Price 11 cents.

No. 145

WAR DEPARTMENT,

CORPS OF ENGINEERS.

ESSAYONS

SURVEY OF THE NORTHERN AND NORTHWESTERN LAKES
Made in obedience to Acts of Congress
and orders from
HEADQUARTERS CORPS OF ENGINEERS, U.S. ARMY.

LAKE MICHIGAN

COAST CHART № 5.

NEW BUFFALO TO CHICAGO.

Projected from trigonometrical Surveys executed under the orders of
Major C.B. COMSTOCK, Corps of Engineers,
Brvt. Brigadier General, U.S.A.
in 1871 - 1875.

Additions and Corrections under the direction of
Major W. L. FISK, Corps of Engineers, U.S. Army
in 1903.

SCALE $\frac{1}{80,000}$.

AUTHORITIES.

Off-shore Hydrography by Capt. A.N. Lee and 1st Lieut. D.W. Lockwood.
Topography and in-shore Hydrography by Asst. Engrs. J.B. Mayer, Lewis Foote, and Henry Custer.
Triangulation by Asst. Engrs. A.R. Flint and R.S. Woodward.
The Lake front from Diversey Street, Chicago, Illinois, to the Indiana State line corrected from surveys made under the direction of Captain W.L. Marshall, Corps of Engineers in 1892 - 1900
Additional surveys of Calumet Harbor and Calumet River made under the direction of Lieut. Col. O.H. Ernst and Major J.H. Willard, Corps of Engineers, in 1900 and 1901.
The Street System from Hyde Park to East Chicago reduced from Official City Plats and other reliable sources.
Compilation and Reduction by M. von Hippel. Revision by A. Mangelsdorf under the supervision of Edward Molitor, Assist. Engineer.

ABBREVIATIONS

F. W. - Fixed white. *F. R.* - Fixed red. *R. ab. W.* - red above white. LT. - Light.
The figures in brackets placed after the letters denoting character of light, indicate, its visibility in statute miles, when observer's eye is 15 feet above lake level.

DRY DOCKS

Location.	Name of Dock.	Length		Width.		Depth Over Sill.
		On Blocks	Over All.	Gate.	Top.	
		ft.	ft.	ft.	ft.	ft.
Chicago	Ship Owners' Dry Dock Co.		310	50		14
"	" " " " "		500	80		15
"	" " " " "		260	40		9
South Chicago	Chicago Shipbuilding Co.	556	564	70	100	16

SCALE OF FEET.
1000 0 1 2 3 4 5000 6 7 8 9 10,000 20,000

SCALE OF METERS.
500 0 1000 2000 3000 4000 5000 10,000

STATUTE MILES.
½ ¼ 0 1 2 3 4 5 6

OPENING & CLOSING OF NAVIGATION.

Location.	Average dates		Years used for averages.	Number of days closed.
	Closing.	Opening.		
Illinois and Michigan Canal	Nov. 24	Apr. 1	45	128
Chicago and Calumet Rivers	Jan. 7	Feb. 27	25	51

NOTE. The ice in Lake Michigan adjacent to Chicago is generally kept broken by ice-boats.

SAILING DIRECTIONS.

Bearings of sailing courses are true. Distances in statute miles.
Follow the courses and distances located on the chart. The distances *given on* sailing courses *are to the points of departure shown on Coast and General Charts.*

For DANGERS, ANCHORAGES and HARBORS OF REFUGE,
See the latest annual Bulletin and Supplements of the Survey of Northern and Northwestern Lakes published under the direction of the Chief of Engineers, U.S. Army, by the U.S. Lake Survey Office, Detroit, Mich.

CANALS.

Name of Canal.	Connecting Waters.	Terminal Points.	Length of Canals in Stat. Mls.	Locks.				Total Elevation of Lockages
				Number.	Length.	Width.	Depth.	
					ft.	ft.	ft.	ft.
Illinois & Michigan	L. Michigan & Mississippi R.	Chicago - La Salle	97.24	16	110	18	6	
Sanitary & Ship Can. of Chicago	L. Michigan & Desplaines R.	L. Michigan - Lockport	34.05					

WATER TABLE.

Showing the mean level and the mean fluctuations of Lake Michigan from April to November of each year between 1860 and 1875 from observations at Milwaukee, Wis.

DATE.	Mean level from April to November, inclusive.	Maximum mean monthly level.	Minimum mean monthly level.	Range for the period of navigation.
	ft.	ft.	ft.	ft.
1860	+1.15	July + 1.50	Nov. + 0.47	1.03
1861	+1.29	Aug. + 1.73	Apr. + 0.78	0.95
1862	+1.16	June + 1.39	Nov. + 0.71	0.68
1863	+0.55	June + 0.84	Nov. - 0.05	0.89
1864	-0.05	May + 0.39	Nov. - 0.73	1.12
1865	-0.05	Aug. + 0.33	Nov. - 0.59	0.92
1866	-0.43	Aug. - 0.11	Apr. - 0.90	0.79
1867	+0.02	July + 0.46	Nov. - 0.67	1.13
1868	-0.55	July - 0.12	Nov. - 1.08	0.88
1869	-0.29	Aug. + 0.30	Apr. - 1.20	1.50
1870	+0.63	Sept. + 0.89	Nov. + 0.14	0.75
1871	+0.47	July + 1.08	Nov. - 0.56	1.64
1872	-0.84	July - 0.60	Apr. - 1.25	0.65
1873	+0.03	Aug. + 0.41	Apr. - 0.84	1.25
1874	+0.20	June + 0.54	Nov. - 0.32	0.86
1875	+0.14	Aug. + 0.43	Apr. - 0.51	0.94

The above figures, as their sign is + or -, indicate the number of feet that the level of the lake was above or below the plane to which the soundings are reduced. That plane is the mean level of the lake from 1860 to 1875, inclusive.

NOTE.

The characteristic soundings only are given. They are selected from numerous soundings recorded on the original sheets.

The dotted surfaces represent the depths of 6, 12, and 18 feet, and serve to show at a glance the limits of navigation and the figures thereon indicate feet. Outside the dotted surfaces the figures express fathoms. Water areas with depth of 18 feet or less are tinted in blue.

The figures on the Topography indicate, in feet, the elevations above the mean level of the lake.

The soundings are reduced to the mean level of Lake Michigan as observed at Milwaukee, Wis. from January 1st 1860, to December 31st 1875. This plane of mean level is 11.39 feet below the benchmark on Dr. I. A. Lapham's house on Poplar street, Milwaukee, and 3.06 feet below high water of 1838 as observed at Milwaukee, or 581.26 ft. ab. M.T. at N.Y.

Sailing lines are represented thus: ....

*Range lines " " " * ————

Longitudes on this map depend on that of Fort Howard astronomical station adopted in 1874 as 88° 00′ 57.″82.

Latitudes are derived geodetically from Fort Howard.

(Chicago City datum which is the low water of 1847 is 1.8 feet lower than the plane of this chart.)

DANGERS.

Half way between Chicago and Calumet Lights are 5 Shoals ¾ to 1¼ mls. from shore, with 9 to 15 feet water thereon and a 9 feet shoal exists 2 miles North from Calumet Light, ½ mile from shore.

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