,	Long rolling sea,
	4 pm	NW by W	23	"	" " "
	Mdnt	N	13	"	" " "
6	8 am	Calm	0	"	Smooth,
	Noon	S by W	13	Hazy, foggy,	"
	4 pm	S by E	23-28	Cloudy,	"
	Mdnt	S	18	"	"

Date 1914	Time	Wind		State of Weather	State of Sea.
		Direction	Force miles per hr.		
May	7 8 am	SE by E	13	Cloudy,	Moderate,
	Noon	E	18	Overcast, drizzly,	"
	4 pm	SE	18	Misty,	Calm,
	Mdnt	SSW	8	Cloudy,	Long rolling sea,
	8 8 am	E	8	"	" " "
	Noon	SSE	13-23	Cloudy, misty,	Moderate,
	4 pm	SE	18-23	Overcast, passing showers,	Calm,
	Mdnt	SE by S	23	Overcast, passing showers, misty,	Moderate,
	27 8 am	W	18	Overcast, passing showers,	Long rolling sea,
	Noon	SW	18	Cloudy,	" " "
	4 pm	W by N	13	"	" " "
	Mdnt	NW	13	"	" " "
	28 8 am	NW	18	"	" " "
	Noon	NE	18	"	" " "
	4 pm	NW	28	Hazy,	" " "
	Mdnt	N	34	Cloudy,	Rough,
	29 8 am	NNW	34	"	"
	Noon	"	28	Cloudy, hazy,	"
	4 pm	NW	34	" "	"
	Mdnt	NNW	34	" "	"
	30 8 am	NNW	34	" "	"
	Noon	"	34	" "	"
	4 pm	NW	34	Hazy, dark,	"
	Mdnt	"	40	" "	"
	31 8 am	NNW	28-34	Cloudy, hazy,	"
	Noon	NW	28	" "	Moderate,
	4 pm	"	23	" "	"
Mdnt	W	18	" "	"	
July	13* Mdnt	NW	8	Cloudy,	(State of <u>surf</u> ) Light,
	Sunrise	SW	13	"	Moderate,
	Noon	SW	13	"	"
	Sunset	NW	8	Hazy,	Light,
	14* Mdnt	NW	8	"	Moderate
	Sunrise	"	8	Foggy,	"
	Noon	"	12	Clear	"
	Sunset	Calm	0	<del>Dense</del> fog,	"
	15 Mdnt	NW	8	" "	"
	Sunrise	"	23	Hazy,	"
	Noon	"	48	"	"
	Sunset	"	48	"	Rough,

Dense

Date 1914	Time	Wind		State of Weather	State of surf.
		Direction	Force miles per hr.		
July 16	Mdnt	NW	23	Hazy,	Rough,
	Sunrise	"	23	"	"
	Noon	"	40	"	"
	Sunset	"	48	"	"
17	Mdnt	"	18	"	Moderate,
	Sunrise	"	13	Foggy,	"
	Noon	"	23	Hazy,	"
	Sunset	"	40	"	"
18	Mdnt	"	18	"	"
	Sunrise	"	13	Foggy,	"
	Noon	"	48	Hazy,	"
	Sunset	"	34	"	"
19	Mdnt	"	23	"	"
	Sunrise	"	13	"	"
	Noon	"	40	Foggy	"
	Sunset	"	23	"	"
20*	Mdnt	"	13	Hazy,	"
	Sunrise	"	8	Cloudy,	"
	Noon	"	34	Hazy,	"
	Sunset	"	13	"	"
21*	Mdnt	"	13	Hazy,	"
	Sunrise	"	8	"	"
	Noon	"	34	"	"
	Sunset	"	40	"	"
22	Mdnt	"	13	"	"
	Sunrise	"	8	"	"
	Noon	"	48	Clear,	"
	Sunset	"	40	"	"
23	Mdnt	"	13	"	"
	Sunrise	"	13	"	"
	Noon	"	34	"	"
	Sunset	"	23	"	"
24*	Mdnt	"	23	Hazy,	"
	Sunrise	"	13	"	"
	Noon	"	23	"	"
	Sunset	Calm	0	"	"
25*	Mdnt	"	0	Foggy,	"
	Sunrise	NW	13	"	"
	Noon	SW	13	Rain, fog,	"
	Sunset	Calm	0	Dns. fog,	"
26	Mdnt	"	0	"	Light,
	Sunrise	NW	8	"	"
	Noon	"	13	Fog intrm't,	"
	Sunset	"	13	Clear,	"

*Dense*

Date 1914	Time	Wind		State of Weather	State of Surf.
		Direction	Force miles per hr.		
July	27* Mdnt	Calm	0	Clear,	Light,
	Sunrise	"	0	Foggy,	"
	Noon	NW	23	Clear,	"
	Sunset	"	28	"	"
28*	Mdnt	"	13	"	"
	Sunrise	"	8	"	"
	Noon	"	40	"	"
	Sunset	"	34	Hazy,	Moderate,
29	Mdnt	"	13	"	"
	Sunrise	Calm	0	<del>Dns.</del> fog,	"
	Noon	NW	34	" "	Light,
	Sunset	"	28	" "	"
30	Mdnt	"	8	Foggy,	"
	Sunrise	"	13	"	"
	Noon	"	23	"	"
	Sunset	"	13	Hazy,	"
31	Mdnt	Calm	0	"	"
	Sunrise	NW	13	"	"
	Noon	"	34	"	"
	Sunset	"	13	"	"
Aug.	1 Mdnt	"	13	Foggy,	"
	Sunrise	Calm	0	"	"
	Noon	NW	34	Hazy,	"
	Sunset	"	34	Foggy, Dense	"
2	Mdnt	"	13	<del>Dns.</del> fog,	"
	Sunrise	"	8	" "	"
	Noon	"	34	Foggy,	"
	Sunset	"	40	"	Moderate,
3	Mdnt	"	34	"	"
	Sunrise	"	23	"	"
	Noon	"	34	Hazy,	Light,
	Sunset	"	23	"	"
4*	Mdnt	"	23	Cloudy,	"
	Sunrise	"	13	"	"
	Noon	"	34	Hazy,	"
	Sunset	"	34	"	"
5	Mdnt	"	13	"	"
	Sunrise	Calm	0	<del>Dns.</del> fog,	"
	Noon	NW	23	Hazy,	"
	Sunset	"	13	"	"
6*	Mdnt	S	13	"	"
	Sunrise	"	8	Foggy,	"
	Noon	SW	18	Cloudy,	"
	Sunset	NW	13	Hazy,	Rough,

Date 1914	Time	Wind		State of Weather	State of Surf.
		Direction	Force miles per hr.		
Aug. 7	Mdnt	NW	13	Foggy,	Rough,
	Sunrise	E	13	"	"
	Noon	NW	34	Cloudy,	"
	Sunset	"	13	Hazy,	"
8	Mdnt	"	8	"	"
	Sunrise	"	8	"	"
	Noon	"	23	"	"
	Sunset	"	34	"	"
9	Mdnt	"	28	"	"
	Sunrise	"	13	<del>Dns.</del> fog,	"
	Noon	"	40	"	"
	Sunset	"	40	Foggy, Dense	"
10	Mdnt	"	34	<del>Dns.</del> fog,	"
	Sunrise	"	13	"	Moderate,
	Noon	"	34	"	Rough,
	Sunset	"	40	"	"
11	Mdnt	"	23	"	High,
	Sunrise	"	8	"	"
	Noon	"	48	Foggy, Dense	"
	Sunset	"	40	<del>Dns.</del> fog,	"
12	Mdnt	Calm	0	"	Rough,
	Sunrise	NW	8	"	"
	Noon	"	34	Hazy, Dense	"
	Sunset	"	18	<del>Dns.</del> fog,	"
13	Mdnt	"	18	"	"
	Sunrise	SW	23	"	"
	Noon	"	28	"	Moderate,
	Sunset	"	18	Foggy,	Light,
14*	Mdnt	"	13	"	"
	Sunrise	Calm	0	"	"
	Noon	SW	13	Cloudy,	"
	Sunset	"	8	"	"
15*	Mdnt	"	8	"	"
	Sunrise	"	8	"	"
	Noon	"	13	"	"
	Sunset	Calm	0	"	"
16*	Mdnt	"	0	"	"
	Sunrise	"	0	"	"
	Noon	W	Light	Clear,	"
	Sunset	Calm	0	Hazy,	"
17*	Mdnt	"	0	Cloudy,	"
	Sunrise	"	0	"	Moderate,
	Noon	NW	Light	"	"
	Sunset	"	28	Hazy,	Light,

Date 1914	Time	Wind		State of Weather	State of Sea.
		Direction	Force miles per hr.		
Aug. 28	8 am	Calm	0	Misty, foggy,	Moderate,
	Noon	NNW	8	Cloudy,	"
	4 pm	W	8	Overcast, cldy, fgy,	"
	Mdnt	NE	18	Cloudy, 78	"
29	8 am	N	18	Overcast, misty,	Calm,
	Noon	NW	13	Overcast, foggy,	"
	4 pm	NNW	23	Overcast, misty,	Moderate,
	Mdnt	"	18	Overcast,	Ground swell,
30	8 am	NW	18	Cloudy,	Moderate,
	Noon	"	18-23	"	"
	4 pm	N by W	18	"	"
	Mdnt	"	18	"	"
31	8 am	NNW	8	"	Ground swell,
	Noon	"	8	"	" "
	4 pm	"	8	"	" "
	Mdnt	NW	13	Overcast, foggy,	" "
Sept. 1	8 am	SW	8	Overcast,	" "
	Noon	NE	8	"	Moderate,
	4 pm	"	8	Cloudy,	"
	Mdnt	Calm	0	Overcast,	Ground swell,
2	8 am	SE	8	Overcast, misty,	" "
	Noon	"	8	" "	" "
	4 pm	"	8	Cloudy, hazy,	" "
	Mdnt	S by W	8	Overcast, foggy,	" "
3	8 am	SE	8	" "	" "
	Noon	"	8	Cloudy,	" "
	4 pm	"	8	"	" "
	Mdnt	S by E	13	"	" "
4	8 am	S by W	8	Overcast,	" "
	Noon	SW	18	"	" "
	4 pm	W by N	13	"	" "
	Mdnt	NW	13	Cloudy,	" "
5	8 am	NW	13-18	"	Moderate,
	Noon	"	8	Cloudy, hazy,	Ground swell,
	4 pm	"	13	Cloudy, hazy,	Moderate,
	Mdnt	Calm	0	" "	Ground swell.

\*"Set" made at Newport.