

2039

COGSWELL'S  
NAUTICAL ALMANAC,  
1888.

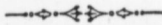


CONTAINING

LISTS OF LIGHT HOUSES IN CANADA, UNITED STATES,  
WEST INDIES, &c., &c.,

**Altitudinal Tables,**

Tide Tables, Phases of the Moon, &c.



**175 BARRINGTON STREET,**

HALIFAX, N. S.

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PRINTED AT THE OFFICE OF THE NOVA SCOTIA PRINTING COMPANY.

1887.

**PRICE 25 CENTS.**

# Wm. Stairs, Son & Morrow,

SHIP CHANDLERS

—AND—

Hardware Merchants.



AT THEIR NEW WAREHOUSES,

**174 to 190 Lower Water St.,**

(Opp. Jones' Wharf.)

SELL AT LOWEST PRICES:

**Cordage, Wire Rope, Anchors & Chains,**

OAKUMS,

COPPER PAINT,

CEMENT,

SEAM PAINT,

SPIKES,

NAILS,

OILS,

Etc., Etc.,

And everything found in first class Stocks for Ships' use.

—AGENTS FOR—

Yarmouth Cotton Duck,

Mt. Vernon " "

Muntz Metal Sheathing.

**CALL AND SEE OUR NEW ESTABLISHMENT.**



COGSWELL'S

**NAUTICAL ALMANAC,**

FOR THE YEAR

1888.

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PUBLISHED BY  
R. H. COGSWELL,  
Watch and Chronometer Maker, Nautical Instruments, &c.  
178 BARRINGTON STREET,  
HALIFAX, N. S.

PHASES OF THE MOON—1888.

Mean Time at Greenwich.

PICKFORD & BLACK, Importers of Chain Cables and Anchors, 51 Upper Water St.

MACDONALD & CO., Manufacturers of Plumbers' Brass Goods.—See adv. p. 3 cover.

January.				July.			
	d.	h.	m.		d.	h.	m.
☾ Last Quarter	5	23	42.6	● New Moon	8	18	16.7
● New Moon	12	20	38.7	☽ First Quarter	16	0	12.9
☽ First Quarter	20	16	49.3	○ Full Moon	22	17	45.1
○ Full Moon	28	11	18.9	☾ Last Quarter	30	8	29.6
☾ Perigee	8	1		☾ Apogee	3	12	
☾ Apogee	20	13		☾ Perigee	19	7	
				☾ Apogee	31	6	
February.				August.			
	d.	h.	m.		d.	h.	m.
☾ Last Quarter	4	7	25.8	● New Moon	7	6	21.0
● New Moon	11	11	52.5	☽ First Quarter	14	4	44.1
☽ First Quarter	19	13	59.2	○ Full Moon	21	4	20.3
○ Full Moon	26	23	57.6	☾ Last Quarter	29	2	18.3
☾ Perigee	1	17		☾ Perigee	14	0	
☾ Apogee	17	10		☾ Apogee	28	1	
☾ Perigee	29	4					
March.				September.			
	d.	h.	m.		d.	h.	m.
☾ Last Quarter	4	15	26.1	● New Moon	5	16	56.1
● New Moon	12	4	21.0	☽ First Quarter	12	9	59.9
☽ First Quarter	20	8	43.4	○ Full Moon	19	17	24.3
○ Full Moon	27	10	7.4	☾ Last Quarter	27	20	30.2
☾ Perigee	16	2		☾ Perigee	8	23	
☾ Perigee	28	11		☾ Apogee	24	20	
April.				October.			
	d.	h.	m.		d.	h.	m.
☾ Last Quarter	3	0	41.3	● New Moon	5	2	34.2
● New Moon	10	21	7.7	☽ First Quarter	11	17	29.1
☽ First Quarter	18	23	52.2	○ Full Moon	19	9	8.9
○ Full Moon	25	18	22.1	☾ Last Quarter	27	13	55.6
☾ Perigee	12	11		☾ Perigee	6	19	
☾ Perigee	25	21		☾ Apogee	22	10	
May.				November.			
	d.	h.	m.		d.	h.	m.
☾ Last Quarter	2	11	47.1	● New Moon	3	12	2.4
● New Moon	10	13	23.5	☽ First Quarter	10	4	15.8
☽ First Quarter	18	11	5.1	○ Full Moon	18	3	15.9
○ Full Moon	25	1	40.1	☾ Last Quarter	26	5	20.5
☾ Perigee	9	13		☾ Perigee	4	3	
☾ Perigee	24	7		☾ Apogee	18	15	
June.				December.			
	d.	h.	m.		d.	h.	m.
☾ Last Quarter	1	0	53.4	● New Moon	2	22	5.6
● New Moon	9	4	34.0	☽ First Quarter	9	18	45.8
☽ First Quarter	16	18	49.7	○ Full Moon	17	22	40.9
○ Full Moon	23	9	7.5	☾ Last Quarter	25	17	59.9
☾ Last Quarter	30	15	52.6	☾ Perigee	2	16	
☾ Apogee	5	21		☾ Apogee	15	16	
☾ Perigee	21	12		☾ Perigee	31	3	

Iron Pipes, all sizes, at MACDONALD & CO'S—See p. 3 cover.

MACDONALD & CO. Manufacturers of Patent Roller Bushings.—See adv. page 3 cover.

SUN'S SEMI-DIAMETER.

Mean Noon, Greenwich.

Day of Month	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1	16 18	16 15	16 10	16 16	1 15 53	15 48	15 45	15 47	15 53	16 16	16 9	16 15
2	16 18	16 15	16 9	16 16	1 15 53	15 47	15 45	15 48	15 53	16 16	16 10	16 16
3	16 18	16 15	16 9	16 16	1 15 53	15 47	15 45	15 48	15 54	16 2	16 10	16 16
4	16 18	16 15	16 9	16 16	1 15 53	15 47	15 45	15 48	15 54	16 2	16 10	16 16
5	16 18	16 15	16 9	16 16	0 15 53	15 47	15 45	15 48	15 54	16 2	16 11	16 16
6	16 18	16 15	16 8	16 16	0 15 52	15 47	15 45	15 48	15 54	16 2	16 11	16 16
7	16 18	16 14	16 8	16 16	0 15 52	15 47	15 46	15 48	15 55	16 3	16 11	16 16
8	16 18	16 14	16 8	15 59	15 52	15 47	15 46	15 48	15 55	16 3	16 11	16 16
9	16 18	16 14	16 7	15 59	15 52	15 47	15 46	15 48	15 55	16 3	16 11	16 16
10	16 18	16 14	16 7	15 59	15 51	15 47	15 46	15 49	15 55	16 4	16 11	16 17
11	16 18	16 14	16 7	15 59	15 51	15 46	15 46	15 49	15 55	16 4	16 12	16 17
12	16 18	16 14	16 7	15 58	15 51	15 46	15 46	15 49	15 56	16 4	16 12	16 17
13	16 17	16 13	16 7	15 58	15 51	15 46	15 46	15 49	15 56	16 4	16 12	16 17
14	16 17	16 13	16 6	15 58	15 51	15 46	15 46	15 49	15 56	16 5	16 12	16 17
15	16 17	16 13	16 6	15 57	15 51	15 46	15 46	15 50	15 56	16 5	16 13	16 17
16	16 17	16 13	16 6	15 57	15 50	15 46	15 46	15 50	15 57	16 5	16 13	16 17
17	16 17	16 13	16 5	15 57	15 50	15 46	15 46	15 50	15 57	16 5	16 13	16 17
18	16 17	16 12	16 5	15 57	15 50	15 46	15 46	15 50	15 57	16 6	16 13	16 17
19	16 17	16 12	16 5	15 56	15 50	15 46	15 46	15 50	15 58	16 6	16 13	16 17
20	16 17	16 12	16 5	15 56	15 50	15 46	15 46	15 51	15 58	16 6	16 14	16 17
21	16 17	16 12	16 4	15 56	15 49	15 46	15 46	15 51	15 58	16 7	16 14	16 17
22	16 17	16 12	16 4	15 56	15 49	15 46	15 47	15 51	15 59	16 7	16 14	16 18
23	16 17	16 11	16 4	15 55	15 49	15 46	15 47	15 51	15 59	16 7	16 14	16 18
24	16 17	16 11	16 4	15 55	15 49	15 46	15 47	15 51	15 59	16 7	16 14	16 18
25	16 16	16 11	16 3	15 55	15 49	15 46	15 47	15 52	15 59	16 8	16 14	16 18
26	16 16	16 11	16 3	15 55	15 49	15 46	15 47	15 52	16 0	16 8	16 15	16 18
27	16 16	16 11	16 3	15 54	15 48	15 46	15 47	15 52	16 0	16 8	16 15	16 18
28	16 16	16 10	16 2	15 54	15 48	15 46	15 47	15 52	16 0	16 8	16 15	16 18
29	16 16	.. ..	16 2	15 54	15 48	15 46	15 47	15 53	16 0	16 9	16 15	16 18
30	16 16	.. ..	16 2	15 54	15 48	15 45	15 47	15 53	16 1	16 9	16 15	16 18
31	16 16	.. ..	16 2	.. ..	15 48	.. ..	15 47	15 53	.. ..	16 9	.. ..	16 18

PICKFORD & BLACK, Importers of Refined Iron Clinch Rings.

MACDONALD & CO., Manufacturers of Patent Roller Bushings.—See adv. page 3 cover.

SIMSON'S LINIMENT

Should be in every Ship.

MACDONALD & CO., Manufacturers of Hand and Power Pumps.

TIDES—1888.

Mean Time of High Water at Halifax, N. S.

PICKFORD & BLACK, SHIP CHANDLERS, MANILLA, AND HEMP ROPE.

MACDONALD & CO., Manufacturers of COMPOSITION RUBBER BRACES.—See adv. p. 3 cover.

DATE.	JAN.	FEB.	MARCH.	APRIL.	MAY.	JUNE.
1	H. M. 9 2M	H. M. 9 58M	H. M. 9 41M	H. M. 10 49M	H. M. 11 21M	H. M. 0 52A
2	9 41	10 31	10 11	11 43M	0 32A	1 50
3	10 18	11 22M	11 5	1 3A	1 44	3 15
4	10 59	0 17A	11 58M	2 16	3 0	4 15
5	11 45M	1 28	1 11A	3 40	4 9	5 6
6	0 41A	3 3	2 42	4 45	5 2	5 50A
7	2 0	4 28	4 10	5 38A	5 46A	6 10M
8	3 29	5 36A	5 18	6 0M	6 6M	6 49
9	4 50	5 58M	6 8A	6 39	6 42	7 27
10	5 55A	6 43	6 30M	7 14	7 18	8 15
11	6 21M	7 29	7 9	7 43	7 52	8 43
12	6 58	8 13	7 41	8 18	8 26	9 21
13	7 51	8 42	8 17	8 52	9 2	9 59
14	8 29	9 16	8 49	9 24	9 38	10 38
15	9 4	9 48	9 20	9 59	10 16	11 20M
16	9 40	10 23	9 52	10 36	10 57	0 8A
17	10 18	10 59	10 27	11 18M	11 43M	1 10
18	10 56	11 37M	11 6	0 6A	0 36A	2 23
19	11 34M	0 22A	11 47M	1 7	1 51	3 46
20	0 17A	1 17	0 37A	2 23	3 15	5 12
21	1 8	2 26	1 44	3 47	4 31	6 13A
22	2 15	3 43	3 5	5 3	5 37A	6 40M
23	3 18	4 55	4 26	6 4A	6 7M	7 27
24	4 25	5 57A	5 34A	6 31M	6 57	8 7
25	5 25A	6 27M	6 4M	7 18	7 40	8 48
26	5 52M	7 8	6 54	7 55	8 19	9 26
27	6 43	7 53	7 37	8 31	9 1	10 8
28	7 28	8 40	8 13	9 9	9 41	10 50
29	8 7	9 5M	8 50	9 52	10 25	11 33M
30	8 47	.....	9 26	10 36M	11 12M	0 15A
31	9 22M	.....	10 5M	.....	0 5A	.....

The above is Mean Time for Halifax, 15 minutes added

MACDONALD & CO., Manufacturers of Copper and Zinc Baths.



TIDES—1888.

Mean Time of High Water at Halifax, N. S.

MACDONALD & CO., Manufacturers of Brass Einnacles and Stands.—See adv. p. 3 cover.

PICKFORD & BLACK, IMPORTERS OF WELSH BOLT IRON SPIKES.

DATE.	JULY.	AUG.	SEPT.	OCT.	NOV.	DEC.
	H. M.	H. M.	H. M.	H. M.	H. M.	H. M.
1	1 11A	2 21A	4 0A	4 35A	6 5A	6 4M
2	2 14	3 28	5 7	5 38	6 30M	6 55
3	3 18	4 38	6 4A	6 31A	7 16	7 39
4	4 20	5 35A	6 29M	6 53M	7 53	8 20
5	5 14	6 1M	7 14	7 37	8 30	9 1
6	6 2A	6 50	7 53	8 12	9 12	9 43
7	6 25M	7 33	8 29	8 48	9 54	10 28
8	7 8	8 11	9 4	9 24	10 41	11 16M
9	7 49	8 48	9 40	10 5	11 35M	0 9A
10	8 28	9 23	10 18	10 52	0 44A	1 9
11	9 5	9 56	11 2	11 48M	1 57	2 13
12	9 41	10 39	11 58M	0 58A	3 6	3 19
13	10 18	11 14M	1 11A	1 21	4 12	4 19
14	10 57	0 13A	2 41	3 44	5 5	5 11
15	11 43M	1 27	4 10	4 51	5 50A	5 55A
16	0 38A	3 1	5 20A	5 40A	6 11M	6 16M
17	1 46	4 30	5 49M	6 4M	6 47	6 55
18	3 16	5 39A	6 32	6 43	7 22	7 35
19	4 42	6 10M	7 13	7 18	7 56	8 12
20	5 56A	6 57	7 47	7 51	8 32	8 54
21	6 25M	7 35	8 19	8 24	9 8	9 26
22	7 12	8 12	8 51	8 57	9 45	10 4
23	7 53	8 47	9 23	9 30	10 23	10 42
24	8 32	9 19	9 56	10 6	11 4	11 22M
25	9 9	9 52	10 33	10 47	11 48M	0 7A
26	9 45	10 27	11 20	11 27M	0 40A	1 4
27	10 24	11 2	11 55M	0 17A	1 48	2 20
28	11 1	11 34M	0 48A	1 18	3 7	3 47
29	11 39M	0 30A	1 57	2 34	4 28	5 6
30	0 23A	1 29	2 22A	3 55	5 36A	6 12A
31	1 17A	2 42A	.....	5 7A	.....	6 38M

will give Standard Time for Nova Scotia.

PICKFORD & BLACK, AMERICAN TAR, FITCH, ROSIN, 51 UPPER WATER ST.

THE SUN'S										Chronometer of G. M. T.			
Day of the Week.	Day of the Month.	Apparent Right Ascension.		Var. in 1 hour.	Apparent Declination.		Var. in 1 h'r.	Equation of time to be added to Apparent Time.	Var. in 1 h'r.	H.	MIN.	SEC.	THS.
		h.	m.		s.	°				'	"	m.	s.
S	1	18	45	53.65	11.042	S. 23	1	50.6	12.13	3	39.54	1.182	1
M	2	18	50	24.51	11.029	22	56	45.6	13.28	4	7.76	1.169	2
T	3	18	54	49.02	11.014	22	51	13.1	14.42	4	35.64	1.154	3
W	4	18	59	13.17	10.998	22	45	13.4	15.55	5	3.16	1.139	4
T	5	19	3	36.93	10.981	22	38	46.6	16.68	5	30.29	1.122	5
F	6	19	8	0.28	10.964	22	31	52.8	17.80	5	57.01	1.104	6
S	7	19	12	23.18	10.944	22	24	32.3	18.91	6	23.28	1.085	7
S	8	19	16	45.61	10.924	22	16	45.2	20.01	6	49.09	1.065	8
M	9	19	21	7.55	10.903	22	8	31.9	21.10	7	14.40	1.044	9
T	10	19	25	28.97	10.881	21	59	52.5	22.18	7	39.19	1.021	10
W	11	19	29	49.83	10.857	21	50	47.4	23.24	8	3.43	0.998	11
T	12	19	34	10.11	10.832	21	41	16.8	24.30	8	27.08	0.973	12
S	13	19	38	29.78	10.806	21	31	20.9	25.35	8	50.13	0.947	13
F	14	19	42	48.80	10.779	21	21	0.1	26.38	9	12.54	0.920	14
S	15	19	47	7.16	10.751	21	10	14.7	27.40	9	34.28	0.892	15
M	16	19	51	24.84	10.722	20	59	5.0	28.41	9	55.34	0.863	16
T	17	19	55	41.80	10.692	20	47	31.2	29.40	10	15.70	0.833	17
W	18	19	59	58.04	10.661	20	35	33.7	30.38	10	35.33	0.802	18
T	19	20	4	13.54	10.630	20	23	12.8	31.35	10	54.22	0.771	19
F	20	20	8	28.38	10.598	20	10	28.9	32.30	11	12.35	0.740	20
S	21	20	12	42.25	10.566	19	57	22.4	33.24	11	29.72	0.707	21
S	22	20	16	55.44	10.533	19	43	53.5	34.16	11	46.30	0.675	22
M	23	20	21	7.83	10.500	19	30	2.7	35.06	12	2.10	0.641	23
T	24	20	25	19.42	10.466	19	15	50.4	35.96	12	17.09	0.608	24
W	25	20	29	30.20	10.432	19	1	16.8	36.83	12	31.28	0.574	25
T	26	20	33	40.17	10.398	18	46	22.4	37.69	12	44.66	0.540	26
F	27	20	37	49.32	10.364	18	31	7.6	38.54	12	57.21	0.506	27
S	28	20	41	57.65	10.330	18	15	32.7	39.36	13	8.95	0.472	28
S	29	20	46	5.15	10.295	17	59	38.2	40.18	13	19.87	0.438	29
M	30	20	50	11.83	10.261	17	43	24.3	40.97	13	29.97	0.404	30
T	31	20	54	17.70	10.228	17	26	51.6	41.75	13	39.25	0.370	13
W	32	20	58	22.75	10.194	S. 17	10	0.3	42.51	13	47.72	0.336	13

SIMPSON'S LINIMENT  
Is the Great Pain Eradiator.

MACDONALD & CO., Importers of Steam Pumps, etc.—See adv. p. 3 cover.

Brass Hinges, Hasps and Locks, at MACDONALD & CO.'S.—See cover.

**ISAAC H. MATHERS,**

**Ship Agent**

— AND —

**COMMISSION MERCHANT.**

VICE-CONSUL FOR SWEDEN AND  
NORWAY.

HALIFAX, NOVA SCOTIA.

**JOHN STRACHAN,**

ADJUSTER OF

**MARINE LOSSES,**

— AND —

Insurance Broker.

AVERAGE BONDS prepared at Shortest Notice.

**No. 54 BEDFORD ROW, HALIFAX.**

MACDONALD & CO., Manufacturers and Fitters of Steam Heating Apparatus.—See adv. p. 3 cover.

PICKFORD & BLACK, WOODBERRY COTTON DUCK, 1 TO 2.

PICKFORD & BLACK, Importers of Wire Rope, Canvas, 51 Upper Water St.

		THE SUN'S										Chronometer of G. M. T.				
Day of the Week.	Day of the Month.	Apparent Right Ascension.		Var. in 1 hour.	Apparent Declination.		Var. in 1 h'r.	Equation of time to be added to Apparent Time.		Var. in 1 h'r.	H.	MIN.	SEC.	TH.		
		<i>h.</i>	<i>m.</i>		<i>s.</i>	<i>s.</i>		<i>°</i>	<i>'</i>		<i>''</i>	<i>m.</i>	<i>s.</i>	<i>s.</i>		
W	1	20	58	22.75	10.194	S.17	10	0.3	42.51	13	47.72	0.336	1			
T	2	21	2	26.99	10.160	16	52	50.9	43.26	13	55.39	0.303	2			
F	3	21	6	30.42	10.126	16	35	23.7	43.99	14	2.25	0.269	3			
S	4	21	10	33.06	10.094	16	17	39.2	44.71	14	8.32	0.236	4			
S	5	21	14	34.91	10.061	15	59	37.7	45.41	14	13.60	0.203	5			
M	6	21	18	35.97	10.028	15	41	19.7	46.09	14	18.08	0.171	6			
T	7	21	22	36.24	9.995	15	22	45.6	46.75	14	21.79	0.138	7			
W	8	21	26	35.72	9.962	15	3	55.8	47.40	14	24.71	0.105	8			
T	9	21	30	34.41	9.929	14	44	50.6	48.02	14	26.84	0.073	9			
F	10	21	34	32.32	9.897	14	25	30.7	48.63	14	28.20	0.040	10			
S	11	21	39	38.45	9.864	14	5	56.4	49.22	14	28.77	0.008	11			
S	12	21	42	25.81	9.832	13	46	8.1	49.80	14	28.58	0.024	12			
M	13	21	46	21.40	9.800	13	26	6.2	50.35	14	27.61	0.056	13			
T	14	21	50	16.22	9.769	13	5	51.2	50.89	14	25.89	0.087	14			
W	15	21	54	10.29	9.738	12	45	23.5	51.41	14	23.41	0.119	15			
T	16	21	58	3.62	9.707	12	24	43.6	51.91	14	20.19	0.149	16			
F	17	22	1	56.21	9.676	12	3	51.7	52.40	14	16.25	0.179	17			
S	18	22	5	48.09	9.647	11	42	48.4	52.86	14	11.58	0.209	18			
S	19	22	9	39.26	9.618	11	21	34.2	53.31	14	6.21	0.238	19			
M	20	22	13	29.73	9.589	11	0	9.3	53.75	14	0.14	0.267	20			
T	21	22	17	19.51	9.561	10	38	34.3	54.16	13	53.39	0.295	21			
W	22	22	21	8.64	9.533	10	16	49.6	54.56	13	45.98	0.322	22			
T	23	22	24	57.11	9.506	9	54	55.5	54.94	13	37.93	0.349	23			
F	24	22	28	44.95	9.480	9	32	52.5	55.30	13	29.24	0.375	24			
S	25	22	32	32.17	9.455	9	10	41.0	55.65	13	19.93	0.400	25			
S	26	22	36	18.80	9.431	8	48	21.3	55.98	13	10.03	0.424	26			
M	27	22	40	4.85	9.407	8	25	53.9	56.30	12	59.56	0.448	27			
T	28	22	43	50.34	9.385	8	3	19.1	56.60	12	48.53	0.470	28			
W	29	22	47	35.31	9.363	7	40	37.3	56.88	12	36.98	0.492	29			
T	30	22	51	19.77	9.343	S. 7	17	48.9	57.15	12	24.92	0.512	30			
													31			

**SIMSON'S LINIMENT**  
Cures Sore Throat.

MACDONALD & CO, MANUFACTURERS OF BRASS BINNACLE GUARDS.—See adv. p. 3 cover.



# SYDNEY COAL.

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This Coal is mined by the General Mining Association, Limited, of London, G.B., at North Sydney, Cape Breton. To prevent other Coals trading upon the reputation of "Sydney," the name "SYDNEY COAL" was some years ago registered as a trade mark. The public are cautioned that any Coal advertised with the word "Sydney," along with another word designating Mine is not "Sydney Coal," and has no connection whatever with it. "SYDNEY" and "VICTORIA" Coals are the only Coals mined on Sydney Harbor.

"SYDNEY COAL" has long stood alone in its reputation for HOUSE USE. It is also an excellent STEAM COAL.

**CUNARD & MORROW,**  
HALIFAX, N. S., General Agents.

---

# VICTORIA COAL.

---

This Coal is mined by the Low Point, Barrasois, and Lingan Mining Company, Limited, at the Victoria Mines on Sydney Harbor, C. B. VICTORIA COAL is very good for STEAM purposes, and is a favorite HOUSE COAL.

**S. CUNARD & CO.**  
HALIFAX, N. S., General Agents.

---

# ANTHRACITE COAL.

---

For sale by the Cargo and smaller quantities, by

**S. CUNARD & CO., HALIFAX, N. S.**

MACDONALD & CO., Manufacturers of Brass Bolts and Catches.

VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.

PICKFORD & BLACK, IMPORTERS NETS, TWINES, LINES, 51 UPPER WATER STREET.

PICKFORD & BLACK, 51 UPPER WATER STREET, HALIFAX, N. S.

MARCH.

Chronometer of G. M. T.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of time to be added to Apparent Time.	Var. in 1 h'r.
		Apparent Right Ascension.	Var. in 1 hour.	Apparent Declination.	Var. in 1 h'r.		
		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>"</i>	<i>m. s. s.</i>	<i>s.</i>
T	1	22 51 19.77	9.343	S. 7 17 48.9	57.15	12 24.92	0.512
F	2	22 55 3.76	9.323	6 54 54.2	57.40	12 12.39	0.532
S	3	22 58 47.29	9.340	6 31 53.6	57.64	11 59.40	0.550
S	4	23 2 30.38	9.287	6 8 47.4	57.86	11 45.97	0.568
M	5	23 6 13.05	9.270	5 45 36.1	58.07	11 32.13	0.585
T	6	23 9 55.32	9.253	5 22 20.1	58.26	11 17.89	0.601
W	7	23 13 37.21	9.238	4 58 59.7	58.43	11 3.26	0.617
T	8	23 17 18.73	9.223	4 35 35.3	58.59	10 48.28	0.632
F	9	23 20 59.90	9.209	4 12 7.4	58.73	10 32.94	0.646
S	10	23 24 40.74	9.195	3 48 36.2	58.86	10 17.27	0.660
S	11	23 28 21.26	9.182	3 25 2.3	58.96	10 1.28	0.673
M	12	23 32 1.48	9.171	3 1 26.0	59.05	9 44.99	0.685
T	13	23 35 41.42	9.159	2 37 47.7	59.13	9 28.42	0.696
W	14	23 39 21.09	9.148	2 14 7.7	59.19	9 11.59	0.706
T	15	23 43 0.52	9.138	1 50 26.5	59.24	8 54.51	0.716
F	16	23 46 39.72	9.129	1 26 44.4	59.26	8 37.20	0.725
S	17	23 50 18.71	9.121	1 3 1.8	59.27	8 19.69	0.734
S	18	23 53 57.51	9.113	0 39 19.2	59.27	8 1.99	0.741
M	19	23 57 36.14	9.106	S. 0 15 36.8	59.25	7 44.11	0.748
T	20	0 1 14.61	9.100	N. 0 8 5.0	59.22	7 26.08	0.754
W	21	0 4 52.95	9.095	0 31 45.7	59.17	7 7.92	0.759
T	22	0 8 31.18	9.091	0 55 25.1	59.10	6 49.65	0.763
F	23	0 12 9.31	9.087	1 19 2.7	59.02	6 31.28	0.767
S	24	0 15 47.36	9.085	1 42 38.1	58.93	6 12.83	0.770
S	25	0 19 25.37	9.083	2 6 11.1	58.82	5 54.33	0.771
M	26	0 23 3.34	9.082	2 29 41.3	58.69	5 35.80	0.772
T	27	0 26 41.31	9.083	2 53 8.4	58.56	5 17.27	0.772
W	28	0 30 19.30	9.084	3 16 32.0	58.40	4 58.76	0.770
T	29	0 33 57.34	9.087	3 39 51.8	58.24	4 40.30	0.768
F	30	0 37 35.46	9.090	4 3 7.5	58.06	4 21.92	0.764
S	31	0 41 13.68	9.095	4 26 18.8	57.87	4 3.63	0.759
S	32	0 44 52.02	9.100	N. 4 49 25.5	57.67	3 45.47	0.754

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SIMSON'S LINIMENT  
CURES CRACKED HANDS.

MACDONALD & CO, MANUFACTURERS OF COMPOSITION BUTT BOLTS AND SPIKES.—See p. 3 cover.

RESIDENCES and PUBLIC BUILDINGS FITTED with STEAM HEATING APPARATUS by MACDONALD & CO.

1888]

NAUTICAL ALMANAC.

11

**BOSTON**

*Marine Insurance Company.*

Capital paid in - - - - -	\$1,000,000.00
Net Surplus above all Liabilities	1,693,246.00

**INSURE HULLS, FREIGHTS AND CARGOES.**

PROMPT and LIBERAL SETTLEMENTS in all cases.

**Agent--J. TAYLOR WOOD,**

70 BEDFORD ROW,

HALIFAX, N. S.

**LEITH HOUSE.**

**KELLEY & GLASSEY,**

(Successors to ALEX. McLEOD & Co.)

ESTABLISHED IN 1818.

204 HOLLIS STREET, HALIFAX, NOVA SCOTIA.

IMPORTERS OF

***ALES, WINES & BRANDIES.***

**Royal Islay Blend a Specialty.**

GEO. C. KELLEY.

JOHN GLASSEY.

PICKFORD & BLACK, IRON SPIKES, CUT NAILS, 51 UPPER WATER STREET.

Woodberry Cotton Duck, for sale by PICKFORD & BLACK.

12

ROBERT H. COGSWELL'S

[1888

PICKFORD & BLACK, 51 UPPER WATER STREET, HALIFAX, N. S.

THE SUN'S										Chronometer of G. M. T.					
Day of the Week.	Day of the Month.	Apparent Right Ascension.			Var. in 1 hour	Apparent Declination.			Var. in 1 h'r.	Equation of time to be added to sub from Apparent Time.	Var. in 1 h'r.	H.	MIN.	SEC.	THS.
S	1	0	44	52.02	9.100	N. 4	49	25.5	57.67	3 45.47	0.754	1			
M	2	0	48	30.50	9.107	5	12	27 0	57.45	3 27.44	0.748	2			
T	3	0	52	9.14	9.114	5	35	23.2	57.22	3 9.58	0.740	3			
W	4	0	55	47.96	9.121	5	58	13.6	56.97	2 51.90	0.733	4			
T	5	0	59	26.97	9.130	6	20	57.9	56.71	2 34.40	0.725	5			
F	6	1	3	6.19	9.139	6	43	35.8	56.44	2 17.12	0.715	6			
S	7	1	6	45.64	9.149	7	6	7.0	56.15	2 0.07	0.705	7			
T	8	1	10	25.34	9.159	7	28	30.9	55.84	1 43.26	0.695	8			
M	9	1	14	5.29	9.170	7	50	47.4	55.52	1 26.70	0.684	9			
T	10	1	17	45.51	9.182	8	12	56.0	55.19	1 10.41	0.673	10			
W	11	1	21	26.02	9.194	8	34	56.4	54.84	0 54.41	0.660	11			
T	12	1	25	6.83	9.207	8	56	48.2	54.48	0 38.71	0.647	12			
F	13	1	28	47.96	9.221	9	18	31.2	54.10	0 23.33	0.634	13			
S	14	1	32	29.42	9.235	9	40	4.9	53.70	0 8.28	0.629	14			
S	15	1	36	11.22	9.249	10	1	29.0	53.30	0 6.44	0.606	15			
M	16	1	39	53.37	9.264	10	22	43.1	52.87	0 20.80	0.591	16			
T	17	1	43	35.88	9.279	10	43	46.9	52.44	0 34.80	0.575	17			
W	18	1	47	18.78	9.295	11	4	40.1	51.99	0 48.42	0.560	18			
T	19	1	51	2.06	9.312	11	25	22.3	51.52	1 1.66	0.543	19			
F	20	1	54	45.74	9.329	11	45	53.2	51.04	1 14.49	0.526	20			
S	21	1	58	29.84	9.346	12	6	12.3	50.55	1 26.91	0.509	21			
S	22	2	2	14.36	9.364	12	26	19.5	50.04	1 38.91	0.491	22			
M	23	2	5	59.32	9.383	12	46	14.3	49.52	1 50.48	0.472	23			
T	24	2	9	44.74	9.403	13	5	56.4	48.99	2 1.58	0.453	24			
W	25	2	13	30.64	9.423	13	25	25.6	48.44	2 12.21	0.433	25			
T	26	2	17	17.02	9.443	13	44	41.6	47.88	2 22.35	0.412	26			
F	27	2	21	3.91	9.465	14	3	44.0	47.31	2 31.98	0.391	27			
S	28	2	24	51.33	9.487	14	22	32.6	46.73	2 41.10	0.369	28			
S	29	2	28	39.28	9.509	14	41	7.0	46.14	2 49.68	0.346	29			
M	30	2	32	27.78	9.532	14	59	27.1	45.53	2 57.72	0.323	30			
T	31	2	36	16.83	9.555	N.15	17	32.4	44.91	3 5.20	0.300	31			

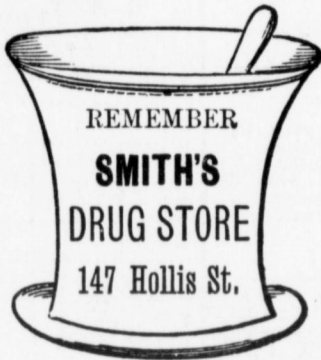
**Simpson's Liniment**  
CURES RHEUMATISM.

VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.—See adv. page cover.

Lead Scupper Pipes, all sizes, MACDONALD & CO.'S.—See p. 3 cover.



Residences and Public Buildings Fitted with Hot Water Heating Apparatus by MACDONALD & CO.—See p. 3 over



### MEDICINE CHESTS

Furnished and Fitted at the

**London Drug Store,  
147 HOLLIS ST.**

**J. GODFREY SMITH,**

Dispensing Chemist, Proprietor.

Captains and Masters of Vessels will please note that the only Diploma for Excellence in fitting out Medicine Chests, was awarded at the Dominion Exhibition of 1881 to

## J. GODFREY SMITH,

AGENT FOR

**B. LAURANCE, The English Optician,**

whose Glasses and Spectacles will enable Captains and the man at the wheel to descry more clearly objects at sea.

# BLACK BROS. & CO.

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**American and Canadian Ducks.**

**English Sail and Repairing Hemp,**

**Manilla and Hemp Cordage,**

**Wire Ropes, Anchors, Chains,**

**Paints, Oils, Naval Stores,**

**Patent Logs, Compasses, Lights.**

**CALL AND GET OUR PRICES.**

**HALIFAX, N. S.**

MACDONALD & CO., Manufacturers of Lead Water Marks.

PICKFORD & BLACK, SHIP CHANDLERS, 51 UPPER WATER ST., HALIFAX.

PICKFORD & BLACK, AGENT FOR TARR & WONSON'S COPPER PAINT.

MAY.										Chronometer of G. M. T.						
THE SUN'S										H.	MIN.	SEC.	THS.			
Day of the Week.	Day of the Month.	Apparent Right Ascension.			Var. in 1 hour.	Apparent Declination.			Var. in 1 h'r.	Equation of time to be sub. from Apparent Time.	Var. in 1 h'r.					
		A.	M.	S.	S.	°	'	"	"	M.	S.	S.				
T	1	2 36	16.83	9.555	N.15	17 32.4	44.91	3 5.20	0.300				1			
W	2	2 40	6.43	9.579	15 35	22.8	44.28	3 12.13	0.277				2			
T	3	2 43	56.61	9.603	15 52	57.7	43.63	3 18.49	0.253				3			
F	4	2 47	47.36	9.626	16 10	17.0	42.97	3 24.28	0.229				4			
S	5	2 51	38.68	9.651	16 27	20.3	42.30	3 29.49	0.205				5			
S	6	2 55	30.59	9.675	16 44	7.3	41.61	3 34.13	0.181				6			
M	7	2 59	23.08	9.699	17 0	37.7	40.91	3 38.19	0.157				7			
T	8	3 3	16.15	9.724	17 16	51.2	40.20	3 41.66	0.133				8			
W	9	3 7	9.81	9.748	17 32	47.4	39.48	3 44.55	0.108				9			
T	10	3 11	4.05	9.772	17 48	28.1	38.74	3 46.86	0.084				10			
F	11	3 14	58.87	9.796	18 3	47.0	37.99	3 48.59	0.060				11			
S	12	3 18	54.26	9.820	18 18	49.8	37.23	3 49.74	0.036				12			
N	13	3 22	50.23	9.844	18 33	34.1	36.46	3 50.33	0.013				13			
M	14	3 26	46.77	9.867	18 47	59.7	35.67	3 50.35	0.011				14			
T	15	3 30	43.87	9.891	19 2	6.2	34.87	3 49.81	0.034				15			
W	16	3 34	41.52	9.914	19 15	53.4	34.06	3 48.71	0.057				16			
T	17	3 38	39.72	9.936	19 29	21.1	33.24	3 47.08	0.079				17			
F	18	3 42	38.45	9.958	19 42	28.8	32.40	3 44.91	0.102				18			
S	19	3 46	37.72	9.980	19 55	16.4	31.56	3 42.20	0.124				19			
S	20	3 50	37.51	10.002	20 7	43.5	30.70	3 38.97	0.145				20			
M	21	3 54	37.82	10.024	20 19	50.0	29.84	3 35.23	0.166				21			
T	22	3 58	38.64	10.045	20 31	35.6	28.96	3 30.98	0.188				22			
W	23	4 2	39.97	10.066	20 42	59.9	28.07	3 26.22	0.209				23			
T	24	4 6	41.81	10.087	20 54	2.9	27.18	3 20.95	0.230				24			
F	25	4 10	44.15	10.108	21 4	44.4	26.28	3 15.19	0.250				25			
S	26	4 14	46.97	10.128	21 15	4.1	25.36	3 8.94	0.271				26			
S	27	4 18	50.29	10.148	21 25	1.8	24.44	3 2.19	0.291				27			
M	28	4 22	54.09	10.168	21 34	37.4	23.52	2 54.97	0.311				28			
T	29	4 26	58.35	10.187	21 43	50.6	22.58	2 47.28	0.330				29			
W	30	4 31	3.06	10.206	21 52	41.2	21.64	2 39.15	0.348				30			
T	31	4 35	8.22	10.224	22 1	9.2	20.69	2 30.58	0.366				31			
F	32	4 39	13.80	10.241	N.22	9 14.2	19.73	2 21.58	0.383							

SIMPSON'S LINIMENT  
CURES STIFF JOINTS.

MACDONALD & CO., Manufacturers of Deep Sea and Hand Leads.

MACDONALD & CO., Manufacturers of Ships' Patent Water Closets.—See adv. p. 3 cover.

Residences and Public Buildings Fitted with Plumbing Fixtures by MACDONALD & CO.—See adv. p. 3 cover.

MACDONALD & CO. Manufacturers of Shines' Patent Water Closets—See adv. p. 3 cover.

PICKFORD & BLACK, IMPORTERS OF DUCKS AND DRILLINGS, 51 UPPER WATER STREET.

# Why will you ruin your Eyesight

BY USING

## COMMON GLASSES

WHEN YOU CAN PURCHASE

# Lazarus, Morris & Co.'s

CELEBRATED



## PERFECTED SPECTACLES !

Manufactured from either fine Flint Glass or Pebble.

### The Best in the World.

About a Million Pairs now in use, giving general satisfaction. By their Brilliancy and Hardness you avoid the frequent change necessary in ordinary Spectacles They are so made that the cone of the lens will come directly in front of the pupil of the eye,

Thereby giving the best possible effect for an Artificial Help.

**PEDDLERS CANNOT GET THESE GOODS.**

Be sure and look for stamp. None genuine unless stamped "L. & M. P. S."

For Sale only by

## R. H. COGSWELL,

### JEWELLER AND OPTICIAN,

### BARRINGTON STREET, HALIFAX.

PICKFORD & BLACK, Importers White Lead, Paints, Oils, 51 Upper Water Street.

JUNE.										Chronometer of G. M. T.							
THE SUN'S										H.	MIN.	SEC.	THS.				
Day of the Week.	Day of the Month.	Apparent Right Ascension.			Var. in 1 hour.	Apparent Declination.			Var. in 1 h'r.	Equation of time to be sub. from	Var. in 1 h'r.						
		<i>h. m. s.</i>	<i>s.</i>	<i>° ' "</i>	<i>" "</i>	<i>m. s.</i>	<i>s.</i>	<i>m. s.</i>	<i>s.</i>								
F	1	4 39	13.80	10.241	N.22 9 14.2	19.73	2 21.58	0.383			1						
S	2	4 43	19.78	10.258	22 16 56.1	18.76	2 12.18	0.400			2						
S	3	4 47	26.16	10.274	22 24 14.7	17.79	2 2.38	0.416			3						
M	4	4 51	32.91	10.289	22 31 9.9	16.81	1 52.21	0.431			4						
T	5	4 55	40.02	10.303	22 37 41.5	15.82	1 41.69	0.445			5						
W	6	4 59	47.47	10.317	22 43 49.4	14.83	1 30.83	0.459			6						
T	7	5 3 55.23	10.329		22 49 33.3	13.83	1 19.66	0.471			7						
F	8	5 8 3.27	10.341		22 54 53.3	12.83	1 8.20	0.483			8						
S	9	5 12 11.58	10.351		22 59 49.2	11.82	0 56.48	0.493			9						
S	10	5 16 20.14	10.361		23 4 20.8	10.81	0 44.52	0.503			10						
M	11	5 20 28.90	10.369		23 8 28.1	9.79	0 32.34	0.511			11						
T	12	5 24 37.85	10.376		23 12 10.9	8.77	0 19.98	0.518			12						
W	13	5 28 46.97	10.382		23 15 29.2	7.75	0 7.46	0.524			13						
T	14	5 32 56.21	10.387		23 18 22.9	6.72	0 5.19	0.529			14						
F	15	5 37 5.56	10.391		23 20 51.9	5.69	0 17.95	0.533			15						
S	16	5 41 14.99	10.394		23 22 56.2	4.66	0 30.79	0.536			16						
S	17	5 45 24.48	10.396		23 24 35.7	3.63	0 43.68	0.538			17						
M	18	5 49 34.00	10.397		23 25 50.3	2.59	0 56.61	0.539			18						
T	19	5 53 43.53	10.397		23 26 40.1	1.56	1 9.55	0.539			19						
W	20	5 57 53.05	10.396		23 27 5.1	0.52	1 22.48	0.538			20						
T	21	6 2 2.54	10.395		23 27 5.2	0.51	1 35.38	0.536			21						
F	22	6 6 11.99	10.392		23 26 40.6	1.54	1 48.23	0.534			22						
S	23	6 10 21.37	10.389		23 25 51.1	2.57	2 1.01	0.531			23						
S	24	6 14 30.66	10.385		23 24 37.0	3.60	2 13.71	0.527			24						
M	25	6 18 39.84	10.380		23 22 58.1	4.63	2 26.30	0.522			25						
T	26	6 22 48.89	10.374		23 20 54.6	5.66	2 38.76	0.516			26						
W	27	6 26 57.80	10.368		23 18 26.5	6.68	2 51.08	0.510			27						
T	28	6 31 6.54	10.360		23 15 33.9	7.70	3 3.23	0.502			28						
F	29	6 35 15.09	10.352		23 12 16.8	8.72	3 15.19	0.494			29						
S	30	6 39 23.44	10.343		23 8 35.3	9.74	3 26.95	0.485			30						
S	31	6 43 31.57	10.333	N.23 4 29.5	10.74	3 38.49	0.475				31						

**SIMPSON'S LINIMENT**

Cures Lame Back.

MACDONALD & CO., Manufacturers of Copper and Lead Tanks.

MACDONALD & CO., MANUFACTURERS OF BRASS SLIDING DOOR ROLLERS.—See adv. p. 3 cover.

MACDONALD & CO. Manufacturers of Brass Binnacles and Stands.—See adv. p. 3 cover.



# JOHN ALLEN & SONS,

Commission Merchants,

DEALERS IN

**FISH,**  **Fish Oils,**

Fishing Supplies and Hake Sounds.

**WHOLESALE AND RETAIL.**

81 LOWER WATER ST.,

HALIFAX, N. S.

# W. W. HOWELL & CO.

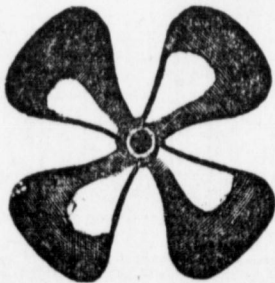
MECHANICAL ENGINEERS

AND MACHINISTS.

MANUFACTURERS OF

MARINE AND STATIONARY

**ENGINES.**



Also—Always on hand, for sale or hire,

Centrifugal Pumps for Wrecking, Mining or other purposes.

**REPAIRING PROMPTLY ATTENDED TO.**

121 to 125 Lower Water St., Halifax.

MACDONALD & CO., Manufacturers of Brass Binnacles and Stands.—See *adb.* p. 3 cover.

PICKFORD & BLACK IMPORTERS OF WELSH BOLT IRON SPIKES.

MACDONALD & CO., Importers of Engineers' Rubber Goods.—See cover.

MACDONALD & CO. MANUFACTURERS OF BRASS SLIDING DOOR BOLTERS.—See *adb.* n. 3 cover.



PICKFORD & BLACK, SHIP BROKERS.

1888]

NAUTICAL ALMANAC.

19

# J. E. WILSON,

— DEALER IN —

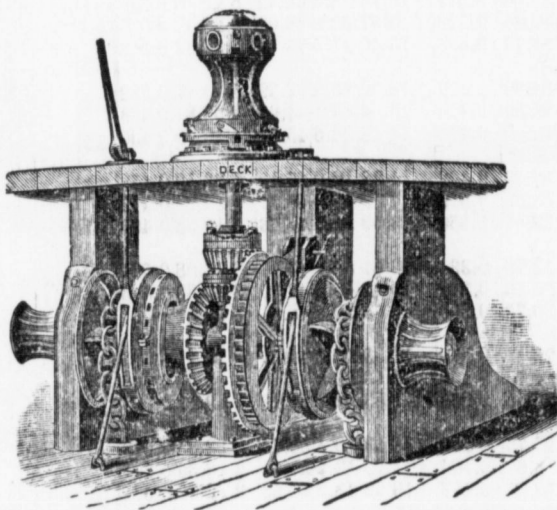
Stoves, Ships' Castings,

**REGISTER GRATES, SLATE MANTELS.**

208 HOLLIS ST., HALIFAX, N. S.

AGENT FOR THE WINDSOR FOUNDRY, WINDSOR.

THE "PROVIDENCE"



CAPSTAN WINDLASS,

All sizes and styles, both for hand and steam power,

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Stoves Fitted up by Experienced Tinsmiths at Short Notice.

SHEET IRON, TIN and COPPER WARE made to Order.

Brass Ventilators made by MACDONALD & CO.—See adv. p. 3 cover.

Residences and Public Buildings Fitted with Plumbing Fixtures by MACDONALD & CO.—See adv. p. 3 cover.

PICKFORD & BLACK, IMPORTERS OF DUCKS AND DRILLINGS 51 UPPER WATER STREET.

MACDONALD & CO. Manufacturers of Plumbers' Brass Goods—See adv. p. 3 cover.





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**Beef, Pork, Hams, Fish, Flour, Meal, Beans, Peas, Barley, Sugar, Rice, Tea, Coffee, Molasses, Vinegar, Butter, Lard, Vegetables, Biscuits, Oils. &c. Also, ALES, WINES AND LIQUORS.**

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THE GENUINE BLOOD MEDICINE.

**Dr. MANSFIELD'S COUGH MIXTURE.**

*G. 409—THE CURE.*

**BEST ENGLISH CHEMICALS AND DRUGS.**

## J. R. GORDON,

*Formerly Dispenser Royal Navy.*

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MACDONALD & CO., Manufacturers of Brass Bolts and Catches.

VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.

PICKFORD & BLACK, IMPORTERS NETS, TWINES, LINES, 51 UPPER WATER STREET.

MACDONALD & CO MANUFACTURERS OF BRASS SLIDING DOOR BOLTERS - See adv. p. 3 cover.

PICKFORD & BLACK, AMERICAN TAR, PITCH, ROSIN, 51 UPPER WATER STREET.

SEPTEMBER.

THE SUN'S

Day of the Week.	Day of the Month.	Apparent Right Ascension.			Var. in 1 hour.	Apparent Declination.			Var. in 1 h'r.	Equation of time to be sub. from Apparent Time.	Var. in 1 h'r.		
		h.	m.	s.		o.	'	"				m.	s.
S	1	10	43	59.56	9.065	N. 8	2	24.0	54.68	0	19.29	0.789	
Z	2	10	47	36.99	9.054		7	40	27.8	55.00	0	38.36	0.800
M	3	10	51	14.17	9.044		7	18	24.1	55.30	0	57.69	0.810
T	4	10	54	51.10	9.034		6	56	13.2	55.60	1	17.26	0.820
W	5	10	58	27.80	9.025		6	33	55.5	55.88	1	37.05	0.829
T	6	11	2	4.29	9.016		6	11	31.2	56.14	1	57.06	0.838
F	7	11	5	40.58	9.008		5	49	0.7	56.39	2	17.27	0.846
S	8	11	9	16.69	9.001		5	26	24.5	56.63	2	37.66	0.853
Z	9	11	12	52.62	8.994		5	3	42.7	56.85	2	58.22	0.860
M	10	11	16	28.41	8.988		4	40	55.7	57.06	3	18.93	0.866
T	11	11	20	4.06	8.983		4	18	4.0	57.25	3	39.78	0.871
W	12	11	23	39.59	8.978		3	55	7.9	57.42	4	0.74	0.876
T	13	11	27	15.02	8.975		3	32	7.7	57.59	4	21.81	0.879
F	14	11	30	50.37	8.972		3	9	3.6	57.74	4	42.95	0.882
S	15	11	34	25.66	8.969		2	45	56.2	57.87	5	4.16	0.884
S	16	11	38	0.90	8.968		2	22	45.7	57.99	5	25.40	0.886
M	17	11	41	36.13	8.968		1	59	32.5	58.10	5	46.67	0.886
T	18	11	45	11.37	8.969		1	36	16.8	58.20	6	7.93	0.885
W	19	11	48	46.64	8.971		1	12	59.0	58.28	6	29.16	0.883
T	20	11	52	21.96	8.973		0	49	39.4	58.35	6	50.33	0.880
F	21	11	55	57.36	8.977		0	26	18.3	58.40	7	11.42	0.877
S	22	11	59	32.87	8.982	N. 0	2	56.0	58.45	7	32.41	0.872	
S	23	12	3	8.51	8.988	S. 0	20	27.2	58.48	7	53.26	0.866	
M	24	12	6	44.30	8.995		0	43	51.0	58.49	8	13.97	0.859
T	25	12	10	20.26	9.003		1	7	14.9	58.50	8	34.50	0.851
W	26	12	13	56.42	9.011		1	30	38.8	58.49	8	54.83	0.843
T	27	12	17	32.81	9.021		1	54	2.2	58.46	9	14.95	0.833
F	28	12	21	9.43	9.031		2	17	24.8	58.42	9	34.82	0.823
S	29	12	24	46.31	9.042		2	40	46.3	58.36	9	54.44	0.812
S	30	12	28	23.47	9.054		3	4	6.3	58.29	10	13.78	0.800
M	31	12	32	0.92	9.067	S. 3	27	24.4	58.21	10	32.83	0.787	

Chronometer of G. M. T.

H.	MIN.	SEC.	THS
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VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.—See adv. page 3 cover.

MACDONALD & CO., Manufacturers of Patent Roller Bushings.—See adv. page 3 cover.

Simson's Liniment

Is the Sailor's Friend.

Brass Ventilators made by MACDONALD & CO.—See adv. p. 3 cover.

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**TICKETS**

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For Sale at Lowest Rates.

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MACDONALD & CO., Manufacturers of Hand and Power Pumps.

MACDONALD & CO., Manufacturers of Patent Roller Bushings.—See adv. page 3 cover.

PICKFORD & BLACK, Importers of Refined Iron Clinch Rings.

PICKFORD & BLACK, 51 UPPER WATER STREET, HALIFAX, N. S.

OCTOBER.

Chronometer of G. M. T.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of time to be sub. from Apparent Time.	Var. in 1 h'r.	Chronometer of G. M. T.				
		Apparent Right Ascension.	Var. in 1 hour.	Apparent Declination.	Var. in 1 h'r.			H.	MIN.	SEC.	THS.	
M	1	12 32 0.92	9.067	S. 3 27 24.4	58.21	10 32.83	0.787	1				
T	2	12 35 38.70	9.081	3 50 40.3	58.11	10 51.55	0.773	2				
W	3	12 39 16.81	9.095	4 13 53.7	58.00	11 9.94	0.759	3				
T	4	12 42 55.27	9.110	4 37 4.1	57.86	11 27.98	0.744	4				
F	5	12 46 34.10	9.126	5 0 11.2	57.72	11 45.66	0.729	5				
S	6	12 50 13.32	9.143	5 23 14.6	57.56	12 2.95	0.712	6				
S	7	12 53 52.95	9.160	5 46 13.9	57.38	12 19.83	0.695	7				
M	8	12 57 32.98	9.177	6 9 8.7	57.18	12 36.30	0.677	8				
T	9	13 1 13.45	9.196	6 31 58.6	56.97	12 52.34	0.659	9				
W	10	13 4 54.37	9.215	6 54 43.3	56.74	13 7.93	0.640	10				
T	11	13 8 35.75	9.234	7 17 22.3	56.50	13 23.06	0.620	11				
F	12	13 12 17.61	9.255	7 39 55.2	56.24	13 37.71	0.600	12				
S	13	13 15 59.98	9.276	8 2 21.7	55.96	13 51.86	0.579	13				
S	14	13 19 42.86	9.298	8 24 41.3	55.67	14 5.49	0.557	14				
M	15	13 23 26.28	9.321	8 46 53.7	55.36	14 18.59	0.534	15				
T	16	13 27 10.25	9.344	9 8 58.5	55.04	14 31.14	0.511	16				
W	17	13 30 54.81	9.369	9 30 55.4	54.70	14 43.10	0.486	17				
T	18	13 34 39.96	9.394	9 52 44.0	54.34	14 54.47	0.461	18				
F	19	13 38 25.74	9.421	10 14 23.8	53.97	15 5.21	0.434	19				
S	20	13 42 12.17	9.448	10 35 54.7	53.59	15 15.31	0.407	20				
S	21	13 45 59.25	9.476	10 57 16.1	53.19	15 24.76	0.380	21				
M	22	13 49 47.01	9.505	11 18 27.7	52.77	15 33.53	0.351	22				
T	23	13 53 35.48	9.534	11 39 29.2	52.34	15 41.59	0.321	23				
W	24	13 57 24.65	9.564	12 0 20.1	51.89	15 48.95	0.291	24				
T	25	14 1 14.56	9.595	12 21 0.1	51.43	15 55.58	0.261	25				
F	26	14 5 5.21	9.626	12 41 28.7	50.95	16 1.46	0.229	26				
S	27	14 8 56.63	9.658	13 1 45.6	50.45	16 6.59	0.198	27				
S	28	14 12 48.81	9.690	13 21 50.4	49.94	16 10.95	0.165	28				
M	29	14 16 41.77	9.723	13 41 42.7	49.41	16 14.53	0.132	29				
T	30	14 20 35.53	9.757	14 1 22.0	48.86	16 17.31	0.099	30				
W	31	14 24 30.10	9.791	14 20 48.0	48.30	16 19.30	0.066	31				
T	32	14 28 25.48	9.825	S. 14 40 0.2	47.71	16 20.47	0.032					

SIMSON'S LINIMENT

Is used both Externally and Internally.

MACDONALD & CO., MANUFACTURERS OF COMPOSITION BUTT BOLTS AND SPIKES.—See p. 3 cover.

Residences and Public Buildings Fitted with Hot Water Heating Apparatus by MACDONALD & CO.—See p. 3 cover.

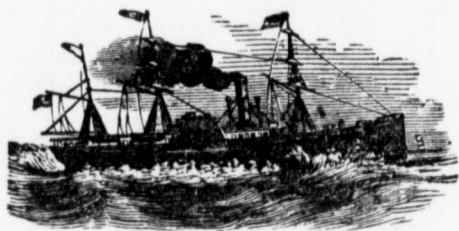


PICKFORD & BLACK, Agents DONALDSON LINE, for Glasgow.

1888]

NAUTICAL ALMANAC.

25



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Commission Merchants,

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AND

Prince Edward Island

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Residences and Public Buildings Fitted with Hot Water Heating Apparatus by MACDONALD & CO.—See p. 3 cover

MACDONALD & CO., Manufacturers of Lead Water Marks.



PICKFORD & BLACK, Agents FURNESS LINE, for London.

1888]

NAUTICAL ALMANAC.

27

**PICKFORD & BLACK,**  
**S. S. AGENTS & SHIP BROKERS,**  
**HALIFAX, N. S.**

AGENTS FOR

**DONALDSON LINE FOR GLASGOW,**  
**BOSSIERE LINE FOR HAVRE,**  
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Special Attention given to the Careful Handling of Fruit.

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**HALIFAX, N. S.**

MACDONALD & CO., Makers of Tumbler Racks, &c.—See p. 3 cover.

RESIDENCES and PUBLIC BUILDINGS FITTED with STEAM HEATING APPARATUS by MACDONALD & CO.

PICKFORD & BLACK, IRON SPIKES, CUT NAILS, 51 UPPER WATER STREET.





Woodberry Cotton Duck, for sale by PICKFORD & BLACK.

1888]

NAUTICAL ALMANAC.

29

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## PIANOS, ORGANS,

## Violins, Accordeons, Band Instruments,



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**PAGANINI VIOLIN.**

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SPECIAL: A fine PARLOR ORGAN, containing two full sets of Reeds, only \$60 Cash. Address—

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HALIFAX.

### Explanation of Astronomical Symbols and Abbreviations.

☉ The Sun.  
☾ The Moon.  
☿ Mercury.  
♃ Venns.  
♁ or ♁ The Earth.

h Hours.  
m Minutes of Time.  
s Seconds of Time.

♂ Mars.  
♃ Jupiter.  
♄ Saturn.  
♅ Uranus.  
♆ Neptune.

° Degrees.  
' Minutes of Arc.  
" Seconds of Arc.

♋ Conjunction.  
☐ Quadrature.  
☉ Opposition.  
♋ Ascending Node.  
♏ Descending Node.

N. North. S. South.  
E. East. W. West.

o. ♈ Aries ..... 0	IV. ♉ Leo.....120	VIII. ♊ Sagittarius..240
I. ♉ Taurus ..... 30	V. ♍ Virgo . . . 150	IX. ♏ Capricornus.270
II. ♊ Gemini..... 60	VI. ♎ Libra.....180	X. ♐ Aquarius . . .300
III. ♋ Cancer ... . 90	VII. ♏ Scorpio....210	XI. ♑ Pisces .....330

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## MARBLE AND GRANITE WORKERS,

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Plumbers and Steamfitters Slabs.**

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VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.—See adv. page 3 cover.

PICKFORD & BLACK, 51 UPPER WATER STREET, HALIFAX, N. S.

Lead Scupper Pipes, all sizes, MACDONALD & CO.'S.—See p. 3 cover.

**TIDE TABLES**

Showing the approximate time of High Water at the undermentioned places— which will be found by adding to or subtracting from the time of High Water at Halifax on any given day, as follows:

	H. M.		H. M.
Amet Sound, N. S. ....add	2 41	Canso Gut, (N entrance) N.S add	1 26
Andrews St., N. B. ....add	3 1	Canso Gut, (Plaster Cove) ..add	1 21
Annapolis, N. S. ....add	3 11	Canso Harbor, C. B. Island. .sub	0 1
Anne St., B., C. B. ....add	0 45	Carraquette Harbor, Gulf St.	
Anthony Strait, Nfld. ....sub	0 39	Lawrence ....sub	5 9
Anticosti Island, Gulf of St. Law-		Carbonear, Nfld ....sub	0 29
rence, East Cape ....sub	9 49	Cardigan Bay, P. E. I. ....add	0 51
Antigonish Harbor, R. St. Law ad	1 11	Carriboo Harbor, N. S. ....add	2 11
Antrobus Island, Gulf St. Law ad	2 41	Carelton Point, Gulf St Law sub	4 49
Appectetat Bay, Gulf St. Law add	3 21	Carong River, R. St Law ....sub	0 34
Argyle, Bay of Fundy ....add	1 38	Cascumpeque Harbor, P. E. I.sub	2 9
Arichat, C. B. ....add	0 21	Castors Harbor, Nfld ....add	3 1
Avon River, N. S. ....add	4 41	Catalina Harbor, " ....sub	0 59
		Cawee Islands, Gulf St. Law sub	5 59
Baltimore, U. S. ....sub	1 16	Champlain, R. St. Lawrence add	1 56
Barbe St. Harbor, Nfld. ....add	2 11	Change Island, Nfld ....sub	0 29
Bangor, U. S. ....add	2 17	Chester Harbor, N. S. ....sub	0 5
Barnstable, U. S. ....add	3 33	Cheticamp, C. B. Island ....add	0 26
Barrow Harbor, Nfld. ....sub	1 36	Civil East Cove, Long Harbor,	
Basque Point, Nfld. ....add	1 6	Newfoundland ....add	0 19
Bathurst, Gulf St. Law ....sub	4 34	Clam Point, Bay of Fundy ..add	0 38
Batiscon, R. St. Law ....add	1 59	Clark Harbor, " ....add	0 51
Bear Cape, P. E. Island ....add	1 11	Clearwater Point, Gulf St Law ad	3 21
Bear Head, C. B. Island ....add	0 41	Coacocha Bay, " sub	3 19
Beaubere Island, Gulf St. L. sub	1 19	Cocagne River, " sub	0 19
Beaver Harbor, N. S. ....add	0 9	Cod Cape, U. S. ....add	3 41
Bedeque Harbor, P. E. I. ....add	2 26	Conroy Island, Nfld ....add	1 26
Bermuda, Ireland Isle ...sub	0 35	Conroy Cove, Ship Harbor,	
Bersimis R., Gulf St. Law. sub	5 49	Newfoundland ....add	0 11
Bechewen Harbor, Gulf St.		Cook Harbor, Nfld ....sub	0 11
Lawrence ....add	3 43	Condres Island, (Prairie Bay)	
Bic Island, Gulf St. Law ....sub	5 34	R. St. Lawrence ...sub	3 25
Black Rock, Bay of Fundy ..add	3 40	Caw Head Harbor, Nfld ... add	2 52
Blind Bay, N. S. ....add	0 3	Crane Island, R St. Law....sub	2 25
Bonavista, Nfld. ....sub	0 24	Crapaud, P. E. Island ....add	2 11
Bonne Esperance Harbor,		Cremailere Harbor, Nfld....sub	0 36
Gulf St. Lawrence ....add	1 26	Crox Harbour ....sub	1 19
Boston Light, U. S. ....add	3 23	Crow Harbor, N. S. ....add	0 11
Boughtor Harbor, P. E. I. ....add	0 51	Cumberland Basin, Bay of	
Braha Harbor, Nfld. ....sub	0 49	Funday ....add	4 5
Brandy Pots, River St. Law sub	4 49	Gutwell Harbor, Nfld ....sub	0 49
Bridgewater, N. S. ....add	0 17	Chignecto Cape, Bay of Fundy ad	3 11
Brig Bay, Nfld. ....add	1 57	Charlottetown, P. E. I. ....add	2 56
Buctouche River, Gulf St Law ad	4 19		
Bull Island, Nfld. ....sub	0 27	Dalhousie Harbor, G. St Law sub	4 39
Burgeo Island, " ... add	0 43	Deer Harbor, Nfld ....sub	0 1
Bruin Harbor, " ....add	0 56	Digby Gut, Bay of Fundy....add	3 11
Burnt Island, " ....sub	0 1		
		East Point, P. E. I. ....add	0 41
Campbelltown, Gulf St. Law sub	3 49	Eastport, U. S. ....add	3 14
Campobello, Bay of Fundy ..add	3 32	Egg Island, Gulf St. Law....add	5 49

PICKFORD & BLACK, SHIP CHANDLERS, MANILLA, AND HEMP ROPE.

MACDONALD & CO., Manufacturers of COMPOSITION RUBBER BRACES—See adv. p. 3 cover.

MACDONALD & CO., Manufacturers and Fitters of Steam Heating Apparatus.—See adv. p. 3 cover

MACDONALD & CO., Manufacturers of Copper and Zinc Baths.

MACDONALD & CO., Manufacturers and Fitters of Steam Heating Apparatus.—See adv. p. 3 cover

PICKFORD & BLACK, WOODBERRY COTTON DUCK, 1 TO 2.

	H. M.		H. M.
Ellenwood's Anchorage, Bay of Fundy	...add 2 5	Island (Country) Harb'r, N.S.	sub 0 9
Egmont Bay, P. E. I.	...add 4 49	Isles au Condres, R. St. Law	sub 3 24
Escumenac Point, Gulf of St. Lawrence	.. add 3 39	Ispich, U. S.	....add 3 37
Fall River, U. S.	....add 0 22	Leboque, Bay of Fundy	....add 2 15
Famish Gut, Nfld	....add 0 15	Jeddore, N. S.	....sub 0 32
Fear Cape, U. S.	....sub 0 49	John St., N. B., Bay Fundy	....add 3 32
Ferole Cove, Nfld	....add 3 1	John's St., Nfld.	....sub 0 10
Ferole Harbor Old, Nfld	....add 1 39	Jonriman Island, N. B.	....add 1 41
Fish Heap, Grand Manan, Bay of Fundy	....add 3 27	Kegashka Bay, Gulf St. Law	add 2 56
Flat Island Cove, Nfld	....add 0 38	King's Cove, Nfld.	... sub 3 34
Fleur de lis Harbor, "	....add 0 34	Kirpon Harbor, "	....sub 0 44
Florida Cape, U. S.	....add 0 40	Le Hune Bay, Nfld.	....add 0 51
Fogo Island, Nfld	....sub 0 29	La Polie Bay, "	....add 1 11
Folly Point, Peticodiac River, Bay of Fundy	....add 4 0	Lamalaine, "	....add 1 26
Francois Bay, Nfld	....add 0 51	Lark Harbor, "	....add 2 48
Frechette Island, R. St. Law	add 0 11	Lawn, Grrat and Little, Nfld	add 0 26
Freshwater Bay, Nfld	....sub 0 19	Lawrence St. Harbor, "	add 0 41
Funk Island, "	....sub 0 49	LaHave, N. S.	....add 0 2
Gander Bay, Nfld	....and 0 6	Lunenburg, N. S.	....add 0 5
Gaspe Basin, Gulf St. Law	sub 5 9	Lepreau, Bay of Fundy	....add 3 29
George Cape, N. S.	....add 1 26	L'Etang Harbor,	....add 3 30
George Port, Bay of Fundy	add 3 28	Liscomb Arthur, N. S.	....add 0 11
George St. Harbor, Nfld	....add 2 14	Little Metis, Gulf St Law	....sub 5 39
Georgetown, U. S.	....add 0 51	Little Netasquan, "	....add 3 11
Good Bay, Nfld	....add 2 51	Little Port, Newfoundland	....add 2 53
Goodbout River, Glf St. Law	sub 5 67	Little Placentia, "	....add 0 9
Goose Bay, Nfld	....sub 0 27	Little River, "	....add 0 51
Grand Harbor, Grand Manan, Bay of Fundy	....add 3 18	Little Tancook Island, N.S.	sub 0 6
Grand Passage, Bay of Fundy	ad 2 54	Liverpool Bay, N. S.	....add 0 1
Grand Rustico, P. E. I.	....sub 1 19	Louisburg Harbor, N. S.	....add 0 11
Grand didul Madame, I.C.D.	add 0 6	Lunaire St. Bay, Nfld	....sub 0 43
Great St. Law Harbor, Nfld,	add 0 41	Lynn Harbor, U. S.	....add 3 20
Green Island, River St Law	sub 5 4	Mabou River, C. B.	....add 1 11
Green's Harbor, Nfld.	....sub 1 5	Machias, Seal Island, Bay Fundy	....add 3 16
Grigust Bay, Nfld.	....sub 0 49	Magdalen Islands, Glf St Law	add 0 31
Grindstone Island, Bay Fundy	ad 3 58	Magdalen River, R. St. Law	sub 6 34
Guysboro, N. S.	....add 0 31	Mahone Bay, N. S.	....add 0 11
Habitants' Harbor, C. B.	....add 0 31	Manicouago R., R. St. Law	sub 5 24
Halifax Harbor, N. S.	.... 0 0	Maquereau Port, Glf St Law	sub 5 47
Hand's Harbor, Nfld.	....sub 0 36	Marblehead, U. S.	....add 3 41
Harbor Grace, "	....sub 0 24	Margaret's St Bav, N. S.	....sub 0 2
Hatteras Cape, U. S.	....add 1 11	Mary St Cape, Nfld	....add 2 41
Hawke Island, Bay of Fundy	add 3 32	Matan River, Gulf St Law	....sub 5 35
Hawke Bay, Nfld.	.... add 3 11	May Cape, U. S.	....add 0 30
Hearts Content, "	....sub 0 10	Menadou Cape, C. B.	....add 0 26
Hillsborough River, P. E. I.	add 2 56	Merigomish, N. S.	.... add 2 17
Holmes Hole, U. S.	....add 3 54	Medway Port, N. S.	.... add 0 1
Horton Bluff, Bay Fundy	....sub 7 19	Mingan Harbor, G St Law	sub 6 33
		Minemegash, P. E. I.	.... add 4 19
		Miquelon Road, Nfld	....add 0 44
		Miramichi (Bar), G St Law	sub 2 19

PICKFORD & BLACK, Agents for COMMERCIAL CABLE CO.

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ROBERT H. COGSWELL'S

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PICKFORD & BLACK, AGENT FOR TARR & WONSON'S COPPER PAINT.

	H. M.		H. M.
Miscoon, Gulf St Lawrence....sub	5 19	Roche Cape, River St. Law..add	1 41
Moncton (Railway) Bay Fun sub	7 34	Restigouche River, Campbell-	
Monts Point de, Gulf St Law sub	7 49	town, Culf St Law ....sub	3 49
Mount Louis Bay, R St Law sub	5 49	Sable Cape, (Clark's Harbor)	
Mouton Port, N. S. ....add	0 5	Bay Fundy ....add	1 9
Nantucket, U. S. ....sub	7 25	Sable Island, N. Side, N. S..sub	0 19
Negro Harbor, N. S. ....add	0 23	Sable Island, S. Side ....sub	1 19
Neuf Port, Gulf St Law ....sub	5 39	Sacred Bay, Nfld. ....sub	0 26
New Bedford (entrance) U.S.add	0 8	Saguenay, Chicoutimi, Gulf	
New Haven, U. S. ....add	3 27	St Lawrence ....sub	3 38
New Pelican Harbor, Nfld ..sub	0 19	Saguenay, Tadousac, Gulf St.	
New York, U. S. ....add	0 24	Lawrence ....sub	5 4
Newburyport, " ....add	3 33	Salem, U. S. ....add	3 54
Nicholas St. Harbor, Gulf of		Sandy Cove, E., Bay Fundy..add	2 44
St Lawrence ....sub	5 54	Sandy Cove, W., " ....add	2 58
Noel Bay, Bay Fundy ....sub	7 8	Sandy Hook, U. S. ....sub	0 20
North Cape, C. B. ....add	0 11	Seal Cove, Grand Manan,	
North Harbor, Nfld. ....add	0 11	Bay Fundy ....add	3 6
Oderin, Nfld. ....add	0 19	Seal Island, Cape Sable,	
Orleans Islands, R. St. Law..sub	2 9	Bay Fundy ....add	2
Parrsboro', Bay Fundy ....sub	7 32	Seldom-come by, Nfld ....sub	0 36
Paul, St., Gulf St. Lawrence .add	0 11	Seven Islands Bay, Gulf St.	
Peter, St., Harbor, P. E.I....add	0 41	Lawrence ....sub	0 36
Petit Passage, Bay Fundy....add	2 52	Sheet Harbor, N. S. ....add	0 17
Petit Port, B. of Islands,Nfld add	1 53	Shelburne, " ....add	0 15
Philadelphia, U. S. ....sub	6 31	Sheldrake Island, G. St Law sub	1 49
Pictou Harbor, N. S. ....add	2 11	Ship Harbor, N. S. ....add	0 5
Pierre Strait, Nfld. ....add	0 44	Sippigan, Gulf St. Law ....sub	4 7
Pillars River, Gulf St Law ..sub	2 49	Smith Sound, Nfld. ....sub	0 41
Placentia, Nfld. ....add	1 26	Spaniard's Bay, " ....sub	0 4
Plymouth, U. S. ....add	3 30	Spencer's Anchorage, B Fun add	3 53
Pomquet, N. S. ....add	1 26	Spicer's Cove, Bay Fundy ..add	3 46
Pool's Harbor, Nfld. ....sub	0 49	Sydney Harbor, C. B. ....add	1 11
Port au Choil " ....add	2 58	Tatamagouche, N. S. ....add	2 11
Port Hood, C. B. ....add	1 11	Tracadie Harbor, " ....sub	0 19
Portland, U. S. ....add	3 36	Trepassy, Nfld. ....sub	0 16
Poulamenta Bay, Madam Is-		Trinity Bay, (Bull,s Is.) Nfld sub	0 27
land, C. B. ....add	0 1	Trinity Harbor, Nfld ....sub	0 39
Prospect River, N. S. ....sub	0 6	Trinton Harbor, " ....sub	0 19
Providence, U. S. ....add	0 27	Turner C, P.E.I. ....sub	1 39
Provincetown " ....add	3 33	Verte Bay, N. S. ....add	2 11
Pubnico (Beach Pt.)B Fundy add	1 36	Vin Harbor, Gulf St Law....sub	2 4
Pugwash Harbor, N. S. ....add	2 41	Wallace Harbor, N. S. ....add	2 4
Quaco, Bay Fundy ....add	3 46	Wapitagan Harbor, Gulf St.	
Quebec, R. St. Lawrence ....sub	1 11	Lawrence ....add	2 41
Race, Cape, Nfld. ....sub	0 19	Washington Navy Yard,	
Random Head Harbor, Nfld sub	0 19	United States ....sub	0 6
Rencoutre Bay (the Cove)		West Quoddy, Bay Fundy ..add	3 23
Newfoundland ....add	1 6	Whitehaven, N. S. ....add	0 11
Richibucto River, G. St Law sub	4 19	Wilmington, U. S. ....add	1 17
Richmond, U. S. ....sub	3 21	Yarmouth, N. S. ....add	2 20
Richmond Harbor, P.E.I....sub	1 49	Voik Harbor, Nfld. ....add	2 48

MACDONALD & CO., Manufacturers of Ships' Patent Water Closets.—See adv. p. 3 cover.

MACDONALD & CO., Manufacturers of Brass Binnacles and Stands.—See adv. p. 3 cover.

MACDONALD & CO., Manufacturers of Deep Sea and Hand Leads.



# LIGHT HOUSES

OF NOVA SCOTIA, NEW BRUNSWICK, &c.

Arranged from the Dominion Official list.

[All bearings are *magnetic*, and are given from seaward; height of light from high water, and of building from base to vane on lantern.]

GEORGE'S ISLAND, west side of the Island, Halifax Harbor, lat 44 38 30 N, lon 63 33 20 W, two fixed white catoptric lights, vertical, 20 feet apart, 50 and 30 feet high, drab square building, 21 feet high. Lights show seaward, on the S; and into harbor on N side; on W side the upper light only can be seen. Vessels going into Halifax Harbor, passing Meagher's Beach, will keep the light on starboard bow. The light is for the purpose of guiding vessels in and out of the Harbor, through the channel west of the Island. These lights open to westward of Meagher's Beach, clear the westward of Thrum Cap Shoal.

## EAST FROM HALIFAX, N. S.

MEAGHER'S BEACH, Sherbrook Tower, east side of entrance to Halifax Harbor, lat 44 36 N, lon 63 31 50 W, fixed white catoptric light, visible 12 miles, 58 feet high, building white with red roof, granite. height 48 feet. When Sambro light bears W S W, this light should not be brought to the westward of north, which clears the Thrum Cap Shoal. A fog bell here, strikes 7 times in each minute.

DEVIL'S ISLAND, on south point of island, at the eastern entrance to Halifax harbor, two fixed white catoptric lights, horizontally, E  $\frac{3}{4}$  N, and W  $\frac{3}{4}$  S, 175 yards apart, visible 13 miles, the light E 59 feet high, W light 52 feet, both buildings white, octagonal, wood, height E 53 feet, W 45 feet, lat 44 34 50 N, lon 63 27 15 W. The eastern light opens to southward of western, clears to the southward of the Thrum Cap Shoal. Pilots are stationed here.

JEDDORE ROCK, on summit of rocks about 22 miles east of Halifax, lat 44 39 45, lon 63 0 22, one fixed red light, visible 12 miles, white, square, wood, dwelling attached, 86 feet high.

EGG ISLAND, centre of island, lat 44 39 50 N, Lon 62 51 32 W, catoptric light, alternate red and white, revolving every minute, visible 15 miles, 80 feet high, octagonal building, black and white vertical stripes on seaward side, height 45 feet. Visible around horizon. An iron can buoy, painted red, about 200 yards south of the Brig Rock, W by S from the light house, about 2 miles.

POPE'S HARBOR, on west point of Harbour Island, lat 44 47 40 N, lon 62 38 50 W, fixed red light, catoptric, visible 9 miles, 45 feet high, tower white, square, wood, with dwelling attached, height 37 feet.

MACDONALD & CO., Importers of Engineers' Rubber Goods.—See cover.

PICKFORD & BLACK, SHIP CHANDLERS, MANILLA, AND HEMP ROPE.

- SHEET ROCK**, at the entrance to Sheet Harbor, lat 44 49 55 N, lon 62 29 40 W, revolving red light every 40 seconds, visible 10 miles. White, square, wood, with dwelling attached. 75 feet above high water mark. Automatic whistling buoy in 24 fathoms water S by W  $\frac{1}{2}$  W 5 and one-sixth miles from Sheet Rock light house.
- SHEET HARBOUR PASSAGE**, on mainland near eastern end of Sober Island, lat 44 51 30 N, lon 62 26 35 W, fixed red catoptric, visible 5 miles. Light shown from window in keeper's dwelling elevated 42 feet above high water. For benefit of vessels navigating Sheet Harbour Passage.
- BEAVER ISLAND**, S E, part of East Beaver, or William Island, lat 44 48 10 N, lon 62 20 39 W, white catoptric light, revolving every 2 minutes, visible 12 miles, 70 feet high, white building with two black balls, to seaward, S S W, 35 feet high.
- BEAVER HARBOUR**, on eastern end of Beaver Point, lat 44 52 23 N, lon 62 23 40 W. A pole light red visible 6 miles.
- LISCOMB**, on island, lat 44 59 20 N, lon 61 57 50 W, red and white catoptric light, alternating every two minutes visible 15 miles, 64 feet high, white square wooden tower, with dwelling attached.
- WEDGE ISLAND**, mouth of St Mary's River, lat 45 0 35, lon 61 52 35, one revolving red light, shows 1 minute in 3 minutes, visible 12 miles, white, square, wood, with dwelling attached, catoptric.
- HOLY POINT**, west side of entrance to Isaac's Harbor, lat 45 10 0 N, lon 61 39 12 W, two fixed white catoptric lights vertically, 20 feet apart, visible 9 miles, 80 feet high, square white building, 20 feet high, with dwelling attached.
- COUNTRY HARBOUR**, on Green Island, Guysboro' County, lat 45 6 15 N, lon 61 32 30 W, fixed white catoptric light, visible 14 to 16 miles, 51 feet high, white square wooden building, with dwelling attached, height 23 feet. Coast light, and to guide vessels frequenting Country and Fisherman's Harbors.
- TOR BAY**, on eastern point of Berry Head, W side of entrance to Bay, Guysboro' County, lat 45 11 37 N, lon 61 18 35 W, fixed catoptric light, red to seaward, white northward into Bay and towards Molasses Harbor, visible 10 miles, square wooden building, with dwelling attached, white with vertical red stripes, top of lantern painted black. Height of lantern 51 feet, tower 36 feet.
- THREE TOP ISLAND**, on the south-east point of Three Top Island, Whitehaven, Guysborough County, Nova Scotia, lat 45 12 40 N, lon 61 9 40 W. The light is fixed white catoptric, elevated 48 feet above high water mark, and in clear weather should be seen 11 miles. The building is a wooden one painted white, and consists of a square tower 32 feet high from base of building to vane on lantern, with keeper's dwelling attached. This light is for the purpose of guiding vessels into Whitehaven, and in order to point out the dangers on the northern side of Western Passage is obscured when bearing to the eastward of N E by E. It is visible from all other points of approach except when intercepted by the high land of Whitehead Island.
- WHITEHEAD ISLAND**, S W extremity of Island, Guysboro' County, lat 45 12 N, lon 61 8 15 W, white catoptric light, revolving every 20 seconds, visible 11 miles, 55 feet high, pyramidal wooden building, 35 feet high, with dwelling attached, octagonal lantern. Light not totally obscured during the eclipses; 10 seconds duration of flash, and 10 seconds eclipse.

MACDONALD & CO., Manufacturers of COMPOSITION RUBBER BRACES—See *adv. p. 3 cover*.

Residences and Public Buildings Fitted with Hot Water Heating Apparatus by MACDONALD & CO.—See *p. 3 cover*

**CANSO CAPE**, north part of Cranberry Island, lat 45 19 50 N, lon 60 55 25 W, two fixed white lights in one tower, vertically, 35 feet apart, upper visible 12, lower 5 miles, 89 and 54 feet respectively, high, octagonal wooden building, horizontally striped red and white, with dwelling house attached. A steam fog whistle, near the light-house, in thick weather sounds a blast of 8 seconds in each minute. An automatic signal buoy in 20 fathoms,  $1\frac{1}{2}$  miles E S E of Grimes Rock, taken up about December.

**CANSO HARBOR**, on Hart or Cutler Island, lat 45 21 N, lon 60 58 30 W, fixed red catoptric light, visible 12 miles, 42 feet high, white square wooden building, with dwelling attached, height 28 feet.

**CROW HARBOR**, on Rock Island, Chedabucto Bay, lat 45 21 5 N, lon 61 16 W, fixed white dioptric light, visible 8 miles. Square wooden tower with dwelling attached, painted white.

**GUYSBORO' HARBOR**, W side of entrance, near Peart Point, Chedabucto Bay, lat 45 22 50 N, lon 61 29 10 W, fixed white catoptric light, visible 8 miles, 30 feet high, white square wooden building, height 20 feet.

**SAND POINT**, or Eddy Point, south entrance, lat 45 31 30 N, lon 61 14 40 W, two fixed white catoptric lights, horizontal, 24 feet apart, visible 8 miles, each 25 feet high, white square wooden building, with a black diamond. Lights in window at each end of building. A black can buoy is moored off the extreme end of Sand Spit.

**POINT TUPPER**, Ship Harbor or Port Hawkesbury, lat 45 36 40 N, lon 61 22 W, fixed red catoptric light, visible 7 miles, 44 feet high, white square building, height 24 feet. In consequence of the intervention of the land on the south side, can only be seen three miles in that direction.

**CREIGHTON'S HEAD**, on the north extremity, lat 45 30 40 N, lon 61 6 W, white catoptric light, revolving every 40 seconds, visible 10 miles, 29 feet high, square white wooden building, height 20 feet. For guiding vessels into Little or West Arichat. Three buoys placed to mark the dangers off the harbor.

**JERSEYMAN ISLAND**, Arichat Harbor, lat 45 30 20 N, lon 61 3 W, fixed red catoptric light, visible 11 miles, 39 feet high, white square wooden building, height 28 feet. This light is for the purpose of guiding vessels through Crid Passage, in and out of Arichat Harbor. There is also a Range Beacon on the S E Point of Jerseyman's Island, that marks Hautford Shoal, off the entrance to Arichat Harbor. When the beacon and spire of the Roman Catholic Chapel are in range, it leads over the West Part of the shoal in 10 feet of water. Vessels bound into Arichat, Cape Breton, should pass to the west of the shoal, or bring the beacon in range of the cupola on the Convent, which stands 130 yards east of the R C Church, which will lead in clear of the shoal. Only those well acquainted should pass to the eastward of the shoal or bring the beacon to bear to the N of N E. An Iron Can Buoy painted red has been placed about one cable's length S W of the Hautford Shoal in six fathoms of water. The buoy will be placed on or about the 1st of May in each year, and taken up about the 10th December.

**ARICHAT**, Marache Point, south entrance to Madame Island, lat 45 29 N, lon 61 1 50 W, fixed white catoptric light, visible 8 miles, 34 feet high, square white wooden building, height 25 feet.

**PETITDEGRAT**, on Big Arrow Rock, south-east of Madame Island, lat 44 29 54 N, lon 60 57 30 W, fixed red catoptric light visible 10 miles, 38 feet high, white square tower, with dwelling attached, height 31 feet.

MACDONALD & CO., Manufacturers of Lead Water Marks.

Residences and Public Buildings Fitted with Hot Water Heating Apparatus by MACDONALD & CO.—See p. 3 cover

PICKFORD & BLACK, SHIP CHANDLERS, 51 UPPER WATER ST., HALIFAX.

PICKFORD & BLACK, Agents BOSSIERE LINE, for Havre.

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ROBERT H. COGSWELL'S

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PICKFORD & BLACK, Importers White Lead, Paints, Oils, 51 Upper Water Street.

- GREEN ISLAND, summit of Island, lat 45 28 50 N, lon 60 53 40 W, red and white catoptric light, revolving alternately every 45 seconds, visible 14 miles, 70 feet high, white square wooden building, height 31 feet. Light, centre of keeper's dwelling. Visible around horizon.
- CAPE LA RONDE, west side of entrance to St Peter's, lat 45 34 45 N, lon 60 53 W, fixed white catoptric light, visible 14 miles, 92 feet high, white square wooden building, with dwelling attached, height 28 feet. For guiding vessels into St Peter's Bay.
- OUETIQUE ISLAND, on south point, lat 45 36 40 N, lon 60 57 15 W, fixed red catoptric light, visible 9 miles, 78 feet high, white square wooden building, with dwelling attached, height 28 feet. For guiding vessels through Lennox passage. Three Pole Lights in Lennox Passage. One on Glasgow Point, one on Seal Island, or Dog Island, and one on Grand Dique. Red light shown from lantern hoisted on a mast 25 feet high, with shed painted white at its base. Visible 5 miles. NOTE.—The Pole Lights in St Peter's Inlet are the same as above.
- JEROME POINT, east side of St. Peter's Bay, lat 45 39 5 N, lon 60 52 W., a fixed red light, visible 8 miles. Square wooden tower, with dwelling attached, painted white.
- SAINT ESPRIT ISLAND, east end, lat 45 37 30 N., lon 60 29 20 W, one revolving white catoptric light, flash at intervals of 30 seconds, building white, with two red bands, square, wood, with dwelling attached. Height of building 55 feet, of light 78 feet; Bad Neighbor Shoal, S W  $\frac{3}{4}$  W  $1\frac{1}{2}$  mile from this light is not more than twelve feet below water; A bell buoy off Fourchie Head.
- GUION ISLAND, about 230 yards from west end of Island, lat 45 46 10 N, lon 60 6 20 W, red revolving light, catoptric, attains its greatest brilliancy every 30 seconds, visible 12 miles, 74 feet high, tower white, square, with dwelling attached, height 54 feet.
- LOUISBURG, north side of entrance to harbor, 120 yards inshore of point, lat 45 54 30 N, lon 59 57 15 W, fixed white catoptric light, visible 16 miles, 85 feet high, building white, with a black vertical stripe on dwelling, height 35 feet; an automatic signal buoy in 30 fathoms 1 and five-eighths miles S E  $\frac{1}{2}$  E from light-house; from this buoy a course N W by W will clear the Broad Shoal, and lead to the fairway of Louisburg Harbor; taken up about December.
- MAINADIEU, on south side of west point of Scatterie Island, lat 46 0 30 N, lon 59 47 30 W, fixed red catoptric light, 90 feet high, white square wooden building, height 40 feet.
- SCATTERIE, north-east point on Trap Rock, lat 46 2 15 N, lon 59 40 15 W, white catoptric revolving light, visible a minute, eclipsed half a minute, visible 15 miles, 90 feet high, white octagonal building, height 70 feet; the light should never be brought to bear to eastward of N N E, or to southward of S S W, nor approached nearer than  $1\frac{1}{2}$  mile; visible half minute, eclipsed one minute; a boat is here to render assistance; fog whistle near the light-house; sounds two blasts of 5 seconds, with intervals of 10 seconds, in every minute.
- COW BAY, on outer end of breakwater. Lantern on frame. Fixed red
- FLINT ISLAND, on Island, lat 46 11 N, lon 59 46 50 W, white catoptric light, revolving every 15 seconds, visible 12 miles, 65 feet high, white octagonal building, height 43 feet. Visible around horizon.
- LINGAN HEAD, north side of entrance to Bridgeport Harbor, lat 46 14 10 N, lon 60 2 40 W, fixed red catoptric light, visible 10 miles, 50 feet high,

MACDONALD & CO., MANUFACTURERS OF BRASS SLIDING DOOR ROLLERS.—See *adv.* p. 3 cover.

VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.

MACDONALD & CO., Manufacturers of Copper and Lead Tanks.



VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.

PICKFORD & BLACK, IMPORTERS NETS, TWINES, LINES, 51 UPPER WATER STREET.

- white square wooden building, height 20 feet. For guiding vessels into Bridgeport Harbor
- LOW POINT**, Flat Point, east side of Spanish Bay, lat 46 16 30 N, lon 60 7 30 W, fixed white catoptric light, visible 14 miles, 70 feet high, building octagonal, red and white vertical stripes, height 51 feet. Marine Telegraph and Signal Station.
- SYDNEY BAR**, on west end of South Bar, lat 46 12 40 N, lon 60 12 40 W, fixed red catoptric light, visible 10 miles, 30 feet high, white square wooden building, height 20 feet.
- CRANBERRY HEAD**, on northern side of Spanish Bay, entrance to Sydney Harbour, lat 46 16 0 N, lon 60 12 20 W. A steam fog trumpet sounds a blast of ten seconds duration every minute
- POINT ACONI**, on high cape, north side of entrance to Little Bras d'Or, lat 46 20 30 N, lon 60 17 10 W, fixed red catoptric light, visible 11 miles, 91 feet high, square white wooden building, height 20 feet. For guiding vessels into Little Bras d'Or
- BLACK ROCK POINT**, south side of entrance to Big Bras d'Or, lat 46 18 30 N, lon 60 23 30 W, fixed white catoptric light, 45 feet high, white square building, height 23 feet. White cross on red ground. Three Pole Lights in St Peter's Inlet. One on Majorie's Isle, west of Sandy's Point, one on the S E point Beaver Island, and one on Gregory Island. Red light shown from lantern hoisted on a mast 25 feet high, with shed painted white at its base. Visible 5 miles
- CAPE GEORGE**, south side of Bras d'Or Lake, west side of entrance to St Peter's Inlet, lat 45 44 28 N, lon 60 48 20 W, fixed white catoptric light, visible 12 miles, 50 feet high, white square wooden building, height 20 feet. To guide vessels through St Peter's Inlet
- GRAND NARROWS**, on Uniacke Point, N side of channel, Barra Straits, lat 45 58 N, lon 60 48 W, fixed white catoptric light, visible 10 miles, 29 feet high, white square wooden building, height 20 feet. For guiding vessels through Barra Straits, and navigating Little and Great Bras d'Or Lakes
- PIPER'S COVE**, on the western bend of Derby Point, near Piper's Cove, in the Grand Narrows, lat 45 56 30 N, lon 60 48 W, light, fixed red, dioptric, visible 9 miles. White, square, wooden building
- LITTLE NARROWS**, eastern entrance, lat 46 0 0, lon 60 58 25. One fixed white light, visible 10 miles, white, square, wood, 35 feet high. Catoptric
- FRASER'S POINT**, on north side of St Patrick's Channel, lat 45 57 45 N, lon 61 4 30 W, fixed red light, shown from a dioptric lantern, hoisted on a mast 25 feet high, with a shed painted white at its base, visible 5 miles
- KIDSTON ISLAND**, on N E Point, at entrance to Baddeck Harbor, N side of Bras d'Or Lake, lat 46 5 58 N, lon 60 44 20 W, fixed red catoptric light, visible 7 miles, 31 feet high, square, wooden building, white
- MCKENZIE'S POINT**, N side of Bras d'Or Lake, about 2 miles S W of Port Bevis, lat 46 7 15 N, lon 60 39 W, fixed white catoptric light, visible 11 miles, 95 feet high, square white wooden tower. For guiding vessels through Bras d'Or Lake.
- CAREY'S BEACH**, N side of entrance to Big Bras d'Or. Pole light red
- BIRD ISLAND**, Ciboux Island, 1.3 miles from N end, lat 46 23 1 N, lon 60 22 30 W, red catoptric light, revolving every minute, visible 16 miles, 77 feet high, white octagonal building, height 33 feet.

PICKFORD & BLACK, Importers of Wire Rope, Canvas, 51 Upper Water St.

- ST ANN'S HARBOUR, on north point of Beech, lat 46 17 30 N, lon 60 32 15 W, fixed white catoptric light, visible 8 miles, 25 feet high, white building, height 30 feet. The light exhibited to find entrance through on a dark night.
- INGONISH HARBOUR, on beech southern side of entrance to harbor, lat 46 38 15 N, lon 60 23 10 W. Light fixed red dioptric, visible 9 miles, elevated 45 feet above high water. Building square tower, white, 38 feet from base to vane
- INGONISH, on Island, lat 46 41 20 N, lon 60 20 W, fixed white light, visible 20 miles, 237 feet high, white square wooden building, height 40 feet
- CAPE NORTH, on Money Point,  $\frac{3}{4}$  miles S E from Money Point, lat 47 1 25 N, lon 60 23 15 W, red and white catoptric light, revolving every 45 seconds, visible 15 miles, 74 feet high, square white wooden building, height 26 feet. Coast light makes a complete revolution every  $1\frac{1}{2}$  minute
- CAPE ST LAWRENCE—light house to be erected
- CHETICAMP, near south of Island, lat 46 36 30 N, lon 61 3 10 W, white catoptric light, revolving every 45 seconds, visible 20 miles, 149 feet high, white square wooden building, height 24 feet
- ST PAUL'S ISLAND, on rock off N E point of island, lat 47 13 50 N, lon 60 8 20 W, fixed white light, dioptric, third order, visible 20 miles, 140 feet high, white octagonal building, height 40 feet. Obscured between N by E  $\frac{1}{2}$  and E N E
- ST PAUL'S ISLAND, S W point of island, lat 47 11 20 N, lon 60 9 40 W, white dioptric light, third order, revolving every minute, visible 20 miles, 140 feet high, white octagonal building 40 feet high. Obscured when bearing S S E to W  $\frac{1}{4}$  N. A fog whistle on the S E side of the island S W of Atlantic Cove, about half a mile from the Hurricane Establishment, sounds once for five seconds in each minute during thick weather and storms
- MARGAREE HARBOUR, on outer end of breakwater pier, lat 46 26 35 N, lon 61 6 50 W, seaward light fixed red, white light eastern and western sides lantern, visible 7 miles, 29 feet high, square white building
- MARGAREE, summit or middle of Sea Wolf Island, lat 46 21 30 N, lon 61 15 30 W, fixed white catoptric light, visible 21 miles, 298 feet high, square white building. To vessels in dangerous proximity to the island the light may become obscured by the abrupt cliffs on the sides of the island
- MABOU, two range lights, lat 46 5 40, lon 61 28 10, each, small dioptric lantern, hoisted on mast, the outer, fixed, white, 25 feet high, visible 9 miles; the inner, fixed, red, visible 7 miles; lead into harbor, through dredged channel past breakwater
- PORT HOOD, S E side of entrance to harbor lat 46 N, lon 61 31 40 W, fixed catoptric light, red N, white S, visible 10 miles, 55 feet high. Square white building
- IRON CAN BUOYS have been placed at the following Shoals:—Port Hood Harbor, C B, Portsmouth Point, Spithead, Smith Spit, Dean Shoal, also one at Judique Shoal. Judique Shoal and Dean Shoal Buoys are painted red, the other three are painted black. These Buoys will be placed on or about the 1st May in each year, and taken up about the 10th November
- NORTH CANSO, north entrance west side, 120 yards inshore, lat 45 41 40 N, lon 61 29 10 W, fixed white catoptric light, visible 18 miles, 110 feet high, white square wooden building, 35 feet high. There is good anchorage under the light when the wind is off shore. Lantern on dwelling

MACDONALD & CO, MANUFACTURERS OF BRASS BINNACLE GUARDS.—See adv. p. 3 cover.

MACDONALD & CO., Manufacturers and Fitters of Steam Heating Apparatus.—See adv. p. 3 cover

HARBOR AU BOUCHE, two lights in separate towers, lat 45 41 0 N, lon 61 31 15 W, fixed white catoptric light, visible 9 miles, 36 feet high, white square wooden building, 32 feet high, 473 yards S W  $\frac{3}{4}$  S from front light, one fixed red catoptric light, 107 feet high. Range lights to lead through dredged channel over the bar.

POMQUET ISLAND, north east end of island in St George's Bay, lat 45 39 40 N, lon 61 44 30 W, fixed red catoptric light, visible 9 miles, 50 feet high, square white building, height 23 feet. Obscured on easterly bearings

CAPE ST GEORGE, north side cape, lat 45 52 30 N, lon 61 54 40 W, white catoptric light, revolving every half minute, visible 25 miles, 350 feet high, white square building, height 39 feet

MERIGOMISH, on King Head, entrance to harbor, lat 45 39 20 N, lon 62 28 30 W, red, fixed, catoptric light, visible 10 miles, 105 feet high, white, square wooden building, 40 feet high

PICTOU ISLAND, south-east point, lat 45 49 10 N, lon 62 30 30 W, fixed white catoptric light, visible 12 miles, 52 feet high, square white building

PICTOU HARBOR, south point of entrance, lat 45 41 30 N, lon 62 39 30 W, fixed catoptric lights, vertical, 25 feet apart, upper white, lower red, visible 11 miles, lantern 65 feet high, building octagonal, striped red and white vertically, height 55 feet. Lighted when navigation is open. A small red light is seen below lantern. By keeping light W S W vessels clear the east reefs off Pictou Island

In tower of new Custom House a fixed white light, in range with lights at the entrance to the harbor, leads through the channel up to the bar

CARIBOU ISLAND, north-east part of Island, lat 45 46 N, lon 62 42 20 W, white catoptric light, revolving every minute, visible 10 miles, 35 feet high, white square building, height 26 feet

AMET ISLAND, centre of island, Northumberland Straits, lat 45 50 15 N, lon 63 10 10 W, fixed white catoptric light, visible 10 miles 44 feet high, white square wooden building, height 26 feet. Visible around horizon

MULLIN POINT, north side of entrance to Wallace Harbor, Cumberland County, lat 45 49 45 N, lon 63 25 15 W, fixed catoptric light, visible 11 miles, 39 feet high, white square wooden building, height 25 feet. Red light, shown from window in keeper's dwelling. Two lights in one, form a range to lead across bar, and in channel up to Mullin's Point

A red can buoy marks entrance to channel, and two fairway buoys

PUGWASH, in harbor, lat 45 52 30 N, lon 63 40 20 W, fixed catoptric light, red seaward, white towards harbor, visible 8 miles, 48 feet high, white square building, height 44 feet. Black buoys to be left on port hand, and red on starboard when entering the harbor.

**WEST FROM HALIFAX.**

CHEBUCTO HEAD, west side of entrance to Halifax Harbor, lat 44 30 20 N, lon 63 30 50 W, white light, revolving every minute, visible 18 miles, 132 feet high, white square wooden building, height 22 feet. An Automatic Signal Buoy, painted red, placed in lat 44 31 42 N, lon 63 29 28 W, in 21 fathoms of water, N E  $\frac{1}{2}$  E,  $1\frac{1}{4}$  miles from Chebucto Head, sounds a ten inch whistle. From the buoy Chebuto Head bears S W  $\frac{1}{4}$  W, magnetic  $1\frac{1}{8}$  mile. Sandwich Point N by W, 4 miles. Passing to the westward of the buoy at the distance of half a cable and steering a N  $\frac{1}{4}$  W course magnetic, will lead up the harbor to the eastward of the Neverfail Shoal, and at a distance of two cables to the westward of Meagher's Beach light.

PICKFORD & BLACK, SHIP BROKERS.

40

ROBERT H. COGSWELL'S

[1888

PICKFORD & BLACK, Importers of Chain Cables and Anchors, 51 Upper Water St.

MACDONALD & CO., Manufacturers of Plumbers' Brass Goods.—See adv. p. 3 cover.

house. A similar buoy painted black, in lat 44 28 25 N, lon 63 22 10 W, in 36 fathoms, from this buoy Sambro Island light W  $\frac{1}{2}$  N  $8\frac{1}{2}$  miles.— Devil's Island light N  $\frac{7}{8}$  W  $7\frac{3}{4}$  miles, and the inner signal buoy N W  $\frac{1}{2}$  N 6 miles.

The Portuguese buoy is colored red and black horizontally; the Rockhead buoy black and white vertically. The other buoys of Halifax Harbor are colored red on the starboard hand and black on the port hand, entering the harbor.

HERRING COVE, Western Head, lat N 44 33 57, lon W 63 33 0, fixed red, on mast, elevated 52 feet above water. Visible 8 miles

SAMBRO, middle of Island, lat 44 26 10 N, lon 63 33 30 W, fixed white dioptric 2nd order light, visible 20 or 21 miles, 115 feet high, building white, octagonal 60 feet high

A steam fog whistle, erected on south side of island, and elevated 90 feet above high water, in thick weather, fogs and snow storms, sounds each minute a blast of ten seconds' duration.

A Bell Buoy, painted black, placed S E of the Blind Sister

A Spar Buoy has been placed off the S W Breaker, Sambro, and one on the Pollock, and another on the Whippey Shoal, near Sambro

SHIPLEY HEAD, Terrance Bay, lat 44 27 40, lon 63 42 8, fixed red, on mast, 55 feet high, visible 7 miles

BETTY'S ISLAND, on Brig Point, near Prospect, lat 44 26 22 N, lon 63 45 54 W, revolving red catoptric light, greatest brilliancy every two minutes, 75 feet high, visible 14 miles, building white, with two horizontal red bands, square, wood, height 54 feet, dwelling attached. Coast light

PEGGY POINT, east side of entrance to St Margaret's Bay, lat 44 29 30 N, lon 63 55 W, fixed red catoptric light, 65 feet high, building white, square, 26 feet high. Lantern on dwelling

CROUCHER'S ISLAND, on south point of island, lat 44 38 24, lon 63 57 20, fixed white light, visible 15 miles, square tower, 40 feet high, with dwelling attached, painted white

MARGARET'S BAY, on Green Island, Lunenburg County, lat 44 23 N, lon 64 2 45 W, red and white catoptric light, revolving alternately every one and a-half minutes, building white, square, wood, 28 feet high, with dwelling attached. Coast light

HUBBARD'S COVE, Green Point, W side of entrance, lat 44 37 14 N, lon 64 3 8 W, fixed red dioptric, 60 feet high. Building white, square, wood, with dwelling attached

CHESTER, E, Ironbound Island, a little to the eastward of centre of island, in Mahone Bay, lat 44 26 10 N, lon 64 4 50 W, fixed white dioptric light, visible 16 miles, 150 feet high, white oblong tower on dwelling, 46 feet high, wood, lantern. Seen from all points of approach. The lantern alone is visible, building hidden by trees

QUAKER ISLAND, on highest part of island, lat 44 30 55, lon 64 13 50, fixed red light, visible 11 miles. Square tower, 35 feet high, with dwelling attached, painted white. To guide into Chester Basin

HOBSON'S NOSE, Mahone Bay, lat 44 25 N, lon 64 13 46 W, red fixed catoptric light, visible 11 miles, 68 feet high, building white, square, wood, 29 feet high

Iron Pipes, all sizes, at MACDONALD & CO.'S—See p. 3 cover.

Residences and Public Buildings Fitted with Plumbing Fixtures by MACDONALD & CO.—See adv. p. 3 cover.

B



WESTHAVER'S ISLAND, Mahone Bay, lat 44 26 12, lon 64 20 5, has been destroyed by fire. A temporary light is displayed from a lantern hoisted on a pole on the site of lighthouse

CROSS ISLAND, east point Lunenburg Bay, lat 44 18 45 N, lon 64 10 W, 2 white catoptric lights vertical, 35 feet apart, upper intermittent revolving every minute, and visible 14 miles, 100 feet high, lower fixed, visible 6 miles, and 65 feet high, building red, octagonal base, height 53 feet. Pilots resort here, and vessels may take refuge in case of necessity. Upper bright 45 seconds, dark 15 seconds. A fog trumpet has been erected here, sounding blasts of 10 seconds duration eve. y 1½ minutes

BATTERY POINT, Lunenburg, lat 44 21 45 N, lon 64 17 30 W, fixed red catoptric light, visible 8 miles, 50 feet high, white, square tower on dwelling, height 24 feet. This harbor is easy of access, buoys are placed in the bay and entrance to harbor on Owens Reef, Sculpin Rock, Haddock Shoal, Battery Point Shoal, and Head Shoal. In approaching the harbor from seaward, the buoy on Sculpin Rock, painted red and black, in horizontal stripes, may be left on either hand, giving it a berth of two cable's length. The other buoys are painted black and must be left on the port hand going in

WEST IRONBOUND ISLAND, near Cape LaHave, mouth of LaHave River, lat 44 13 45 N, lon 64 16 20 W, white catoptric light, revolving every 30 seconds, visible 13 miles, 72 feet high, building white, square, height 29 feet. Near edge of cliff 40 feet high

LAHAVE BELL BUOY, painted red, off LaHave River, in 22 fathoms water. 3 miles E by S from Moser's Island Light, and 2½ miles S S W from Ironbound Light

LAHAVE, on Fort Point, lat 44 17 20 N, lon 64 21 W, fixed red catoptric light, visible 8 miles, 48 feet high, building white, square, wood, height 35 feet

MOSHER'S ISLAND, on island, west side of entrance to LaHave River, lat 44 14 15 N, lon 64 18 50 W, fixed red catoptric light, visible 8 miles, 55 feet high, building white, square, height 26 feet

MEDWAY HEAD, Port Medway, west side of entrance, lat 44 6 10 N, lon 64 32 15 W, fixed white catoptric light, visible 10 miles, 44 feet high, building white, square, with black square seaward, height 23 feet. Like a dwelling house. Spar Buoys are placed in the channel to Port Medway Harbor, on the breaking ledges, Nautilus Rock, corner ground and edge of flats off Bang's Point. In passing in from seaward the red buoys must be left on the starboard, and the black buoys on the port hand

A Red Can Buoy on west side of S W Breaker, off Port Medway

COFFIN ISLAND south point Liverpool Bay, lat 44 2 N, lon 64 37 30 W, white catoptric light, revolving every two minutes, light 30 seconds, dark 90 seconds, visible 16 miles, 65 feet high, building octagonal, horizontal stripes, red and white, eight in number, height 50 feet

An Automatic Buoy, striped vertically black and white, S ¼ W, 1 11-16 miles from Coffin's Island light-house

BROOKLYN PIER, on end of Breakwater, Liverpool, lat 44 2 45 N, lon 64 41 15 W, fixed light, white seaward, green towards harbor, visible 10 miles. Square tower. (Discontinued until necessary repairs to pier are effected.)

FORT POINT, Liverpool Bay, south entrance, lat 44 2 30 N, lon 64 42 20 W, fixed red catoptric light, visible 7 miles, 30 feet high, building white, square, height 17 feet. Left on port side when entering the harbor

PICKFORD & BLACK, AGENT FOR TARR & WONSON'S COPPER PAINT.

PORT MOUTON, north-east side of Spectacle Island, Queen's County, lat 43 55 N, lon 64 48 W, fixed red catoptric light, visible 11 miles, 47 feet high, square wooden building, height 20 feet. For guiding vessels into harbor

LITTLE HOPE, nearly on centre of island, lat 43 48 30 N, lon 64 47 15 W, red catoptric light, revolving every minute, visible 12 miles, 40 feet high, square white building, height 26 feet. Centre of keeper's dwelling visible around horizon. A mechanical hand fog trumpet will be sounded in answer to a steamer's whistle or vessels' fog trumpet in thick weather.

SHINGLE POINT, east side Port L'Hebert Harbor, lat 43 48 40 N, lon 64 55 30 W, fixed red catoptric light, visible 10 miles, 33 feet high, white square wooden building, height 29 feet.

CARTER'S ISLAND, Ragged Island Harbor, lat 43 42 15 N, lon 65 5 30 W, fixed red light, visible 11 miles, 66 feet high, white square wooden building, height 29 feet

RAGGED ISLAND, Gull Rock, lat 43 39 15 N, lon 65 5 50 W, fixed white catoptric light visible 10 miles, 56 feet high, white square wooden building, height 31 feet

BULL ROCK, an Iron Can Buoy with cage, painted black, has been placed in 10 fathoms water S S W  $\frac{1}{2}$  W, about 150 yards from the Bull Rock, off Western Head, Shelburne County

FARM LEDGE, Iron can buoy, red, 200 yards S of Ledge

EASTERN BULL, red spar buoy

BLACK POINT BREAKWATER, red spar buoy

SAND SPIT, at east side of entrance to Shelburne Harbor, lat 43 41 25 N, lon 65 19 28 W, fixed red catoptric light, visible 11 miles, 47 feet high, white square wooden building, height 44 feet. Built on a pier

SHELburne HARBOR—A red Iron Can Buoy has been placed in 4 $\frac{1}{2}$  fathoms, on west side of Middle Rock Shoal; a red Can Buoy off extreme of Sand Spit, in four fathoms, and a black Spar buoy on east end of Adamant Shoal

CAPE ROSEWAY, near south-east point of MacNutt's Island, Shelburne harbor, lat 43 37 15 N, lon 65 15 45 W, two white catoptric lights, vertical, 55 feet apart, upper light visible 18 miles, and 120 feet high, lower 65 feet, and visible 10 miles, octagonal building, vertical black and white stripes, height 77 feet

CAPE ROSEWAY, fog trumpet near the light house sounds a blast of 10 seconds duration with an interval of 110 seconds between the blasts

A black Can Buoy S S E from the Jig Rocks in 9 fathoms water.

NEGRO ISLAND, on north side, lat 43 30 54 N, lon 65 28 58 W, red and white catoptric light, revolving every minute, visible 12 miles, 48 feet high, white square wooden tower with keeper's dwelling attached; height 29 feet. For guiding vessels in and out of Clyde River or Negro Harbor.

BACCARO, on west side of entrance to Barrington Harbor, lat 43 26 54 N, lon 65 28 12 W, fixed red catoptric light, visible 10 miles, 49 feet high, white square building, with black ball seaward, height 35 feet. A Spar Buoy to the south of Bantam.

BARRINGTON E BAY LIGHTSHIP, lat 43 31 5 N, lon 65 34 25 W, fixed white light, hull and spars painted red, with word "Barrington" in white letters on both sides. Height 30 feet above deck. Moored in 6 fathoms at low water. Wesses' Ledge bearing S W by W  $\frac{1}{4}$  W, distant  $\frac{3}{8}$  mile, Baccaro Light bear-

MACDONALD & CO., Manufacturers of Ships' Patent Water Closets.—See adv. p. 3 cover.

MACDONALD & CO., Manufacturers of Deep Sea and Hand Leads.

RESIDENCES and PUBLIC BUILDINGS FITTED with STEAM HEATING APPARATUS by MACDONALD & CO

ing S S E  $\frac{1}{2}$  E, distant 6 and 3-16 miles, and Bantam Rocks, bearing S by E  $\frac{1}{2}$  E, distant 6 $\frac{1}{2}$  miles. To guide vessels into Barrington East Bay, and through Barrington Passage.

In passing through Barrington Pass to the westward, the dangers to be left on starboard hand are marked by red buoys, those to be left on the port hand by black buoys.

CAPE SABLE, on Cape, lat 43 23 19 N, lon 65 37 11 W, white catoptric revolving light, bright 15 seconds, dark 25 seconds, visible 12 miles, 53 feet high, white octagonal building, 50 feet high. A steam fog whistle on Cape, elevated about 40 feet above high water, sounds in thick weather, fogs and snow storms, a blast of ten seconds' duration each minute, with an interval of 50 seconds between each blast.

BRAZIL ROCK—A bell Buoy has been placed here to mark this danger, instead of the Can Buoy, painted red and black horizontal stripes, moored in about 18 fathoms to southward of Rock.

STODDART ISLAND, on N W point of island, lat 43 28 30 N, lon 65 43 10 W, fixed red catoptric light, visible 9 miles, 22 feet high, white small square tower. To guide vessels into the anchorage of Stoddart Harbor and Shag Harbor Sound.

BON PORTAGE ISLAND, on south point, lat 43 27 16 N, lon 65 44 39 W, red catoptric light, revolving every minute, visible 12 miles, 46 feet high, white square wooden building, height 28 feet. For guiding vessels into Barrington West Bay and Shag Harbor.

PUBNICO HARBOR, Beach Point, east side of entrance, 120 yards from low water mark, lat 43 35 45 N, lon 65 46 54 W, fixed white catoptric light, visible 8 miles, 28 feet high, square white building, height 20 feet. Open westward of St John's Island, bearing N E by N, clears the ledge; in making harbor from any other direction, the light must be brought to the northward of E N E before it can be steered for to avoid shoal spot off St Ann's Point. Spar buoys mark the channel. Black left on port hand, red on starboard in approaching the harbor. A bell buoy has been placed near John's Ledge.

PEASE'S ISLAND, on the south point of Pease's Island, one of the Tusket Islands, Yarmouth County, Nova Scotia, lat 43 37 35 N, lon 66 1 40 W. The main or sea light will be revolving catoptric, showing alternately red and white, each color visible for 15 seconds, with intervals of 45 seconds between the flashes. It is elevated 56 feet above high water mark, and in clear weather should be seen 12 miles from all points of approach from the southward, and also through the Schooner and Ellenwood Passages. A fixed red catoptric light will also be shown from a window in the tower, 16 feet below the main light. It is intended to mark the channel between the two dangers known as the Old Man and Old Woman Rocks, and is, therefore visible between the bearings W by N  $\frac{1}{2}$  N, and N W by N, N W by W, and in no other directions. It should be visible 4 miles. The tower is a wooden building, painted white and consists of a square tower 42 feet high from base to vane on lantern, with a keeper's dwelling attached.

ARGYLE, on south point of Whitehead Island, Yarmouth County, lat 43 39 30 N, lon 65 52 4 W, fixed red catoptric light, visible 12 miles, 115 feet high, building white, square, wood, with dwelling attached, height 28 feet. For guiding vessels into Argyle Harbor.

TUSKET RIVER, Big Fish Island, south-west point, lat 43 42 10 N, lon 65 57 15 W, two fixed white catoptric lights, horizontal, 8 yards apart, visible 12 miles, 50 feet high, white square wooden building, height 23 feet. Visible seaward; in windows each end of a dwelling house.

SEAL ISLAND, south point,  $\frac{1}{2}$  mile inland, lat 43 23 34 N, lon 66 0 52 W, fixed white light, dioptric, 2nd order, visible 18 miles, 98 feet high, white octagonal building, height 60 feet. The Blonde Rock lies S by W  $3\frac{1}{2}$  miles from light house. Between this Rock and the Island there are some dangers, the ground is rocky throughout, and large vessels ought not attempt passing between them. A fog whistle near light house, during fogs and snow storms, sounds in each minute a blast of 5 seconds duration, and after an interval of 5 seconds gives another blast of 5 seconds, with an interval of 45 seconds.

BLONDE ROCK, an automatic buoy has been placed in 16 fathoms water about  $\frac{1}{2}$  mile S  $\frac{1}{2}$  E from the Rock.

YARMOUTH OR CAPE FORCHU, east cape, south point, lat 43 47 28 N, lon 66 9 20 W, white catoptric light, intermittent—light  $1\frac{1}{2}$  minute, dark  $\frac{1}{2}$  minute, visible 18 miles, 117 feet high, octagonal tower, vertical stripes, red and white, height 59 feet. Fog whistle on west side, sounds in fogs and snow storms, 10 seconds in every minute.

An Automatic Buoy, painted red with letter L, has been placed in 18 fathoms of water, about  $\frac{1}{2}$  mile W by N from the Lurcher shoal, which lies 15 miles W N W from this light.

BUNKER'S ISLAND, on end of reef off S W point of Island, east side of entrance to Yarmouth Harbor, lat 43 48 30 N, lon 66 8 45 W, fixed red catoptric light, visible 10 miles, 27 feet high, the lantern on a dwelling house, built on a wooden pier. A red beacon light for the purpose of guiding vessels into the harbor. Visible from the southward between the bearings of NE by N and N  $\frac{1}{2}$  E. It can also be seen over Stanwood's Beech, when bearing S  $\frac{1}{2}$  E to S E  $\frac{1}{2}$  E, but cannot be run for on these bearings, the only entrance to the harbor being through Yarmouth Sound and round East Cape. Fog Bell sounds at intervals of 15 seconds.

TRINITY LEDGE, an Iron Bell Buoy, painted red, has been moored to the westward of Trinity Ledge, off Cape St Mary.

CAPE ST MARY, east side of Bay, lat 44 5 20 N, lon 66 12 40 W, red and white catoptric light, revolving alternately every 30 seconds, visible 17 miles, 103 feet high, octagonal white building, height 43 feet.

METEGHAN RIVER, at entrance end of Breakwater, lat 44 13 43 N, lon 66 8 12 W, fixed green catoptric light, visible 6 miles, 23 feet high, building vertical, red stripes on seaward side, 21 feet high, lantern painted black. Beacon for guiding vessels into river. Must be left on starboard hand and passed close aboard. Tide leaves breakwater one hour before low water.

CHURCH POINT east side of St Mary's Bay, Digby County, lat 44 19 55 N, lon 66 7 36 W, fixed red catoptric light, visible 10 miles, 36 feet high, square white wooden building, height 20 feet. For guiding against dangers in vicinity of Church Point.

SISSIBOO, south side of entrance to river, lat 44 26 30 N, lon 66 1 15 W, fixed white dioptric light, visible 8 miles, 36 feet high, white wooden building, pyramidal, height 33 feet.

WESTPORT, Peter's Island, entrance to Grand Passage, lat 44 15 30 N, lon 66 20 20 W, 2 fixed white catoptric lights, horizontal, 24 feet apart, visible 10 miles, each 40 feet high, square white building, height 15 feet. Visible from the northward between the bearings of S by W and S S W, and from the southward between the bearings of N E, by E, and N N W  $\frac{1}{2}$  W.

A red Can Buoy off Dartmouth Point, and a black Can Buoy off Cow Ledge.

A red beacon on Cow Ledge.

BRIER ISLAND, north-west Point, lat 44 14 57 N, lon 66 23 30 W, fixed white catoptric light, visible 13 miles, 92 feet high, white octagonal building, height



55 feet. A steam fog whistle on N W of Brier Island, south side of light house, sounds during thick and foggy weather and snow storms as follows:—blast of four seconds, interval of four seconds, blast of four seconds, interval of four seconds, blast of four seconds, interval of forty seconds—making sixty seconds.

**BOAR'S HEAD**, 17 yards from edge of cliff, lat 44 24 16 N, lon 66 13 W, red and white catoptric light, revolving alternately every minute, visible 14 miles, 70 feet high, white square building. On south entrance to Petit Passage.

**POINT PRIM**, south point of entrance to Annapolis Basin, lat 44 41 34 N, lon 65 47 20 W, fixed white catoptric light, visible 13 miles, 76 feet high, square tower, vertical red and white stripes, height 22 feet. Fog whistle on Prim Point sounds in snow storms and in thick or foggy weather 8 seconds in each minute, making an interval of 52 seconds between each blast.

**DIGBY PIER**, red Pole Light on outer end of pier.

**SHAFNER'S POINT**, on N side of Annapolis river, lat 44 42 40 N, lon 65 37 8 W. Fixed white dioptric, 55 feet high, visible 8 miles. Building white, square, wood. Indicates Goat Island Shoals.

**MARSHALL COVE or PORT WILLIAMS**, south shore, lat 44 56 52 N, lon 65 16 W, two fixed white catoptric lights, vertical, 22 feet apart, upper 92 feet high, visible 10 miles, white square building, height 22 feet. Lantern on top of dwelling; lower light in bow window, visible from W S W round N to E N E

**MARGARETVILLE**, on extremity of point, south shore, lat 45 2 57 N, lon 65 4 W, two fixed red catoptric lights, 30 and 27 feet high, visible 8 miles, square building, horizontal white and black stripes, height 22 feet. Visible from W S W round N to E N E

**ISLE HAUTE**, on highest point lat 45 14 55 N, lon 65 0 45 W, white intermittent catoptric light, 365 feet high, shows 40 seconds in every minute, visible 20 miles, white square wooden building, dwelling attached, almost hidden by trees; height 53 feet.

**BLACK ROCK**, south shore, lat 45 10 10 N, lon 64 46 W, fixed white catoptric light, visible 12 miles, 45 feet high, square white building, height 35 feet.—Light on top of dwelling, visible from all points of approach. A fog whistle on the extreme point of Cape d'Or, on the opposite side of the channel from Black Rock, sounds during thick weather, fogs and snow storms, twice in each minute, each blast being of six seconds duration, with intervals of 24 seconds between. The whistle will probably be heard in calm weather, or with the wind, at a distance of 20 miles, and in stormy weather, or against the wind, from 5 to 8 miles, according to the state of the atmosphere.

**ADVOCATE HARBOR**, northwest side of entrance, lat 45 19 25 N, lon 64 47 30 W, fixed red dioptric light, 36 feet high, visible 7 miles, square white building, 27 feet high. Coast light, and to indicate entrance to harbor, over the bar. Lighthouse is being removed to the point on the opposite side of the channel.

**KINGSPORT**, on Oak Point Pier, lat 45 9 30 N, lon 64 21 45 W, fixed white catoptric light, height 30 feet. Upper enclosed part of building, white; open frame, brown; height 26 feet, visible 8 miles from S W  $\frac{1}{2}$  W round by E to N W by W  $\frac{1}{2}$  W.

**HORTON**, on buff, west side of Avon River, lat 45 6 15 N, lon 64 13 30 W, fixed white catoptric light, visible 20 miles. Square tower with dwelling attached.

**WALTON HARBOR**, Basin of Minas, Hants County, lat 45 14 N, lon 64 0 45 W, fixed red catoptric light, visible 10 miles, 60 feet high, square white wooden building, height 20 feet. For guiding vessels into Walton harbor.

**BURNTCOAT**, Basin of Minas, north-west extremity of head, south shore, lat 45 18 40 N, lon 63 48 30 W, fixed white catoptric light, visible 13 miles, 75

feet high, square white building, height 35 feet. On dwelling. Visible from all points of approach.

CAPE D'OR. A steam whistle has been erected at Cape d'Or, Cumberland County. Sounds 6 seconds in every 30 seconds.

CAPE SHARP, on southern extremity of Cape, lat N 45 21 55, lon W 64 23 40. Fixed red dioptric light, 60 feet high, visible 10 miles. Square white tower, with dwelling attached.

PARSBORO', or Partridge Island, west side of river, lat 45 23 N, lon 64 19 W, fixed white catoptric light, visible 9 miles, 37 feet high, white square building, height 32 feet. Lantern on dwelling.

SPENCER POINT, on north shore, Cobequid Bay, lat 45 23 30 N, lon 63 37 W, fixed white catoptric light, visible 6 miles, 35 feet high, window in building 20 feet high.

APPLE RIVER, on Cape Cabston or Hetty Point, north entrance, lat 45 28 20 N, lon 64 51 30 W, fixed white catoptric light, visible 12 miles, 64 feet high, building white, oblong, with tower, height 45 feet. Rebuilt about 33 yards S S E from old one.

**NEW BRUNSWICK.—BAY OF FUNDY.**

HILLSBORO' WHARF, Peticodiac River, lat 45 55 15 N, lon 64 37 45 W, fixed white catoptric light, visible 5 miles, 14 feet high, structure open frame, height 22 feet. To guide vessels going up the river and to the coal and plaster wharves.

GRINDSTONE, west part of island, lat 45 43 13 N, lon 64 37 25 W, fixed white catoptric light visible 12 miles, 60 feet high, octagonal white tower. Visible from N E by E, round by N to E by S, or 315°. In thick weather a trumpet sounds 4 blasts in every minute. Cape Enrage light house, S W by W ½ W, about 10 miles.

CAPE ENRAGE, pitch of Cape, lat 45 35 34 N, lon 54 46 55 W, fixed white dioptric light, 4th order, visible 15 miles, 120 feet high, square white building, height 23 feet. Visible between the bearings of N W round by S to N E. A steam fog whistle, 150 feet N E from the light house, sounds during thick weather 4 seconds in each minute. Will probably be heard in calm weather 10 miles, and in stormy weather from 3 to 5 miles.

QUACO. Destroyed by fire, a temporary light displayed. Tower to be rebuilt on the headland.

CAPE SPENCER, pitch of Cape, lat 45 12 30 N, lon 65 54 W, red and white catoptric light, alternating every 45 seconds, visible 20 miles, 207 feet high, white square building with tower, height 35 feet. Visible between the bearings from E S E round by S to W N W, Partridge Island light bearing by compass N W by W ½ W, northerly, distant 6½ miles.

PARTRIDGE ISLAND, St John Harbor, lat 45 14 20 N, lon 66 3 20 W, fixed white catoptric light, visible 20 miles, 119 feet high, building red and white in vertical stripes, height 40 feet. In foggy weather a steam whistle sounds for 10 seconds every minute. A bell buoy near E side of Partridge Island Reef.

ST JOHN HARBOR, on Negro Point, West End of Government breakwater, one fixed red light, visible 8 miles. Tower taken down pending repairs to breakwater. Dependence cannot always be placed on temporary light, and approach dangerous during storms.

MUSQUASH LIGHT, lat 45 8 35 N, lon 66 14 30 W, fixed red towards seaward, white towards harbor, visible 10 miles. White, square, wood, dwelling

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MACDONALD & CO, Importers of Steam Pumps, etc.—See adv. p. 3 cover.

PICKFORD & BLACK, 51 UPPER WATER STREET, HALIFAX, N. S.

Woodberry Cotton Duck, for sale by PICKFORD & BLACK.

1888]

NAUTICAL ALMANAC.

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attached, catoptric. An automatic buoy moored in 30 fathoms,  $1\frac{1}{2}$  miles south from the Light, and S W from Split Rock, lat 45 7 15, lon 66 13 50.

LEPREAU, on point, lat 45 3 40 N, lon 66 27 30 W, 2 fixed white catoptric lights, vertical 27 feet apart, visible 15 miles, upper light 81 lower 53 feet high, octagonal building, striped horizontally red and white, height 31 feet. Visible between the bearings of W N W around by S to E by N. Fog whistle during fogs and snow storms sounds twice each minute, first giving a blast of 5 seconds duration, with an interval of 5 seconds, then a blast of 5 seconds duration, with an interval of 45 seconds to complete the minute.

DREW'S HEAD, on W side of Beaver Harbor, Charlotte County, lat 45 3 45 N, lon 66 44 W, fixed white catoptric light, visible 10 miles, 45 feet high, white, square, wooden building, height 36 feet. Seen at all points between eastern and western heads of harbor.

PEA POINT, lat 45 2 20 N, lon 66 48 40 W, east side of entrance to LeEtang Harbor, fixed green light, visible 10 miles, visible from east round by south to north. White, square, wood building, dwelling attached.

BLISS-ISLAND, W end of Island, S side of entrance to Bliss Harbor, lat 45 1 15 N, lon 66 51 W, fixed red catoptric light, visible 12 miles, 45 feet high, white, square, wooden building height 30 feet.

LATTIE PASSAGE, on Mascatin Point, lat 45 2 20 N, lon 66 53 30 W. A fog trumpet has been erected on Mascatin Point, south entrance to Lattie Passage, sounds blasts of 7 seconds, with an interval of 30 seconds between each

MIDJIC BLUFF, Passamaquoddy Bay, Charlotte County, lat 45 6 53 N, lon 66 54 30 W, fixed white catoptric light, visible 15 miles, 130 feet high, building white, square, wood, height 29 feet, lantern brown. A bar extends E N E from light house, and vessels require to keep off a distance of 260 yards to clear it at low water.

PORT ST ANDREW'S, on sand reef at E entrance, lat 45 3 45 N, lon 67 0 50 W, fixed white catoptric light, visible 10 miles, 40 feet high, structure white, square, wood, on a framed pier, height 10 feet. To guide to all ports in inner bay, and to vessels going up the River St Croix from Little Passage or West Quoddy. There is only a depth of 4 feet of water on the N W extension of the reef towards mainland.

PORT ST ANDREW'S, N point of entrance, lat 45 4 10 N, lon 67 2 50 W, fixed white catoptric light, 42 feet high, visible 10 miles, white octagonal building, height 22 feet. Visible between the bearings of N W by N and S E by S. A fog trumpet to be erected at head of harbor.

SPRUCE POINT, St Croix River, Charlotte County, lat 45 10 N, lon 67 11 W, fixed white catoptric light, 32 feet high, white square building, height 28 feet. The course from Spruce Point to ballast ground is E by S  $\frac{1}{2}$  S, distance 2 miles. From Spruce Point to Mark Point W N W, distance 2 miles. A vessel after leaving Doucet Island, to clear the reef, should steer N until the Spruce Point light bears N W by W and thence take a W N W course.

MARK POINT, St Croix River, Charlotte County, lat 45 10 10 N, lon 67 12 30 W, fixed white catoptric light, 32 feet high, square white building, height 28 feet.

CAMPOBELLO ISLAND, N point of Head Harbor, lat 44 57 40 N, lon 66 54 10 W, fixed white catoptric light, visible 15 miles, 64 feet high, white octagonal tower with red cross, height 34 feet. This light enables vessels to enter head Harbor at all times. It is also a guide to vessels entering the main channel, to West Isles, Moose Island, and the inner bay of Passamaquoddy. A fog trumpet sounds blasts of 7 seconds, with intervals of 30 seconds between.

PICKFORD & BLACK, 51 UPPER WATER STREET, HALIFAX, N. S.

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Lead Scupper Pipes, all sizes, MACDONALD & CO.'S.—See p. 3 cover.

PICKFORD & BLACK, AMERICAN TAR, PITCH, ROSIN, 51 UPPER WATER STREET.

VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.—See adv. page 3 cover.

SOUTH WEST WOLF ISLAND, on S E point of the island, lat 44 56 30 N, lon 66 44 10 W, white catoptric light; revolving every 1½ minute, visible 17 to 20 miles, 111 feet high, building white, square, wood, height 35 feet. Lantern on dwelling; visible from all points of approach.

SWALLOW TAIL, N E part of Grand Manan, lat 44 45 52 N, lon 64 44 W, fixed white catoptric light, visible 17 miles, 148 feet high, white octagonal wooden building, height 50 feet. Visible between the bearings of S W round by S to N W.

A steam fog whistle on extreme N W head of Grand Manan, 80 feet above high water, sounds in thick weather, fogs and snow storms, 3 blasts of 4 seconds duration in each minute, with an interval of 16 seconds between each blast.

A spindle beacon, painted red, placed in 1876 on Old Proprietor Ledge on the S E of Grand Manan Island, in lat 44 33 10 N, lon 66 40 W, has a cage elevated 31 feet above high water mark, and in clear weather should be seen from a distance of 8 to 10 miles.

GRAND HARBOR, Grand Manan, lat 44 40 2 N, lon 66 45 5 W, fixed white catoptric light, visible 11 miles 40 feet high, white, square, wooden building, with dwelling attached, height 32 feet. Visible from all points seaward.

SOUTH-WEST HEAD, Grand Manan, lat 44 36 0 N, lon 66 54 16 W revolving red and white catoptric light; three red flashes 40 seconds, eclipse 20 seconds, 3 white flashes 40 seconds, eclipse 20 seconds, 200 feet high; white, square wooden building, with dwelling attached, height 43 feet.

GANNET ROCK, on rock, lat 40 0 38 N, lon 66 47 W, fixed and flash white light, dioptric, 4th order, a flash every 4½ seconds, visible 12 miles, 66 feet high, octagonal tower, height 41 feet, vertical black and white stripes. A gun is fired to answer signals during fogs and snow storms. Dangerous rocks extend 4 miles eastward of the light house. Fixed light 45 seconds, eclipse 5½ seconds, flash 4½ seconds, eclipse 5½ seconds—making 60 seconds.

MACHIAS SEAL ISLAND, on island, lat 44 30 7 N, lon 67 6 13 W, 2 fixed white lights, W by N ½ N, and E by S ½ S, 57 yards apart, one light catoptric, the other dioptric of 2nd order, visible 15 miles, E 58 feet, W 54 feet high, buildings white, each 36 feet high. A fog whistle sounds in thick weather, fogs and snow storms, 5 seconds in each half minute.

**NEW BRUNSWICK.—Gulf of St. Lawrence.**

CAMPBELLTON RANGE LIGHTS—Pier beside Railway Wharf, Restigouche River, lat 48 0 50 N, lon 66 39 40 W, fixed white light, visible 9 miles, white, square, wood, height 24 feet, building 22 feet. On Moffatt's wharf, fixed white light, visible 9 miles, white, square, wood, height 24 feet, building 22 feet.

OAK POINT, Restigouche River, front light, lat 48 2 40 N, lon 66 36 30 W. Fixed white light, visible 11 miles, white square wood, height 40 feet, building 22 feet. Back light, fixed white light, visible 12 miles, white, square, wood, height 45 feet, building 22 feet. In range guide across the Traverse.

POINT A LA GARDE LIGHTBOAT, in 7 feet water, on Spit, S side of Main Channel, off Point, lat 48 3 10 N, lon 66 32 10 W, fixed white light, visible 3½ miles, small vessels, black hull with white spars, height 20 feet.

DALHOUSIE RANGE LIGHTS, on Public Wharf, Restigouche River, lat 48 4 40 N, lon 66 22 30 W, fixed white light, visible 9 miles, 24 feet high, white, square, wood building, height 22 feet, and on Montgomery Island, fixed white light, visible 9 miles, 27 feet high, white, square, wood building height 22 feet.

Brass Ventilators made by MACDONALD & CO.—See adv. p. 3 cover.

MACDONALD & CO., Manufacturers of Brass Binnacles and Stands.—See adv. p. 3 cover.

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DALHOUSIE, 1 white fixed light at S entrance of harbor, visible 13 miles. In line S by E  $\frac{1}{4}$  E leads to wharf.

HERON ISLAND, Chaleur Bay, lat 48 N, lon 66 8 W, fixed white light, visible 15 miles, 66 feet high, building white, square, wood, height 20 feet. Visible from all points seaward.

LITTLE BELLENDUNE, on the Point, lat 47 55 20 N, lon 65 53 20 W, fixed white light, visible 15 miles, 66 feet high, white, square, wood building, 26 feet high. Visible from all points seaward.

PETIT ROCHER, on Elm Tree Point, lat 47 48 39 N, lon 65 43 13 W, fixed white light, visible 12 miles, 36 feet high, building white, square, wood, 31 feet high.

BATHURST, on Carron's Point, lat 47 39 10 N, lon 65 36 40 W, fixed lights, one white, visible 10 miles, building white. One red, visible 14 miles, 43 feet high, tower red and white striped, square, wood. Range lights, to guide vessels in the harbor.

CLIFTON, at head of pier, lat 47 45 30 N lon 65 21 0 W, fixed red light, visible 15 miles, 88 feet high, white, square, wood building, 37 feet high.

CARAQUET, on Island, Bay of Chaleur, lat 47 59 40 N, lon 62 54 W, fixed white light, visible 14 miles, 52 feet high, white square tower on dwelling, height 48 feet.

POKESUDIE, N E point of Island, lat 47 49 10 N, lon 64 44 40 W, fixed white light, visible 11 miles, 41 feet high, building white, square, wood, 34 feet high.

LITTLE SHIPPEGAN—Beacon light to be erected.

GOOSE LAKE, W side of Miscon Island, lat 47 54 43 N, lon 64 35 40 W, white light, revolving every minute, visible 10 miles, 40 feet high, building white, square, wood, height 28 feet. Complete revolution every two minutes.

SHIPPEGAN, on Alexander Point, N E of entrance to gully, lat 47 43 30 N, lon 64 59 25 W, fixed white light, visible 11 miles, white, square, wood, 32 feet high, height 30 feet; also range light 484 feet S W by W from main light, fixed white light, visible 9 miles, 22 feet high, lantern on pole, height 20 feet. These lights range with buoy outside bar at entrance of gully.

MISCOU ISLAND, Birch Point, lat 48 1 N, lon 64 29 25 W, fixed red light, visible 12 miles, 79 feet high, building white, octagonal, wood, height 74 feet. A steam fog whistle, placed in 1875, and situated 107 yards east from the lighthouse, sounds in thick weather, fogs and storms, blasts of five seconds' duration every half minute.

POKEMOUCHE, on beach, N side of gully, lat 47 40 10 N, lon 64 46 0 W, fixed green, visible 8 miles, white, square, wood, dwelling attached, light 35 feet high, building 37 feet; also 270 feet S by W  $\frac{1}{4}$  W from main light, fixed red, visible 5 miles; lantern on a pole traveling on a tramway to suit changes in channel, 28 feet high. Range to guide to Can Buoy at passage over bar.

NORTH TRACADIE, one on north side of gully, the other outside of bar, lat 47 32 14 N, lon 64 51 35 W, 2 fixed white lights, visible 12 miles, 32 and 17 feet high, structures white, square, wood, one 30 feet high, and the other 14 feet high. Coast and harbor range lights.

SOUTH TRACADIE, N side of gully, lat 37 40 N, lon 64 52 10 W. 2 fixed lights, visible 8 miles, back light red, 26 feet high, 166 yards north from front one, front light white, 20 feet high, front building an open framed white tower, 19 feet high, back building, height 26 feet, an enclosed square tower painted red. Vessels crossing the bar from sea should steer N, keeping the lights in range. Width of bar, 2 cable lengths.

PICKFORD & BLACK, Importers of Chain Cables and Anchors, 51 Upper Water St.

MACDONALD & CO., Manufacturers of Plumbers' Brass Goods.—See adv. p. 3 cover.

- TABUSINTAC, Crab Island, lat 47 18 54, lon 64 59 30 W, 2 fixed lights, front white, back red, visible 7 miles, 32 feet high, building white, square, wood, height 29 feet; also a range light 150 feet S  $\frac{1}{2}$  W, from main light, fixed white, visible 3 miles, 23 feet high, a lantern on a pole, height 20 feet. Coast and harbor range light, outer light is movable to suit the shifting of the channel.
- NEGUAC, lat 47 17 47 N, lon 65 3 20 W, fixed white light, visible 11 miles, 32 feet high, white square wooden building, height 30 feet. Coast light situate N E side of gully.
- HAY ISLAND, 47 14 10 N, lon 65 3 40 W, two fixed white lights, front light near east end of Island, visible 10 miles, height 23 feet, lantern on mast with red shed at base, height 15 feet, back light 210 feet from front light, visible 11 miles, 30 feet high, building white, square, wood, height 21 feet. Range lights to enable vessels seeking shelter to clear the point of the shoal off the east end of the Island.
- PORTAGE ISLAND, on S point of Island, lat 47 9 50 N, lon 65 2 40 W, fixed white light, visible 12 miles, 46 feet high, building white, wood, height 42 feet.
- OAK POINT, Front, on the Point, Miramichi, lat 47 7 40 N, lon 65 15 10 W, visible 10 miles, 43 feet high, lantern hoisted on a mast, with white shed at base, all supported on trestle work, height 28 feet.
- OAK POINT, Back, 1800 feet N, 55 E from front light, fixed white, visible 10 miles, 48 feet high, same as front light. In one lead to red buoy in river above.
- SHELDRAKE ISLAND, Miramichi Bay, lat 47 6 50 N, lon 65 18 W, 2 fixed white lights, quarter of a mile apart, visible 9 miles, 48 feet high. Range lights.
- GRANT'S BEACH, Front, Miramichi Bay, lat 47 5 30 N, lon 65 28 10 W, fixed white light, visible 10 miles, 120 feet high; also Grant's Beach, Back, 1300 feet N 66 W, from front, fixed white light, visible 10 miles, 140 feet high, building same as Oak Point, height 34 feet. In one lead to Nappan black buoy.
- MIDDLE ISLAND, Miramichi River, lat 47 0 3 N, lon 65 19 9 W, fixed white light, 45 feet high. Range light.
- NEWCASTLE, on lime kiln bank, N side of river, below the town, lat 47 0 45 N, lon 65 33 40 W, fixed red light, visible 9 miles, 87 feet high, white, square, wood, with red roof, height 23 feet.
- BAY DU VIN ISLAND, front light on west end of island, lat 47 5 20 N, lon 65 7 5 W, 1 fixed white light, visible 10 miles. Lantern on mast, red shade at base, 30 feet high. Back light 1222 feet east from front light, visible 11 miles, lantern on mast, red shed at base, 42 feet high. Range lights.
- FOX ISLAND, N W Point, lat 47 8 5 N, lon 65 2 20 W, 3 fixed white lights, visible 8 miles. No 1, 50, No 2, 46, and No 3, 36 feet high; all lanterns on masts, with white shed at base, height 40, 38 and 28 feet. No 1, 100 feet from northernmost point of Island. No 2, 1051 feet S E  $\frac{1}{2}$  E from No 1. No 3, 954 feet S W from No 1. No 1 and 2 in line, range N W  $\frac{1}{2}$  N into the Horseshoe Channel. Nos 1 and 3 in line, range N E through Portage Island Channel. Nos 2 and 3 in line, range W by N, to the upper buoy of Horseshoe Shoals.
- FOX ISLAND, East end, lat 47 6 50 N, lon 65 0 10 W, 2 fixed white lights, visible 10 miles, 30 feet high, white wooden building. Range lights to guide vessels through the Swashway Channel.
- MIRAMICHI BAY LIGHTSHIP, Horseshoe Bar, between Fox and Portage Islands, lat 47 8 N, lon 65 3 W, fixed red light, visible 8 miles, 35 feet high. A schooner rigged ship.

Iron Pipes, all sizes, at MACDONALD & CO'S—See p. 3 cover.

Residences and Public Buildings Fitted with Plumbing Fixtures by MACDONALD & CO.—See adv. p. 3 cover.

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PRESTON BEACH, Miramichi Bay, lat 47 4 50 N, lon 65 54 40 W, 2 fixed white lights, visible 10 miles, 55 and 64 feet high. Range lights.

ESCUMINAC, on point, lat 47 4 32 N, lon 64 47 30 W, fixed white light, visible 14 miles, 70 feet high, white wooden building, height 58 feet. A steam fog whistle situated 100 yards W of the light house, sounds in thick weather, fogs and snow storms, 10 seconds in each minute, with an interval of 50 seconds between each blast. It should be heard from 3 to 11 miles, according to the state of the weather.

RICHIBUCTO HARBOR, on outside of bank, S beach, lat 46 42 46 N, lon 64 16 10 W, fixed white light, visible 12 miles, 40 feet high, tower white, square, wood, dwelling attached, height 33 feet. A so. 102 yards W by S  $\frac{1}{2}$  S from front light, fixed red light, visible 12 miles, 44 feet high, white square open framed tower, height 43 feet. To replace dry beacons and lead through channel over bar at entrance to river.

RICHIBUCTO HEAD, on headland, lat 46 39 40 N, lon 64 42 30 W, fixed white light, visible 14 miles, 70 feet high, white square building, height 50 feet.

BUCTOUCHE INNER LIGHTS, 2 fixed white lights, front light close to shore road on Indian or Church Point, lat 45 20 35 N, visible 9 miles, 23 feet high, building white, square, wood, with red roof, 23 feet high. Back light, 1,980 feet N N W  $\frac{1}{2}$  W from front one, visible 12 miles, 53 feet high, building white, square, wood, with red roof, 23 feet high. Range lights, visible in direction of range replacing former day beacons. Lead into harbor through deepest channel clear of all obstructions from line range of Dixon's Point lights to where channel turns abruptly to westward to enter Buctouche River.

BUCTOUCHE RIVER, on Dixon's Point, lat 46 27 40 N, lon 64 38 50 W, 2 fixed white lights, N W by W, 1050 feet apart, visible 11 and 12 miles, square white towers, 36 and 41 feet high. Range lights built on line of former day beacons, to guide into Buctouche Harbor.

CASSIA'S POINT, on Point, lat 46 19 15 N, lon 64 30 20 W, white light, revolving every half minute, visible 14 miles, 40 feet high, white square wooden building, height 27 feet.

SHEDIAC ISLAND, lat 46 15 20 N, lon 64 31 50 W, 2 fixed white lights, visible 10 miles, 48 and 56 feet high. Beacons.

SHEDIAC HARBOR, Duchene wharf, lat 46 14 20 N, lon 64 31 W, 2 fixed white lights, visible 6 miles, 15 feet high, on poles. Not under Marine Department.

JOURIMAIN, on east end of Island, lat 46 10 N, lon 63 48 30 W, flash white light, 10 seconds, visible 14 miles, 75 feet high, white octagonal tower, height 45 feet. Visible from S E round to N W.

**GULF OF ST. LAWRENCE.**

ST. PAUL'S ISLAND, on rock off N E point of Island lat 47 13 50 N, lon 60 8 20 W, fixed white visible 20 miles, 140 feet high, white octagonal wood building, height 40 feet. Obscured between N by E  $\frac{1}{2}$  E and E N E. Not lit from December 31st to April 1st, unless open water is visible.

ST. PAUL'S ISLAND, S W point of Island, lat 47 11 20 N, lon 60 9 40 W, white revolving light every minute, visible 20 miles, 140 feet high, white octagonal wood building, height 40 feet. Obscured on bearings from S S E to W  $\frac{1}{2}$  N. Not lit from 31st December to 1st April, unless open water is

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- visible. A fog whistle on the S side of the Island, S W of Atlantic Cove, about  $\frac{1}{2}$  mile from the Humane Establishment, sounds for 5 seconds in each minute.
- CARLTON POINT, Bay of Chaleur, lat 48 5 15 N, lon 66 7 0 W, fixed white light, visible 12 miles, 32 feet high, white wood building, height 28 feet.
- PASPEDIAC, near extremity of Spit, lat 48 0 54 N, lon 65 14 20 W, fixed white light, visible 13 miles, 55 feet high, white square wooden building, height 54 feet. In running into the harbor the light changes to red, covering the anchorage.
- MARQUEREAU POINT, Bay Chaleur, lat 48 12 30 N, lon 64 46 12 W, alternate red and white every minute, visible 12 miles, 56 feet high, white square building, height 27 feet. Marine telegraph and signal station.
- GRAND RIVER, mouth of river, coast of Gaspé, lat 48 24 15 N, lon 64 28 35 W, fixed red, visible 8 miles, 52 feet high, white, hexagonal, wood, with red iron lantern, height 43 feet.
- CAPE DESPAIR, Bay Chaleur, lat 48 25 40 N, lon 64 18 20 W, revolving white light every half minute, visible 15 miles, 90 feet high, white, square, wood, with red roof, height 18 feet. Marine telegraph and signal station.
- PEARCE, on Whitehead Cape, lat 48 30 30 N, lon 64 13 0 W, fixed with light, visible 13 miles, 138 feet high, white square wooden building, height 20 feet.
- POINT PETER, on a flat rock or plateau off the Point, lat 48 37 30 N, lon 64 8 45 W, revolving red light every 30 seconds, visible 10 miles, 77 feet high, white, square, wood, with dwelling attached, height 50 feet, visible from all points seaward.
- GASPE, O'Hara Point Wharf, Basin, lat 48 49 53 N, lon 64 31 41 W, fixed red, visible 7 miles, 30 feet high.
- GASPE BAY LIGHTSHIP—At Sandy Beech Point, moored off extreme of Spit, lat 48 50 45 N, lon 64 24 30 W, two, red 29, white 37 feet from deck, fixed lights, painted red, with "light vessel" on her side. Red on fore and white on mainmast.
- GASPE CAPE, lat 48 45 15 N, lon 64 9 15 W, fixed red, visible 12 miles, square, wood, with dwelling attached, light 350 feet high, building 30 feet. A fog gun is fired every half hour.
- CAPE ROSIER, on Cape, lat 48 51 57 N, lon 64 12 0 W, fixed white, visible 16 miles, white, circular, clapboarded, light 136 feet high, building 112 feet. A steam fog whistle sounds a blast of 10 seconds every minute. Marine telegraph and signal station.
- HEATH POINT, east end Anticosti Island, lat 49 5 20 N, lon 61 42 30 W, fixed white light, visible 15 miles, white, with a red horizontal band, circular, faced and clapboarded, light 110 feet high, building 90 feet. The light-house is always kept open to the southward of Cormorant Point; visible between the bearings S W by W to E. Depot of provisions here for ship-wrecks. A fog gun is fired every half hour. Marine telegraph and signal and ice report station.
- BAGOT'S BLUFF,  $\frac{1}{4}$  mile W from S point, Anticosti Island, lat 49 4 0 N, lon 62 15 10 W, flash white light every 20 seconds, visible 14 miles, white with a red vertical stripe, hexagonal, light 75 feet high, building 54 feet. A fog whistle 100 yards E of lighthouse sounds for 10 seconds in every minute. Marine telegraph and signal and ice report station.
- SOUTH WEST POINT Anticosti Island, lat 49 23 45 N, lon 63 35 46 W, revolving white light every minute, visible 15 miles, white, with two red horizontal bands, circular, clapboarded, light 100 feet high, building 75 feet, visible

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VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.



between bearings of N N W, round by southward to S E by E. Marine telegraph and signal and ice report station.

**WEST POINT**, extreme W point, Anticosti Island, lat 49 52 30 N, lon 64 31 40 W, flash white light every minute, visible 15 miles, with two red vertical stripes, circular, clapboarded, light 112 feet high, building 109 feet. A fog gun is fired every half hour. Marine telegraph and signal and ice report station.

**FAME POINT**, County of Gaspé, South Coast, lat 49 6 48 N, lon 64 36 20 W, fixed and flash light, white, with red flashes every 20 seconds, visible 20 miles, white, with a black horizontal band, square, wood, light 200 feet high, building 50 feet. Marine telegraph and signal station.

**CAPE MAGDALEN**, on Cape, lat 49 15 40 N, lon 65 19 30 W, alternating red and white light, every 2 minutes, visible red 15, white 20 miles, white, with a black vertical stripe, hexagonal, light 147 feet high, building 54 feet. Marine telegraph and signal station.

**MARTIN RIVER**, on S shore, Gaspé County, lat 49 13 25 N, lon 66 9 0 W, fixed white light, visible 17 miles, white, with two black horizontal bands, square, wood, with dwelling attached, light 125 feet high, building 54 feet.

**SEVEN ISLANDS**, on Carousal Island, lat 50 5 40 N, lon 66 22 44 W, fixed white light, visible 20 miles, white, with a red horizontal band, square, wood, with dwelling attached, light 200 feet high, building 39 feet.

**POINT ST. ANNE**, 11 miles E from Cape Chatte light, lat 49 8 20 N, lon 66 33 30 W. Fog horn sounds a blast of 8 seconds in every minute.

**CAPE CHATTE**, N E point of Cape, lat 49 5 55 N, lon 66 45 29 W, revolving white light every 30 seconds, visible 18 miles, white, with two black vertical stripes, square, wood, light 120 feet high, building 26 feet; visible from all points of approach seaward. Marine telegraph and signal station.

**EGG ISLAND**, 200 yards from S end of island, lat 49 38 0 N, lon 67 10 0 W, revolving white light every 1½ minute, visible 15 miles, white, with a red vertical stripe, octagonal, surmounting dwelling, light 70 feet high, building 35 feet.

**POINT DES MONTS**, about 1½ mile N E of Point, lat 49 19 35 N, lon 67 21 55 W, fixed white light, visible 15 miles, white, with two red horizontal bands, circular, clapboarded, light 100 feet high, building 75 feet. A fog gun is fired every half hour. Marine telegraph and signal station.

**PRINCE EDWARD ISLAND.**

**NORTH POINT**, on Point, lat 47 3 46 N, lon 63 59 10 W, white light revolving every minute, visible 14 miles, 80 feet high, white octagonal building, height 60 feet.

**WEST POINT**, on Sand Beach, lat 46 37 30 N, lon 64 23 10 W, red and white revolving light, one red and three white flashes in 1½ minutes; greatest brilliancy every 22½ seconds, visible 13 miles, 66 feet high, square wooden building, broad red and white horizontal bands, height 67 feet.

**CAPE EGMONT**, on Point, lat 46 24 20 N, lon 64 7 45 W, fixed red light, 72 feet high, visible 10 miles, white, square, wood, with dwelling attached, height 45 feet.

**SUMMERSIDE**, Railway Wharf, Bedeque Bay, lat 46 23 25 N, lon 63 30 W, fixed white light, visible 10 miles, 33 feet high, square tower on roof of railway freight shed, height 30 feet.

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PICKFORD & BLACK, IMPORTERS NETS, TWINES, LINES, 51 UPPER WATER STREET.

PICKFORD & BLACK, AMERICAN TAR, PITCH, ROSIN, 51 UPPER WATER STREET.

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- INDIAN POINT, east side of shoal on S side of Channel in Bedeque Bay, lat 46 22 40 N, lon 63 48 50 W, fixed white and green arc, visible 13 miles, building octagonal, white. Green between E by N  $\frac{1}{4}$  N, E S E over Miscouche shoals only.
- SEA COW HEAD, or Salutation Head, lat 46 19 10 N, lon 63 48 20 W, fixed white light, visible 15 miles, 88 feet high, white octagonal building, height 60 feet.
- MININEGASH, outer light, shews red between the bearings of N E through E and S, and white from S to S W by W.
- CRAPAUD, west end of bridge, at head of harbor, lat 49 13 0 N, lon 64 8 0 W, fixed white and blue light, visible 6 miles, 41 feet high, white, square, wooden building, height 38 feet. Inner range light, about  $\frac{1}{2}$  mile N from outer one, fixed white light, visible 6 miles, 60 feet high, shown from dormer window of a house, height 24 feet. White light in front tower shows S W over Tryon Shoals, and blue light in line of channel only. The two lights in range lead to Can Buoy on Cameron's reef and a Cask Buoy on Tryon Shoal. After passing these buoys the course is north-west to sheltered anchorage. At entrance to dredged channel is another Cask Buoy, whence the channel to the wharf is straight and marked by spar buoys and bushes. This last should not be attempted by strangers at night.
- ST. PETER'S ISLAND, on S side of Island, Hillsborough Bay, lat 46 7 15 N, lon 63 10 30 W, fixed red light, visible 10 miles, 70 feet high, white, square, wood building, 38 feet high. Shows between W  $\frac{1}{2}$  S and S E by S over an arc of 240°.
- BLACKHOUSE POINT, at west side of entrance to Charlottetown Harbor, lat 46 11 36 N, lon 63 7 28 W, fixed lights, two in one tower, 21 feet apart, vertically, upper white, visible 12 miles, 56 feet high, lower red, 35 feet, visible 3 miles, building white, square wood, with dwelling and signal mast attached, height 42 feet. The lower light is a streak from the window of the tower, showing only towards the bell buoy. Vesse's entering, on coming into this streak, should steer for the light until they make the bell buoy, they should then steer N by E  $\frac{1}{4}$  E for 2  $\frac{1}{2}$  miles, when the port buoy will be made; they should then steer for the entrance to the harbor N  $\frac{1}{2}$  E.
- ORWELL HARBOR, at Brush wharf, 1 fixed red light, visible 8 miles, building white, square, wood, height 28 feet, light shews south-west.
- POINT PRIM, S E extremity of Hillsborough Bay, 100 yards from the point, lat 46 3 10 N, lon 63 2 W, fixed white light, visible 12 miles, 68 feet high, building white, circular, brick, height 55 feet. Bell buoy on east side of channel, black buoy on west side, 2  $\frac{1}{2}$  N by E  $\frac{1}{4}$  E from bell buoy harborward.
- WOOD ISLAND, off south point, lat 45 57 22 N, lon 62 44 30 W, fixed white light, visible 15 miles, 80 feet high, tower white, square, wood, with dwelling attached, height 40 feet.
- CAPE BEAR, on the headland, lat 46 0 35 N, lon 62 27 15 W, one revolving red, every 30 seconds, visible 12 miles, 74 feet high, building, white, square, wood, with dwelling attached, 46 feet high.
- MURRAY HARBOR, on edge of Sand Bar, S side of harbor, lat 46 1 28 N, lon 62 28 25 W, fixed white light, visible 8 miles, 33 feet high, tower 30 feet. Also, on mainland, about a mile W by S from front light, fixed white, visible 10 miles, 57 feet high, tower white, square, height 40 feet. In one, these range lights show the channel to the outer buoy.
- PANMURE HEAD, S E extremity of Cardigan Bay, lat 46 8 55 N, lon 62 27 40 W, fixed white light, visible 16 miles, 96 feet high, white octagonal wooden building, height 50 feet. This light should be kept open off Terras Point to clear reef off Cape Bear.

**CARDIGAN RIVER**, between Ferry Wharf and Morrison's Beach, west shore of river, lat 46 12 50 N, lon 62 31 45 W, fixed light, green and white, visible 8 miles, 43 feet high, building white, square wood, 32 feet high. Green seaward, white across river to N eastward on entering the river. Vessels can stand northward inside Broughton Island, until Panmure Island light bears S by W, and Cardigan River light N W, when they can stand in, keeping light open on port bow, when white light is opened, safe anchorage has been reached.

**GEORGETOWN, St. Andrew's Point**, lat 46 9 57 N, lon 62 31 23 W, fixed light, red, visible 10 miles, 36 feet high, building white, square, wood, height 20 feet. On Westaway's farm,  $\frac{1}{2}$  mile N W by W  $\frac{1}{4}$  W from frons light, fixed white, visible 12 miles, 50 feet high, lantern on mast, height 30 feet. The two in range lead in to the point clear of obstructions.

**SOURIS EAST, Knight's Point**, 300 feet S E of breakwater, lat 46 20 50 N, lon 62 14 30 W, fixed white light with red streak, visible 15 miles, 85 feet high, white, square, wood, with dwelling attached, height 45 feet. Vessels open red streak when light bears S E by S. They are then inside breakwater, and by rounding up and keeping the red light open will come to safe anchorage off the head of Railway Wharf.

**EAST POINT**, 200 feet from extreme point, lat 46 27 15 N, lon 61 50 0 W, white light, revolving every three minutes, visible 15 miles, 100 feet high, building white, octagonal wood, height 60 feet. A fog horn operated by compressed air, sounds a blast of 8 seconds duration every half minute. It stands 100 feet eastward of lighthouse. Fog alarm building in line with tower roughly indicates range of outer point of reef.

**St. PETER'S**, 2 lights, one on outer end of breakwater, lat 46 26 30 N, lon 62 44 30 W, fixed white light, visible 6 miles, 35 feet high, white, square, wooden tower, height 35 feet. The other light on Sand Beach, 126 yards S W by S from front light, also fixed white and visible 6 miles, 32 feet high, white, square, open frame, height 33 feet. Range lights to lead into harbor, the inner one is liable to be moved to suit shifting of the channel.

**SAVAGE HARBOR**, on McEachern's farm, on inner shore of harbor, lat 46 25 40 N, lon 62 48 30 W, fixed white light, visible 5 miles, 22 feet high, mast with brown shed at base, height 25 feet. Inner light 330 feet S  $\frac{1}{2}$  E from outer light, fixed white light, visible 5 miles, 30 feet high, mast with brown shed at base, height 25 feet. Lights in range lead to mid-channel buoy outside bar. Vessels open the lights on starboard buoy after passing buoy, until inner fairway buoy is reached whence channel leaves range. Only 5 feet of water on bar at low tide, outer light liable to be moved.

**TRACADIE**, on beach, west side of channel, 233 yards N E by N from back light, lat 46 25 20 N, lon 63 2 30 W, 2 fixed red lights, visible 10 and 9 miles, height 30 and 19 feet, open square frame work, 32 and 21 feet high. In one, lead through the channel over the bar. Position of both towers liable to be changed to suit shifting of the channel.

**SOUTH, OR LITTLE RUSTICO**, S E end of Robinson's Sound, about 3 miles S E of Grand Rustico, lat 46 26 25 N, lon 63 13 38 W, 2 fixed white lights, visible 6 miles, 26 and 17 feet high, on masts, height 22 and 14 feet. In one, lead through the channel at entrance to harbor. Position of both towers liable to be changed.

**COVE HEAD**, range lights, 225 feet apart, 2 fixed lights, back light white, front one green, visible 3 miles. Lantern on masts 33 and 23 feet high. Back light liable to be moved to suit changes in the channel. Only four feet on bar.

**NORTH, OR GRAND RUSTICO**, west side of entrance to harbor, lat 46 27 42 N, lon 63 17 15 W, fixed white light, visible 8 miles, 49 feet high, white, square,

wood, with dwelling attached, 35 feet high, also 225 feet E N  $\frac{1}{2}$  N from main light fixed red light visible, visible 5 miles, 22 feet high, lantern on mast. Both lights show from S E round by S to N N E. The two, in range, lead to black can buoy outside bar in 13 feet of water. From this the course in is first W by S  $\frac{1}{2}$  S, then S W to point of beach. Outer light liable to be moved to suit channel.

**NEW LONDON**, west side of entrance to Granville Harbor, lat 46 31 10 N. lon, 63 28 45 W, one fixed red light, visible 10 miles, building white, square wood, with dwelling attached, height 40 feet. Range light 500 feet N E of main light, 1 fixed white, visible 3 miles, white, square open frame, 24 feet high. The two lights in range show the entrance to the harbor. Outer range light liable to be moved to suit shifting of the channel.

**FISH ISLAND**, entrance to Malpeque or Richmond Bay, on inside of island, lat 46 34 44 N, lon 63 42 29 W, 2 fixed white lights, 400 yards apart, E by Sand W by N, visible 12 and 6 miles, 50 and 18 feet high, towers higher, white, square, wood, with dwelling attached, 46 feet high; lower, open frame work, lantern white, height 22 feet. The main light is a sea light; the smaller one in range with it shows the channel over the bar.

**LITTLE CHANNEL**, on Conway Island, N side, lat 46 40 N, lon 63 52 40 W, 2 fixed white lights, 66 yards apart, one visible 10 miles, 26 feet high, white, square building, height 30 feet; the other visible 8 miles, 16 feet high, building open frame work, lantern white 20 feet high. In one, lead through channel at entrance of harbor. Outer light liable to be moved to suit changes in channel.

**CASCUMPEC**, or Alberton, on S W part of Sandy Island, lat 46 48 22 N, lon 64 2 15 W, fixed white light, visible 12 miles, 45 feet high, white, square, wood, with dwelling attached, height 41 feet, coast light, and two range fixed red lights, one near inner end of Railway Wharf, lat 46 48 0 N. lon 64 3 0 W, visible 9 miles, on a mast with slatwork, day beacon, height 22 feet, also on the village square, fixed red light, visible 11 miles, 40 feet high, open frame tower, surmounted with a mast 22 feet high, back light is about 1,100 feet due west from the front light, and leads a direct course from the outer buoy up the harbor.

**BIG TIGNISH**, on beach at inner end of north Breakwater Pier, lat 46 57 35 N, lon 63 59 20 W, fixed white light, visible 11 miles, 35 feet high, white with a black horizontal band, square wood building, height 33 feet, and on outer end of north Breakwater Pier, 620 feet S E  $\frac{1}{2}$  E from main light, fixed red, visible 5 miles, lantern 18 feet high on mast, height 14 feet. These two lights in range guide in between the breakwater, the outer light also shows end of pier and is for convenience of small vessels only.

#### SABLE ISLAND.

**SABLE ISLAND**, west end light house, lat 43 57 0 N, lon 60 8 0 W. A revolving white light, giving three flashes at intervals of half a minute, then a cessation of light during one and a-half minutes; visible 17 miles. White octagonal tower, 98 feet high.

**SABLE ISLAND**,  $1\frac{1}{2}$  miles from east end, lat 43 58 30 N, lon 59 46 W, fixed white dioptric light, 2nd order, visible 18 miles, 128 feet high, octagonal building, white and brown alternately, height 86 feet.

#### NEWFOUNDLAND.

**Cape Bauld.** on high ground near extremity, lat 51 38 50 N, lon 55 25 W, red and white alternate 45 seconds, 141 feet high, building white, square, 60 feet high, visible 18 miles. Fog horn in thick weather, sounds 10 seconds in every minute.



Residences and Public Buildings Fitted with Hot Water Heating Apparatus by MACDONALD & CO.—See p. 3 cover

PICKFORD & BLACK, SHIP CHANDLERS, 51 UPPER WATER ST., HALIFAX.

- Cape Norman, Straits of Belle Isle, lat 51 38 N, lon 55 53 40 W, white light, revolving every two minutes, visible 20 miles, 138 feet high, white hexagonal tower, height 40 feet. Visible from all points of approach seaward.
- Point Rich, Straits of Belle Isle, lat 50 41 50 N, lon 57 27 40 W, flash white light every fifteen seconds, visible 18 miles, 130 feet high, white hexagonal tower, height 40 feet. Visible from all points of approach seaward.
- Cape Ray, on west side of Cape, lat 47 37 N, lon 59 18 W, flash white light every 10 seconds, visible 20 miles, white hexagonal tower, 41 feet high, light revolves every 20 seconds, visible 17 miles; at a long distance flashes not observed. In thick and foggy weather and during snow storms a steam fog horn gives a blast of 10 seconds in each minute, leaving an interval of 50 seconds between each blast. Heard from 3 to 10 miles, according to the state of the atmosphere and wind. Marine telegraph and signal and ice report station.
- Gull Island, on Summit, lat 50 0 N, lon 55 22 W, one white light, occulting every 20 seconds, building circular, red and white stripes, 43 feet high.
- Long Point, Toulingate, lat 49 41 N, lon 54 49 W, revolving white light, every 30 seconds, visible 27 miles, 331 feet high, tower red, keeper's dwelling attached, white with red roof.
- Can Island, Seldom-come-by, lat 49 25 5 N, lon 44 10 35 W, fixed white light, 85 feet high, visible 10½ miles, tower and dwelling of wood and attached. The light illuminates an arc of the horizon of 270°.
- Offer Wadham Island, lat 49 16 N, lon 53 45 W, fixed white light 100 feet high, visible 10 miles, circular brick tower, dwelling white and detached.
- Cabot, Stinking Island, Bonvista Bay, lat 49 10 26 N, lon 53 21 21 W, white light, making one complete revolution in a minute, appearing about 11 seconds and 9 seconds dark. Iron light tower, in centre of square wooden building. Roofs flat; sides banded horizontally, red and white alternately.
- Puffin Island, Greenspond, lat 49 3 37 N, lon 53 37 27 W, fixed red light, 85 feet high, visible 10½ miles, lighthouse granite, with dwelling attached. The light is visible N by E through S to W by N by compass.
- Cape Bonavista, lat 48 41 50 N, lon 53 5 20 W, revolving light, alternately white and red every 1 minute and 30 seconds, 150 feet high, visible 15 miles. By keeping this light open with Cape L'Argent it will carry you clear of the Flower Rocks.
- Green Island, at the entrance of Catalina Harbor, Trinity Bay, lat 48 30 16 N, lon 53 2 40 W fixed white light, 92 feet above high water, visible from E N E seaward to S W 11 miles. Vessels bound northward by keeping this light open with the North Head of Catalina until Bonavista light opens with Cape LeJean, will give the Flower Rocks an ample berth; or when coming from northward and bound for Catalina, by giving the N Head a moderate berth, will clear the Brandies Rocks by steering from Green Island light
- Fort Point, Trinity, lat 48 21 55 N, lon 53 20 51 W, fixed white light visible 11 miles, upon a wooden tower painted white, 75 feet high. This light illuminates the arc of the horizon of 320°. In entering the harbor the light must be kept on the port hand.
- Baccalieu Island, northern end lat 48 8 51 N, lon 52 47 50 W, white revolving light, showing a flash every 20 seconds, height 443 feet above high water, visible 24 miles, brick tower, dwelling white with red roof, detached from the tower. When the southern end of the island bears N N E the light will not be visible when nearer the island than 8 miles.

PICKFORD & BLACK, AMERICAN TAR, PITCH, ROSIN, 51 UPPER WATER ST.

- Carbonear Island, lat 47 44 24 N, lon 53 9 22 W, fixed white light, 195 feet high, visible 16 miles, tower and dwelling in one building; the whole horizon is illuminated.
- Harbor Grace Island, lat 47 42 45 N, lon 53 8 15 W, revolving light, 2 white flashes followed by one red, each attains its greatest brilliancy every 30 seconds, visible 15 miles.
- Harbor Grace Beach Beacon and Light, lat 47 41 28 N, lon 53 12 35 W, fixed white light, 40 feet high, in a white tower on the point of beach at the entrance of Harbor Grace; visible 7½ miles. Entering it with a fair or leading wind, bring it to bear W or W by S, and by keeping the light or building a little on the starboard bow, it will bring you clear of the bar, on which at low water there is not more than 8 feet of water.
- Green Point, Bay Roberts, on Point, lat 47 37 N, lon 53 10 W, one white light fixed, visible 8 miles. Building circular, red and white bands. Immediately beneath the principal light is a projecting lantern from which 3 lights are exhibited. The two outer lights show white and the center light in line with Southern Rocks bearing S W ½ W show red.
- Cape St. Francis, lat 47 48 30 N, lon 52 46 50 W, fixed red light, 123 feet high, visible 12 miles.
- Cape St. Francis Fog Alarm.—During thick weather and snow storms a powerful Siren Trumpet will be sounded 5 seconds—5 seconds and silent 45 seconds in each minute. The buildings are of wood, painted white, the roofs flat, lantern on higher roof elevated above it on a square block; the lower building is the fog alarm house.
- Fort Amherst, at the entrance of St. John's, lat 47 35 54 N, lon 52 40 18 W, fixed white light, 114 feet high, visible 12 miles. When Cape Spear is enveloped in fog a heavy piece of ordnance is also discharged at this fort every hour during daylight, to assist vessels in making the harbor.
- St. John's, 2 red lights intended as leading marks for vessels entering the Narrows. The lower light is on a mast on the roof of the Custom House. The upper light (400 yards in the rear) in a small tower, near the N E angle of the Congregational Church, 180 feet high. As leading marks during the day there is a disc on the mast head of the Custom House, and another on the apex of the tower roof—the discs are painted white. By keeping these lights or discs in line the largest vessels will clear all danger.
- Cape Spear, lat 47 31 11 N, lon 52 36 59 W, white light revolving every minute, visible 22 miles, 264 feet high.
- Cape Spear Alarm.—A trumpet, sounded by the escape of compressed air, was placed in 1878 at this station, in a wooden building on the Bill of the Cape, nearly 600 yards N N E from the light house. It will be sounded for 7 seconds of each minute during thick weather or snow storms. The range of sound will probably be from ½ to 10, according to the direction and intensity of the wind or other atmospheric disturbance.
- Ferryland Head, lat 47 0 58 N, lon 52 51 7 W, fixed white light 20 feet high visible 16 miles, red brick tower, dwelling white with red roof, detached from the tower.
- Cape Race, on the Cape, lat 46 39 0 N, lon 53 4 0 W, white light revolving every 30 seconds, visible 30 miles, 180 feet high, circular, S E face striped red and white vertically, height 40 feet. Whistle sounds 10 seconds in every minute, heard from 10 to 30 miles according to wind and weather.
- Cape Pine, lat 46 37 4 N, lon 53 31 48 W, fixed white light, 314 feet high, visible 20 miles, iron tower.

MACDONALD & CO., Importers of Steam Pumps, etc.—See adv. p. 3 cover.

Brass Hinges, Hasps and Locks, at MACDONALD & CO.'S.—See cover.

RESIDENCES and PUBLIC BUILDINGS FITTED with STEAM HEATING APPARATUS by MACDONALD & CO.

LeHave, on point, lat 46 54 N, lon 53 37 W, 1 fixed white light, visible 9 miles. Building circular, red and white bands.

Cape St. Mary's, lat 46 49 30 N, lon 51 11 34 W, revolving light, producing alternately every minute a brilliant red and white light, 390 feet high, visible 23 miles, brick tower, with dwelling on each side, roofs red.

Dodding Head, Great Bruin Island, lat 47 0 27 N, lon 55 8 47 W, revolving light, producing a brilliant white light every minute, 430 feet high, visible 24 miles.

Allan Island, Lamsline, lat 46 51 0 N, lon 55 57 50 W, (both approx.,) fixed white light, 64 feet high, visible 9 miles, illuminated arc 270°, wood octagonal tower, red and white on alternate sides.

Brun't Island, Mercer's Head, Fortune Bay, lat 55 59 30 N, lon 47 16 W flashing white light, greatest brilliancy every 10 seconds, 408 feet high, visible 35 miles in every direction from N round E and S to W N W.

Garnish, Fortune Bay, lat 47 14 N, lon 55 24 W a beacon tower of wood, carrying an octagon and lantern, in which a red light is exhibited.

Bellorom, Fortune Bay, lat 47 29 N, lon 55 27 15 W, fixed white light 25 feet high, visible 7 miles, white wooden tower. In entering the harbor the light must be kept on the port hand.

Rocky Point, Harbor Breton, Fortune Bay, lat 47 27 30 N, lon 55 47 45 W, a square wooden tower, carrying an octagon and lantern, in which a fixed white light will be exhibited. The apparatus is a simple argand burner, with a red light to mark the Harbor Rock.

Pass Island, entrance to hermitage Bay, lat 47 29 15 N, lon 56 12 2 W, fixed white. A fixed red light is placed below the white light to distinguish the rocks and reefs extending from the Wolf Rocks bearing (from the light house) S 74 47 W, to Basseterre Point S, 61 33 E. The reef over the Wolf Rock is about 1½ miles from the island. At a distance of about 4 miles the two lights merge into one, 281 feet high, visible 19 miles, illuminated arc 360°. Wood house, sides painted white, flat roof on which the principal lantern stands. The one showing red light is 14 feet lower and at the angle of the building.

Beacon, Ireland's Eye, entrance of La Poil Bay, a square white building with three black bands has been erected on this island; it is 76 feet high and supported on chains.

Boar Island, Burges, lat 47 36 12 N, lon 57 35 13 W, fixed red light, 240 feet high, visible 17 miles, tower wood, on dwelling.

Rose Blanche Point, lat 47 35 48 N, lon 58 41 80 W, fixed white, 95 feet high, visible 11 miles, granite light house, upon the eastern head, dwelling and tower attached. The light illuminates the horizon from E by S through S to W by compass. Shag Island Black Rock bears W from the light, and distant about a mile. Rose Blanche Shoals W S W half a mile, and Petias Black Rock E by S 3 miles.

Channel Head, Port au Basque, lat 47 33 47 N, lon 59 7 10 W, fixed red light, 90 feet high, visible 7 miles, square light tower and keeper's dwelling are detached wooden buildings.

Gallantry Head, Island of St. Peter's, lat 46 45 30 N, lon 58 27 W, flash light, one red after two white flashes, with intervals of 20 seconds, about 104 feet high, visible 18 miles. The light is hidden at the northward by the high land of St. Peter's.

Gallantry Head Fog Signal Steam Whistle, sounded for periods of 6 seconds at intervals of 1 minute, 1st March to 1st December.

PICKFORD & BLACK, Importers of Wire Rope, Canvas, 51 Upper Water St.

MACDONALD & CO, MANUFACTURERS OF BRASS Binnacle GUARDS.—See adv. p. 3 cover.

South Entrance of St. Peter's — The entrance of the harbor of St. Peter's, called South Channel is marked by two small fixed lights,—one white, illuminating  $\frac{1}{4}$  of the horizon, and placed on the Battery; the other red, on the plain at the N of the town—white lights eleven metres high, visible 3 miles, red, 19 metres high, visible 3 miles. The line connecting these two lights indicates the middle channel. As soon as the red light is seen on the left of Cape Eagle, vessels coming from Columbiar in beating into the NE entrance will have nothing to fear from the shoals off Cape Rogers.

Island of Doge, called Point a Leconte.—A light is exhibited, on the S W point of this Island, at a place called Point a Leconte, 437 feet high, visible 7 miles; the extent of the light is circumscribed in a sector of  $163^\circ$ , presenting two cones of light, one white,  $40^\circ$ , will light the passage to the S E, so as to permit vessels which remain in position within this cone to avoid at the right the shoal Betaille, and to the left the rock of Cape Noir and the rock Bertrand. The second cone is red of  $123^\circ$ ; it should be avoided by vessels entering the S E passage, and will enable them, when they have quitted the white cone, to come to anchor in the roadstead or in the Barachois, in following the line of the white light from Point aux Canona, and of the red light from the interior of the city.

Point Verb, Great Placentia, lat 47 14 11 N, lon 54 1 19 W, a fixed white light will be exhibited nightly, from sunset to sunrise, 98 feet above the level of the sea, and should be visible in clear weather 11 miles. The tower and dwelling are of wood and attached, the vertical parts of the building are painted white, the roof of the dwelling is flat. The illuminating apparatus is dioptric, of the 5th order, with a single argand burner. The whole water horizon is illuminated.

### MAGDALEN ISLANDS.

ENTRY ISLAND, S E side, lat 47 16 30 N, lon 61 41 20 W, fixed white light, visible 12 miles, square, white, with dwelling attached, height 90 feet, building 28 feet. Light seen from all points, except from E S E, round to N, where it is intercepted by the high lands of the island.

AMHERST ISLAND, south point of island, lat 47 13 N, lon 61 58 W, revolving red and white, alternating every half minute, visible 20 minutes, hexagonal, white. Attached to keeper's dwelling. Marine telegraph and signal and ice report station.

GRINDSTONE ISLAND, west side, lat 47 23 30 N, lon 61 57 W, revolving white light, every  $\frac{1}{4}$  minute visible 20 miles, square white, 200 feet high, building 28 feet. In thick foggy weather or snow storms a whistle will sound a blast of 8 seconds during every half minute. Also marine telegraph, &c.

BIRD ROCK, lat 47 50 40 N, lon 61 8 20 W, fixed white light, visible 21 miles, hexagonal white building, dwelling near tower, 140 feet high, building 50 feet. Fog guns every half hour during fogs and storms. Marine telegraph and signal and ice report station.

### LABRADOR.

BELLE ISLE, Straits of Belle Isle, extreme S point of Island, lat 51 53 0 N, lon 55 22 15 W, fixed white light, visible 28 miles, 470 feet, white circular, clap-boarded building, height 62 feet, visible from about N W by N, round by S to E. A fog gun is fired once every half hour. Also about 300 feet lower than main light, fixed white light, visible 17 miles, 128 feet high, white, square wood building, height 31 feet. Depot of provisions for shipwrecked mariners.

PICKFORD & BLACK, 51 UPPER WATER STREET, HALIFAX, N. S.



**ARMOUR POINT**, S E side of Fortune Bay, lat 51 27 35 N, lon 56 50 55 W, fixed white light visible 18 miles, 155 feet high, white circular, building, height 109 feet, fog horn on point, 250 yards W of lighthouse, sounds a blast of 8 seconds every minute. If horn becomes disabled, old whistle, 700 yards N W from horn, will sound similar blasts.

**GREENLY ISLAND**, on S W part of Island, Straits of Belle Isle, lat 51 22 35 N, lon 57 10 50 W, revolving red and white light, white  $\frac{1}{2}$  minute, red  $\frac{1}{2}$  minute, eclipse  $1\frac{1}{2}$  minute, visible 15 miles, 100 feet high, white with red lantern, octagonal wooden tower, with dwelling attached, height 78 feet. Light completes a revolution every 3 minutes. Fog gun fired every half hour. To be replaced by steam fog alarm.

**FLAT ISLAND**, off Great Meccattina Island, lat 50 46 0 N, lon 58 47 0 W, a square pyramidal wooden day beacon, 28 feet high, slatted horizontally, surmounted by a cone 6 feet high, point upwards with vane.

## Lights in West India Islands and Adjacent Coasts.

[Corrected to 1887. Arranged from the Admiralty List.]

### ABBREVIATIONS AND EXPLANATIONS.

#### LIGHTS.

Fixed, or Steady.

Flashing, Showing flashes at short intervals, or groups of flashes at regular intervals.

Revolving. Light gradually increasing to full effect, then decreasing to eclipse. [At short distances and in clear weather a faint continuous light may be observed.]

Fixed and Flashing. Fixed light, with addition of white or colored flashes preceded and followed by short eclipse.

Intermittent or Occulting. A light suddenly and totally eclipsed. When light between eclipses visible less than 30 seconds, term *occulting* applied. When light visible less than half minute, term *intermittent* applied.

Alternating. Red and white alternately at equal intervals, without any intervening eclipse.

#### ABBREVIATIONS.

Da, Danish; Du, Dutch; E, English; Fr, French; Pan, Panama; N. G. Neva Granada; V, Venezuela.

The bearings are magnetic and are given from seaward. The given distances from which the lights are visible are calculated from a height of fifteen feet above the sea, the elevation of the lights being in nearly all cases taken as above high water to centre of lantern; height of building from base to vane. The geographical portion of the lights must be considered as approximate.

### WEST INDIA ISLANDS, ETC.

*Babadoes, I.*, (E.) Ragged point, (300 yards within,) east extreme of the Island, lat 13 10 N, lon 59 26 W, white light, revolving every 2 minutes, 213 feet to centre of lantern, visible in clear weather at 21 miles. Round white coral-stone house 97 feet high. On account of the prevailing strong current running westward on to the Cobblers, a cluster of dangerous reefs  $2\frac{1}{2}$  miles to the southeast of Ragged Point, mariners are cautioned in closing the land to keep well to the north-eastward of the light.

Lead Scupper Pipes, all sizes, MACDONALD & CO.'S.—See p. 3 cover.

- ... South Point, 200 yards from the shore, lat 13 3 N, lon 59 31 W, red light revolving every minute, visible 18 miles, house alternate red and white bands, centre of lantern 145 feet high, building 90 feet. Does not show until it bears to the westward of S W by S, and should be kept well open in order to clear the Cobbler Reefs.
- ... Carlisle Bay, Neeham Point, lat 13 5 N, lon 59 36 W, fixed light, centre of lantern 30 feet high. Red when bearing north to east, and white south of east. Indifferent light. Reported to show white in all directions.
- ... Lower Wharf Carenage, Bridgetown, fixed red light. To mark entrance to Crenago.
- Tabago, I., (E.)* Scarborough, Bacolet or Red Point, lat 11 10 N, lon 60 44 W, fixed white light, 115 feet high, visible 12 miles, pentagon tower, white, height 57 feet. Visible between the bearings of E N E and S W by W, When the mail steamer is expected two red leading lights are shown from two white beacons 83 yards apart, at the west end of the Lower Town of Scarborough.
- Trinidad, I., (E.)* Icos Point, the S W extremity, fixed white light, visible 5 miles, white mast, centre of lantern 35 feet high.
- ... Port Espana, on jetty, lat 10 39 N, lon, 61 31 W, fixed white light, visible 10 miles Hexagonal tower, centre of tower 50 feet high, building 43 feet. Visible between the bearings of N E by N and S E.
- Hugh Ripon, 1 fixed red light, visible 3 miles, to assist in taking up anchorage.
- Grenada, Fort George, lat 12 N, lon 61 45 W, fixed white light, visible 3 to 4 miles, on flag-staff.
- St. Vincent, I., (E.)* Fort Charlotte, lat 13 9 N, lon 61 14 W, fixed white light, visible 6 miles, centre of lantern 640 feet high. For mail steamer when expected.
- St. Lucia, I., (E.)* Tapion Battery, south side of entrance to Castries Harbor, lat 14 1 N, lon 61 1 W, fixed red light, visible 5 miles, centre of lantern 80 feet high. For mail steamer when expected.
- ... Vielle Ville Shoal, fixed red light, red perch. For mail steamer when expected.
- ... Cocoa Nut Shoal, fixed green light, perch. For mail steamer when expected.
- Martinique, I., (Fr.)* Point des Negres in the Fort, lat 14 36 N, lon 61 9 W, fixed white light, red mast, centre of lantern 62 feet high, height of mast 15 feet.
- ... S W part of St. Louis, fixed red light, visible 3 miles, 131 feet high. The buoy at the S E extremity, of a red light, at the arrival or departure of mails, or when required.
- St. Marthe Point, St. Pierre, lat 14 44 N, lon 61 11 W, fixed white light, visible 5 miles.
- Westward of former, fixed lights, visible 5 miles. Red to the northward, blue to the westward, and green to the southward. The white and blue lights in line lead to the anchorage.
- ... Edge of the Bank, St. Pierre Bay, fixed white light, visible 2 miles, lighted on the day the mail is expected, and for three nights after if not arrived.
- ... Carvelle Peninsula, Caracoli Mount,  $\frac{1}{4}$  mile inland, lat 14 46 N, lon 60 53 W, fixed white light, visible 12 miles, white tower, centre of lantern 410 feet high.

MACDONALD & CO., Manufacturers and Fitters of Steam Heating Apparatus.—See adv. p. 3 cover

PICKFORD & BLACK, WOODBERRY COTTON DUCK, 1 TO 2

Dominica, I., (E.) Roseau Bay, extremity of Mole, lat 15 17 N, lon 61 24 W, fixed red light on a flagstaff. When mail steamer is expected.

*Gaudaloupe, I.*, (Fr.) Petite Terre, 202 yards from eastern part, lat 16 10 N, lon 61 5 W, fixed white light visible 15 miles, centre of lantern, 108 feet high, building 75 feet high.

....Gozier Islet, lat 16 2 N, lon 61 29 W, fixed white light, visible 7 miles.

....Manroux Islet, lat 16 13 N, lon 61 31 W, fixed white light in lantern.

....Point a Pitra. White light. When the mail is expected a red light is exhibited at the outer buoy; a white light at the buoy marking the reef at Cassan island, and from a beacon on the shoal opposite Foulibole; and green lights at the buoys on the starboard side of the channel, and at the mooring buoy.

....Port le Meule, lat 16 20 N, lon 61 20 W, fixed white light, visible 12 miles.

....Basse Terre, on Mole, lat 16 0 N, lon 61 45 W, 2 fixed red lights, visible 9 miles.

Antigua, I., (E.) Sandy Island, lat 17 7 N, lon 61 54 W, fixed white light, visible 12 miles, 56 feet high, black wooden structure, height 53 feet. The light bearing S S W clears Diamond Bank, and bearing N by E clears Hurst and Irish Banks, and shoals to the southward.

Mariagalante, I., Grand Bourg., lat 15 54 N, lon 61 17 W, fixed white light, visible 7 miles, centre of lantern 5 feet high.

Monserrat, I., (E.) On beach at Plymouth, lat 16 42 N, lon 62 13 W. A light from a lantern is shown when mail steamer is expected.

St. Christopher, I., (E.) On beach at Basse Terre, lat 17 18 N, lon 62 43 W, fixed red light, visible 4 miles, lighthouse wooden frame, 33 feet from base to vane, centre of lantern 37 feet high.

St. Martin's Island, Old Fort of Amsterdam, Grande Bay, fixed white light, visible 8 miles, centre of lantern 150 feet high.

Sombrero, I., (E.) On the S E side of the island, one third its length from South Point, lat 18 36 N, lon 63 28 W, white light, revolving every minute, visible 20 miles, red open iron frame work, centre of lantern 150 feet high, height of structure 132 feet.

Virginia Islands, (Da.) St. Thomas, east side of entrance, Mohlenfel's Point, lat 18 19 N, lon 64 55 W, fixed white light, visible 12 miles, lighthouse white, centre of lantern 118 feet high.

*Santa Cruz or St. Croix Island*, (Da.) Frederickstadt Fort, lat 17 43 N, lon 64 53 W, fixed white light, visible 4 miles.

....Christianstadt Fort, lat 17 45 N, lon 64 41 W, fixed white light.

*Puerto Rico Island*, (S.) Morro Point Port, San Juan, lat 18 29 N, lon 66 7 W, white fixed and flash light, a flash of 5 seconds duration every minute, visible 18 miles, centre of lantern 171 feet high, tower white octagonal iron.

....On Muertos Island, masonry light house, white, F and Fl, Fl every 3 minutes, visible 18 miles, lat 17 53 N, lon 66 34 W.

....Cape St. Juan, a red and white light revolving every two minutes, visible 17 miles.

....Cebra, white fixed light, visible 16 miles.

....Cape Roxo, light white, light flashes every 45 seconds.

....Mayaguez Bay, Pier Head. Fixed red light. Harbor light.

Hayti, or San Domingo I. San Jose Fort, lat 18 28 N, lon 69 52 W, alternate red and white light, revolving every minute, visible 15 miles, cupola white,

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- centre of lantern, 95 feet high. None of the lights on the Island of San Domingo are to be depended upon.
- ....Areadins Isles, lat 18 47 N, lon 72 38 W, one fixed white light, visible 9 miles, from N  $\frac{1}{4}$  to N  $\frac{3}{4}$  E by trees.
- ....Port au Prince, lat 18 33 N, lon 72 25 W, red light, revolving every half minute, 97 feet high, visible 15 miles.
- Plata, port, S S E, 350 yards from extremity of E entrance point, lat 19 49 N, lon 79 41 W, white light, revolving every 20 seconds, visible 14 miles, 137 feet high, octagonal tower, height 60 feet.
- Jamaica, I.*, (E.) Morant Point, lat 17 65 N, lon 76 12 W, white light, revolving every minute, visible 15 miles, white iron tower, height 96 feet, centre of lantern 115 feet high. Visible when bearing from about N N E  $\frac{1}{2}$  E, round by west to S E by S.
- ....Plum Point, 66 yards northward of point, lat 17 56 N, lon 76 47 W, fixed red and white light, visible 12 miles, lighthouse white, centre of lantern 68 feet high. Red between the bearings of N W by W  $\frac{1}{4}$  W, and E  $\frac{1}{2}$  E. White from N  $\frac{1}{2}$  E, round by S to S E.
- ....Fort Augusta, lat 17 58 N, lon 76 52 W, single lamp suspended from the beacon, centre of lantern 40 feet high. Fixed red and white light. The white light visible to the south and west, and red to the seaward.
- Port Antonio, Folly Point, fixed white light on Scaffold for mail steamers.
- Port Guantomo, angle of Mole's Head, lat 20 1 N, lon 71 65 W, fixed light, one lantern has two white and two red glasses, the colored glasses toward the Bay. The red light marks the northern and the green light the southern angle, shewing the sides and head of the Mole.

**CUBA AND BAHAMA ISLANDS.—Cuba with its Islands.**

- Santiago de Cuba, (Sp.) 100 yards east of the Moro Castle, lat 19 58 N, lon 75 54 W, white light, revolving every two minutes, visible 15 miles, lighthouse white, iron, height 20 feet, centre of lantern 226 feet high.
- Cape Cruz, on Cape, lat 19 50 N, lon 77 44 W, white light with red flash, every three minutes, visible 16 miles, stone lighthouse, centre of lantern 114 feet high, keeper's dwelling yellow.
- Port Xagua, or Cienfuegos, Colorade, east point of entrance, lat 22 1 N, lon 81 30 W, white light fixed and flash, every 2 minutes, visible 14 miles, lighthouse Ville Neuva thereon, height 45 feet, centre of lantern 81 feet high.
- Cochinos Bay, north part of Cay Piedras, lat 21 58 N, lon 81 3 W, fixed white light, visible 7 miles, lighthouse brown, 26 feet high, centre of lantern 30 feet high. Over keeper's dwelling.
- Batabano, lat 22 41 N, lon 82 18 W, fixed white light, visible 3 miles, lantern on mast 31 feet high.
- Isles of Pine, lat 21 26 N, lon 83 6 W, revolving light, visible 16 miles. Proposed.
- San Antonio, (Sp.) On Cape, lat 21 53 N, lon 84 58 W, white light revolving every  $\frac{1}{2}$  minute, visible 20 miles, lighthouse Roncoli thereon, height 107 feet, centre of lantern 117 feet high.
- jutias, on Cay, lat 22 43 N, lon 84 6 W, fixed and flash light. Proposed.
- Goberhadora, on point, lat 23 N, lon 83 13 W, revolving light, visible 15 miles, centre of lantern 110 feet high. Proposed.

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- Havana, Morro Castle, east side of entrance, lat 23 9 N, lon 82 22 W, white light, revolving every half minute, visible 20 miles, lighthouse O'Donnell thereon, extinguished for ten minutes after midnight to clean and trim the lamps.
- Guanos, on point, lat 23 9 N, lon 81 42 W, revolving light every minute, centre of lantern 93 feet high. Proposed.
- Cardenís Bay*, Beidras Cay, lat 23 41 N, lon 81 7 W, white light, fixed, with red flash every 2 minutes, visible 25 miles, tower on house, white, 67 feet high, centre of lantern 74 feet high.
- .... Cay Diana, lat 23 10 N, lon 81 7 W, fixed white light, visible 7 miles, iron column, centre of lantern 43 feet high.
- Crúz del Padre Cay, on reef  $\frac{1}{2}$  of a mille N E of Cay, lat 23 17 N, lon 80 54 W, fixed white light, visible 10 miles, lighthouse conical, white, height 46 feet, centre of lantern 49 feet high. Not to be depended on.
- Bahía de Cadiz, N E part of Cay, lat 23 12 N, lon 80 29 W, white light, revolving every minute, visible 24 miles, house iron, white, height 159 feet, centre of lantern 175 feet high.
- Port Sagua le Grande, N W Point of Hicacal Cay, lat 23 14 N, lon 80 4 W, fixed white light, visible 6 miles, mast on dwelling, centre of lantern 55 feet high. The keeper's dwelling has red doors and windows, and eastward of it there are a few huts.
- Paredon Grand Cay, north part of Cay, lat 22 29 N, lon 78 10 W, white light, fixed and flash every minute, visible 26 miles, house iron, white, with a brown base, height 117 feet, centre of lantern 159 feet high.
- Neuaitas Harbor*, Barlovento Point, lat 21 37 N, lon 77 5 W, fixed white light, visible 9 miles, on white mast from centre of building, height 44 feet, centre of lantern 49 feet high. Keeper's dwelling is quadrangular, yellow.
- .... Maternillos Point, lat 21 40 N, lon 77 9 W, white-light with flash every minute, visible 23 miles, house white, Colon thereon, height 170 feet, centre of lantern 273 feet high.
- Lucrecia, on Point, lat 21 5 N, lon 75 38 W, red light, revolving every minute, visible 15 miles, house stone, white, centre of lantern 112 feet high.
- Baracoa, 250 yards E S E of Barlovento Point, lat 20 22 N, lon 74 30 W, fixed white light, visible 13 miles, iron column, height 29 feet, centre of lantern 48 feet high. On keeper's dwelling.
- Cape Maysi, east point of Cuba, lat 20 15 N, lon 74 10 W, fixed white light, visible 17 miles, tower circular, centre of lantern 128 feet high.

**Bahama Islands.**

- Lobos Cay, (E.) On Bay, lat 22 22 N, lon 77 35 W, fixed white light, visible 16 miles, house circular, iron, broad block, 7 in number, and white, 6 in number, bands height 150 feet, lantern white, centre 146 feet high, base surrounded by keeper's dwelling.
- Cay Sal Bank, N Elbow, Double-headed Shot Cays, lat 23 56 N, lon 80 28 W, fixed white light, visible 15 miles, stone conical tower, white and red upper part, height 58 feet, centre of lantern 96 feet high. Not visible when it bears S W  $\frac{1}{2}$  W, being intercepted by Water Cay when three leagues distant.
- Gun Cay, near South Point, lat 25 34 N, lon 79 19 W, red light revolving every minute and a half, visible 12 miles, conical tower, upper part red, lower white, height 79 feet, lantern white, centre 80 feet high. Not seen between the bearings of S by W  $\frac{1}{2}$  W, and S  $\frac{1}{2}$  E, being intercepted by the Bemini Isles when 8 miles distant.
- Great Isaac, on the Inland, lat 26 2 N, lon 79 6 W, white light, revolving every half minute, visible 16 miles, house iron, with broad red bands, 8 in number, and white, 7 in number, horizontal bands, height 145 feet, lantern white, centre 158 feet high. Eclipses not total within 6 miles,

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- Great Stirrup Cay, (E.) 600 yards from E end of Cay, lat 25 50 N, lon 77 54 W, fixed white light, visible 12 miles, house circular, 5 bands, red and white, alternately, height 46 feet, centre of lantern 81 feet high. Visible from seaward from about N W by W, through W and S to about N E.
- Nassau Harbor, W point Hog Island, lat 25 6 N, lon 77 22 W, fixed white light, visible 10 miles, conical stone tower, white, height, 58 feet, centre of lantern 68 feet high. It is stated that this light is seen at a greater distance than that given. Not visible between N N E and N N W  $\frac{1}{2}$  W. A red light is exhibited at Hog Island from a flagstaff on a point near the lighthouse, when the state of the bar near the entrance of Nassau harbor is impassible or dangerous.
- Athol Island, cupola of quarantine officer's dwelling, lat 25 5 N, lon 77 17 W, fixed white light. Visible between N N W  $\frac{1}{4}$  W, and W by N  $\frac{1}{4}$  N.
- Aboca*, about 4 cables northward of Hole in the Wall, lat 25 51 N, lon 77 11 W, white light, revolving every minute, visible 20 miles, conical stone tower, white lower part and red upper part, height 85 feet, lantern white, centre 160 feet high. Visible from seaward from S W to E S E.
- .... Little Guana, or Elbow Cay,  $\frac{1}{4}$  of a mile inland, lat 26 31 N, lon 76 58 W, fixed white light, visible 15 miles, house, circular, with red and white bands, height 77 feet, lantern white, centre 123 feet high.
- Crooked I. Passage*, Bird Rock, lat 22 51 N, lon 74 22 W, white light, revolving every  $1\frac{1}{2}$  minutes, 120 feet high, visible 17 miles, building conical, stone faced with blue bricks, 112 feet high. Vessels approaching Bird Rock light are cautioned to attend to its bearings, as the encircling reef on the north side of Crooked Island terminates in a direction N by W  $\frac{1}{2}$  W, and nearly one mile distant from the light tower. The currents northward of Crooked Island are variable.
- .... Castle Island, 270 yards within S W part, lat 22 7 N, lon 74 21 W, fixed white light, visible 17 miles, house conical, 3 bands of red brick, height 114 feet, centre of lantern 120 feet.
- Inagua, Great I., 2 miles to the N W of the S W Point, lat 20 56 N, lon 73 41 W, white light, revolving every minute, visible 17 miles, conical building, with two white and two red bands, height 114 feet, centre of lantern 120 feet high.
- Turk's Island, 400 yards S W  $\frac{1}{2}$  W from N extremity of island, lat 21 31 N, lon 71 8 W, white light, flash every minute, visible 15 miles, building white, iron circular, height 60 feet, centre of lantern 108 feet high.

GUYANA COAST.

- Cayenne*, (Fr.), summit of Hospital on Royal Inlet, Salut Islets, lat 5 17 N, lon 52 35 W, fixed white light, visible 12 miles, centre of lantern 197 feet high.
- .... Eufant Perdu, a rock 6 miles northward of Cayenne, lat 5 3 N, lon 52 21 W, fixed white light, visible 7 miles, house wood, frame work, centre of lantern 61 feet high. Visible between S W by S and E, S  $\frac{1}{2}$  S, also between N E by N and W by N  $\frac{1}{2}$  N.
- .. Cepereau Fort, lat 4 56 N, lon 52 20 W, fixed white light, visible 10 miles, centre of lantern 130 feet high, building 40 feet. The white and green lights in one S E by S, leads over *Amiable* Rock, which is avoided by keeping to westward of this rock.
- .... End of Jetty, fixed red light, centre of lantern 39 feet high.
- ... N W Angle of Infantry Barracks, lat 4 56 N, lon 52 19 W, fixed green light, visible 8 miles, centre of lantern 69 feet high. Obscured westward of S W  $\frac{1}{4}$  S.
- Maroni River*, west side of entrance (D.) lat 5 45 N, lon 54 3 W, fixed white light, visible 10 miles, centre of lantern 75 feet high, building white, pyramid, height 70 feet. Visible from W  $\frac{1}{4}$  S to S  $\frac{1}{4}$  S.
- .... E side of entrance (Fr.) lat 5 42 N, lon 53 58 W, fixed white light, visible 10 miles, building white pyramid, centre of lantern 76 feet high.

Iron Pipes, all sizes, at MACDONALD & CO'S—See p. 3 cover.

- Surinam, (Du.) light-vessel in 14 feet,  $3\frac{1}{2}$  miles N W Brams Point, lat 6 1 N, lon 55 16 W, fixed white light, visible 10 miles, yellow ball on foremast, centre of lantern 25 feet high. *Surinam* on sides.
- Berbice, (E.), light vessel moored in 22 feet, N E by N, 9 miles from St. Andrew Point, lat 6 29 N, lon 57 24 W, fixed white light, visible 10 miles, vessel red roofed over, centre of lantern 30 feet high. *Berbice* on each side, and carries a white flag with a red ball in the centre. A sloop pilot boat cruises outside the bar, and carries a white flag with *Pilot* inscribed thereon.
- Demerara*, (E.), light vessel, in 19 feet, with Georgetown light house bearing S S W  $\frac{1}{2}$  W, distant 12 miles, lat 6 57 N, lon 58 5 W, fixed white light, visible 12 miles, vessel red, with one mast 60 feet high, and a blue flag by day; centre of lantern 30 feet high. *Guiana* on her sides. Pilots for Demerara and Essequibo Rivers are on board.
- .... Georgetown, E side of entrance, lat 6 49 N, lon 58 11 W, white light, revolving every minute, visible 16 miles, octagonal tower, red and white, vertical, centre of lantern 103 feet high, house 100 feet.
- .... In same tower, fixed red light. Visible from S by E to S E, to indicate to vessel being westward and clear of breakwater.

**TERRA FIRME COAST.**

- Trinidad*, (E.), Icacas Point, the S W extremity, fixed white light, visible 5 miles, white mast, centre of lantern 39 feet high.
- .... Port Espano, on jetty, lat 10 39 N, lon 61 31 W, fixed white light, visible 10 miles, hexagonal tower, height 43 feet, centre of lantern 50 feet high. Visible between the bearings of N E by N and S E.
- Tobago, (E.), Scarborough or Bacolet Point, lat 11 10 N, lon 60 44 W, fixed white light, visible 12 miles. Pentagon tower, red and white, height 57 feet, centre of lantern 115 feet high. Visible between the bearings of E S E through S, and S W by W.
- Cumana, tower on Custom House, lat 10 28 N, lon 64 12 W, fixed white light, visible 5 miles.
- Puerto Cabello, Brava Point, lat 10 30 N, lon 68 W, revolving red and white light alternately every 40 seconds, visible 14 miles, building quadrangular, centre of lantern 79 feet high.—Uncertain.
- Cabellos, Port, white light visible 3 miles.
- Los Roques, on the north-east hill (150 feet high) of El Roque, lat 11 58 N, lon 66 38 W, white light, revolving every minute, visible 15 miles, centre of lantern 208 feet high. Reported to be irregular in its action from defect in revolving apparatus.
- Buen Ayre, (Du.), Lacre, S point of the island, lat 12 2 N, lon 68 22 W, fixed white light, visible 12 miles, building white, with vertical red stripes, height 75 feet, centre of lantern 85 feet high. Lantern destroyed by storm, September 1877. Temporary light exhibited.
- Orange Battery, at El Puerto, lat 13 10 N, lon 68 19 W, fixed white light, visible 3 miles.
- Little Curacao, (Du.), centre of Island, lat 11 58 N, lon 68 39 W, fixed and flash white light, every minute, visible 14 miles, centre of lantern 75 feet high. The flash is of 6 seconds duration, preceded by an eclipse of 7 seconds.
- Great Curacao Island, (Du.), St Anne Harbor. Rif Fort, lat 12 6 N, lon 68 55 W, fixed white light.
- Cumarebo Bay, lat 11 30 N, lon 69 25 W, fixed white light, visible 6 miles, centre of lantern 49 feet high. This is a private light and its exhibition uncertain. Manzanilla Point bears N E by E E, 5 miles from it.
- Savanilla, Cupino Beach, lat 11 N, lon 74 58 W, white light revolving every 2 minutes, visible 16 miles, centre of lantern 98 feet high. The light is not visible when bearing S E  $\frac{1}{4}$  S.

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PICKFORD & BLACK, IMPORTERS OF DUCKS AND DRILLINGS 51 UPPER WATER STREET.

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- ....Belilic Point, white fixed light, visible 14 miles.
- Marycabo, Zapar Island, lat 10 58 N, lon 71 40 W, fixed light, visible 6 miles, stone tower, centre of lantern 30 feet high.
- Santa Marta, summit of the Morra, lat 11 15 N, lon 74 16 W, fixed white light, visible 24 miles, centre of lantern 328 feet high.
- Colon, or Navy Bay (Pan.), N W part of Manzanillo Island, Colon or Aspinwall, lat 9 23 N, lon 79 53 W, fixed white light, visible 10 miles, wood open white building, height 60 feet, centre of lantern 60 feet high. Reported not to be visible beyond 6 miles.
- ....Red light at N E end of town.
- Limon Port, or Grape Cay, lat 10 N, lon 83 2 W, fixed white light, visible 6 to 8 miles, centre of lantern 60 feet high.
- Truxillo Bay, Cape Honduras, lat 16 1 N, lon 86 3 W, fixed white light, centre of lantern 30 feet high. Truxillo lighthouse having been destroyed by a hurricane in 1875, a temporary light, visible only 4 miles, is now exhibited.
- Bonacco Island, on Cay XII, lat 16 26 N, lon 85 54 W, fixed white and red light, visible 8 miles on mast. Red towards the anchorage. Proposed to be changed to white.
- Coxen Road, westward of Government House, Roaten Island, lat 16 18 N, lon 86 35 W, fixed white light, visible 4 miles, centre of lantern 85 feet high, light house white, square, black top, height 15 feet.
- Utila Island, eastern reef, east harbor, fixed white light, visible 4 miles, small wooden building. Not to be depended on.
- Half moon Cay, (E.), S E Point lat 17 12 N, lon 87 32 W, fixed white light, visible 18 miles, iron tower, white, height 80 feet, centre of lantern 70 feet
- Bokei Cay, on Cay, lat 17 9 N, lon 87 56 W, 2 fixed lights, horizontal, one white, visible 18 miles, and one red, visible 5 miles, flagstaff with a yard on which the lights are displayed, 75 feet high, centre of lantern 60 feet high.
- Belize, (E.), English Cay, S side of Channel, lat 17 19 N, lon 88 4 W, white fixed light, visible 7 miles, 45 feet high, white mast.
- ....Custom House flagstaff, fixed white light.
- Turneff Cays, (E.), Mauger Cay,  $\frac{1}{2}$  mile within north-end reef, lat 17 37 N, lon 87 46 W, 3 fixed white lights, in a triangle, visible 13 miles, tower skeleton iron, upper third black, remainder white, height 57 feet, upper light 53 feet, lower two 47 feet. The bank extends  $1\frac{1}{2}$  mile to the N E of the light house. The lights can be seen above the trees from all points of the compass, but the light house is seen from seaward only, from N E to S W by W.

**BERMUDA.**

- Gibbs Hill, on summit, lat 32 15 N, lon 65 52 W, revolving white light, every minute, 362 feet high, visible 24 miles. Seen round horizon except between the bearings S 50° W, and S 54° W, also S 55° W to S. Building circular, iron, white.
- Mount Hill, near St. David's Head, lat 32 22 N, lon 64 41 W, fixed white, 208 feet high, visible over 270° from N E  $\frac{1}{4}$  E to S E  $\frac{1}{4}$  S, bearing S E by S. The light is hidden by St. George's Island.

**FLORIDA.**

- Dry Tortugas*, Fort Jefferson, Garden Cay, lat 24 38 N, lon 82 53 W, fixed white light, visible 14 miles, house brown, lantern black, centre 70 feet above sea level, house 65 feet to centre of lantern.
- ....Loggerhead, or S W Cay, lat 24 38 N lon 82 56 W, fixed white light, visible 19 miles, house lower part white, upper part black, centre of lantern 152 feet above sea level, house 150 feet to centre of lantern. *Note.*—An iron beacon surmounted by a cylindrical cage, and painted black, stands on Rebecca Shoal, and is visible about 7 miles.

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VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.



VESSELS FITTED WITH PLUMBING FIXTURES BY MACDONALD & CO.

PICKFORD & BLACK, IMPORTERS NETS, TWINES, LINES, 51 UPPER WATER STREET.

- Cay West*, N W Passage, in 6 feet of water, lat 24 37 N, lon 81 54 W, fixed white light, visible 12 miles, tower red, dwelling and lantern white, centre of lantern 40 feet above sea level. Visible between the bearings S E through E to S W.
- .... S W point of island, lat 24 33 N, lon 81 48 W, fixed white light, visible 14 miles, house white, centre of lantern 72 feet above sea level, house 60 feet to centre of lantern. Visible between the bearings of N N E  $\frac{1}{2}$  E and E by N  $\frac{1}{2}$  N.
- Sand Cay, on a sand and shell islet, about  $7\frac{1}{2}$  miles S S W  $\frac{3}{4}$  W from Cay West light house, lat 24 27 N, lon 81 53 W, fixed and flash white light, every 2 minutes, visible 17 miles, house brown color, height 121 feet, lantern white, centre 110 feet above sea level. It shows for a space of *one minute* a clear steady light; in every alternate minute there is a brilliant *flash of ten seconds duration*, preceded and followed by partial eclipses of *twenty-five seconds duration*.
- American Shoal, in 6 feet water, 67 yards N W of Beacon B, lat 24 31 N, lon 81 31 W, fixed white light, flash every five seconds, visible 16 miles, 110 feet high, building brown, on piles.
- Sombrero Shoal, on Shoal, near Sombrero Cay, lat 34 38 N, lon 81 7 W, fixed white light, visible 19 miles, tower open frame work, iron, on piles, brown, centre of lantern 144 feet from sea level, tower 149 feet to centre of lantern.
- Alligator Reef, in 5 feet water, near N E part of reef, lat 24 51 N, lon 80 37 W, white and red flash light every 5 seconds, visible 18 miles, house white, lantern black, centre 143 feet above sea level. The light is a *flashing white and red* light, showing a flash every *five seconds* in the following order, viz., *five white* flashes then *one red* flash.
- Caryfort Reef, near the edge of Gulf Stream, lat 25 13 N, lon 80 13 W, white flash light every half minute, visible 17 miles, iron piles, dark color, 112 feet high, centre of lantern 106 feet above sea level. The dwelling is octagonal in shape.
- Fowey Rocks, 50 yards south of Beacon P., in 5 feet water, lat 25 35 N, lon 80 6 W, fixed white light, visible 16 miles, 110 feet above sea level, tower dark, brown, on piles, keeper's dwelling white.
- Jupiter Inlet, between Jupiter Inlet and Gilbert Bar, lat 26 56 N, lon 80 5 W, white light, fixed flash every minute and a half, visible 19 miles, house red, brick, lantern brown, centre 146 feet above sea level, house 94 feet to centre of lantern. Varied every  $1\frac{1}{2}$  minute by a brilliant flash of  $7\frac{1}{2}$  seconds duration, preceded and followed by partial eclipses of about 19 seconds duration.
- Cape Canaveral, N E pitch of the Cape, lat 28 28 N, lon 80 32 W, white flash light every minute, visible 18 miles, house black and white horizontal bands, centre of lantern 139 feet above sea level, house 55 feet to centre of lantern. Old light tower near is white.

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# COGSWELL'S ALTITUDINAL TABLES

For Computing the True Meridian Altitude of the Sun when it is obscured; by an Observation taken within 34 Minutes; with Explanations and Examples.

## EXPLANATION.

To find the Sun's true Altitude at Noon by these tables, the time by watch to the nearest minute for Apparent time at ship when the altitude is taken and the Latitude by account to the nearest degree is necessary.

With the hour angle and Latitude enter Table I. and find the first correction to be applied to the Sun's true Altitude.

With the Sun's Altitude and the Number found above the first correction in Table I. enter Table II. and find the second correction to be applied to the Sun's true Altitude.

When the Zenith distance and Latitude are of contrary Names the difference between the First and Second Corrections must be added to the Altitude.

### EXAMPLE I.

" 2.  
" 3.  
" 4.  
" 5.

### EXAMPLE I.

At 11h. 40m. A. M.—Apparent time at ship in Lat. by account 47° North the observed Altitude of the Sun's L. L. was 56° 56' 56" North. Error of Instrument 2' 15.5" to add. Height of the Eye 22 feet. Required the Sun's Altitude at Noon.

Sun's Ob'sd Alt.....	56° 56' 53"	True Altitude .....	57° 10' 12.9"
Index Error.....	+ 2 15.5	Correction 1 .....	6 36 0
		" 2.....	8 54
	56 59 11.5		
Dip.....	— 4 37	Mer. Altitude.....	57 25 42.9
App. Alt. L. L.....	56 54 34.5		
Parallax.....	— 4.8		
	56 54 39.3		
Refraction.....	— 37		
	56 54 2.3		
Sun's Semidiameter....	16 10.6		
Sun's true Altitude ....	57 10 12.9		

In Table I. will be found, answering to Hour angle 20 minutes and Lat. 47 degrees, two Numbers, 205 and 6.6 : the first of these enables one to find the second correction, and the other is the first correction.

In Table II., answering to Altitude 57 degrees and Number 205, is found 8.9, which is the second correction to be applied as above.

### EXAMPLE II.

At 11h. 53m. A.M.—App. T. at ship the Sun's true Altitude was observed to be  $47^{\circ} 47' 47''$  Lat. by acct.  $27^{\circ}$  South. Required the Sun's true Altitude at Noon.

	H.	M.		
	12°	00'		True Alt..... $47^{\circ} 47' 47''$
	11	53		1st Corr....0.7' = 0 42
				2nd " ....1.3 = 1 18
Hour angle.....		7'		Mer. Alt..... $47 49 47$

### EXAMPLE III.

At 11h. 10m. A.M., by Watch, show on App. Time at ship  $26'$  the true altitude of the Sun's L. L. was observed to be  $66^{\circ} 17' 34''$  bearing South, the Latitude by account is  $15^{\circ} 0'$  North, and the corrected declination  $8^{\circ} 22' 17''$  S. Required the Latitude by Sun's Meridian Altitude.

	H.	M.		
Time by Watch.....	11	10	A. M.	True Altitude..... $66^{\circ} 17' 34''$ S.
Error on App. T.....	26			Corr. 1 . . . .4.7' = 4 42
				" 2 . . . .40.9 40 54
True App. T.....	11	36"		Alt. at Noon..... $67 03 10$
	12	00		$90 00 00$
Horary angle.....		24'		Zenith distance..... $22 56 50$ N.
				Corr. decl..... $8 22 17$ S.
				Latitude ..... $14^{\circ} 34' 33''$ N.



**EXAMPLE IV.**

Apparent time by Watch 11h. 42m., true Altitude  $62^{\circ} 04'$  North, Lat. by account  $32^{\circ}$  South, corrected Declination  $4^{\circ} 19' 21''$  S. Required Latitude by Meridian Altitude.

	<u>H.</u>	<u>M.</u>			
	12	00		True Alt.....	$62^{\circ} 04' 00''$ N.
	11	42		1st Corr....	$4.8' = 4\ 48$
Hour Angle... ..			<u>18'</u>	2nd " ..	$14.5\ 14\ 30$
				Mer. Alt.....	<u><math>62\ 23\ 18</math></u>
					<u><math>90\ 00\ 00</math></u>
				Zenith dist.....	$27\ 36\ 42$ S.
				Corr. decl.....	<u><math>4\ 19\ 21</math> S.</u>
				Latitude.....	$31\ 56\ 03$ S.

**EXAMPLE V.**

Hour angle 17, True altitude of Ursa Majoris  $44^{\circ} 41' 15''$ , Zenith south of the Star, Latitude by account  $12^{\circ} 15'$  N., corrected declination  $57^{\circ} 34' 45''$  North. Required the Latitude

True Altitude.....		$44^{\circ} 41' 15''$
1st Corr.....	$1.9$	
2nd " .....	$9.1 = 7.2 =$	$7\ 12$
		<u><math>44\ 48\ 27</math></u>
		<u><math>90\ 00\ 00</math></u>
		$45\ 11\ 33$ S.
Declination.....		<u><math>57\ 34\ 45</math> N.</u>
Latitude.....		$12^{\circ} 23' 12''$ N.

NOTE.—The Latitude being North and the Zenith distance South, the difference between the first and second corrections must be added to the Star's true altitude.



14	29	44	58	72	87	101	116	130	145	159	174	188	203	218	232	247	261	276	290	305	321	335	349	364	379	394	409	423					
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
15	29	43	58	72	86	101	116	130	144	159	173	188	202	217	231	246	260	275	289	304	318	333	348	363	378	392	406	421					
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
16	29	43	57	72	86	100	115	129	143	158	172	187	201	216	230	244	259	273	288	302	317	331	346	361	375	390	405	419					
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
17	29	43	57	71	86	99	114	128	143	157	172	186	200	214	229	243	257	272	286	301	315	330	344	359	373	387	402	417					
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
18	29	42	57	71	85	99	113	128	142	156	170	184	199	213	227	242	256	270	285	299	313	328	342	356	371	385	400	414					
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
19	29	42	56	70	84	99	113	127	141	155	169	183	198	212	226	241	254	269	283	297	311	326	340	354	369	383	398	412	426				
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
20	29	42	56	70	84	98	112	126	140	154	168	182	196	210	224	239	253	267	281	295	309	324	338	350	366	381	395	409	424				
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
21	29	42	56	70	84	99	112	126	140	154	168	182	196	210	224	239	253	267	281	295	309	324	338	350	366	381	395	409	424				
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
22	29	42	56	69	83	97	111	125	139	153	167	181	195	209	223	237	251	265	279	293	307	321	335	350	364	378	392	406	421				
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
23	29	41	55	69	83	97	110	124	138	152	166	180	194	207	221	235	249	263	277	291	305	319	333	347	361	375	389	403	418				
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
24	29	41	55	68	82	96	110	123	137	151	165	178	192	206	220	233	247	261	275	289	303	317	330	344	358	372	386	400	414				
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
25	29	41	55	68	82	95	109	122	136	150	163	177	191	204	218	232	245	259	273	287	300	314	328	341	352	369	383	397	411				
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
26	29	41	54	67	81	94	108	121	135	149	162	175	189	203	216	230	243	257	270	284	298	311	325	339	353	366	380	394	408				
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
27	29	40	54	67	80	93	107	120	134	147	160	174	187	201	214	228	241	255	268	282	295	309	322	336	349	363	377	390	404	418			
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
28	29	40	53	66	79	93	106	119	133	146	159	172	186	199	212	226	239	252	266	279	292	306	319	333	346	360	373	387	400	414	428		
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
29	29	39	52	66	79	92	105	118	131	145	158	171	184	197	210	224	237	250	263	277	290	303	316	330	343	356	370	383	387	410	423		
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0			
30	29	39	52	65	78	91	104	117	130	143	156	169	182	195	208	222	235	247	260	274	287	300	313	326	340	353	366	379	393	405	419		
0.10	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34





45	10 21 31 42 52 63 73 84 94 105 116 126 136 147 157 168 178 189 199 209 220 231 242 252 263 273 284 295 305 316 327 337 348 359	45
46	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	46
47	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	47
48	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	48
49	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	49
50	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	50
51	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	51
52	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	52
53	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	53
54	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	54
55	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	55
56	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	56
57	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	57
58	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	58
59	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	59
60	0.1 0.2 0.3 0.4 0.6 0.8 1.1 1.4 1.7 2.0 2.4 2.8 3.2 3.7 4.2 4.7 5.3 5.9 6.6 7.3 8.0 8.7 9.4 10.2 11.1 12.0 12.9 13.8 14.8 15.8 16.8 17.9 19.0	60
1	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34	

TABLE II.

Number.	ALTITUDE.																				Number.			
	10	15	20	23	26	29	31	33	35	37	38	39	40	41	42	43	44	45	46	47		48	49	50
30	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	80
40	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	40
50	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	50
60	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.7	60
70	0.1	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.9	70
80	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.1	1.1	80
90	0.2	0.3	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.4	1.5	90
100	0.3	0.4	0.6	0.6	0.7	0.8	0.9	0.9	1.0	1.1	1.2	1.2	1.2	1.3	1.3	1.4	1.5	1.5	1.5	1.6	1.6	1.7	1.8	100
110	0.3	0.5	0.7	0.7	0.8	1.0	1.0	1.1	1.2	1.3	1.4	1.4	1.4	1.5	1.6	1.6	1.7	1.8	1.8	1.9	1.9	2.0	2.1	110
120	0.4	0.6	0.8	0.9	1.0	1.2	1.2	1.3	1.4	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.1	2.2	2.2	2.3	2.4	2.5	2.5	120
130	0.5	0.7	0.9	1.0	1.2	1.4	1.4	1.6	1.6	1.7	1.9	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	130
140	0.5	0.8	1.0	1.2	1.4	1.6	1.7	1.8	2.0	2.1	2.3	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	140
150	0.6	0.8	1.1	1.3	1.5	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.9	150
160	0.7	1.0	1.3	1.5	1.8	2.1	2.3	2.4	2.6	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	4.4	160
170	0.8	1.1	1.5	1.7	2.0	2.3	2.6	2.8	3.0	3.2	3.3	3.4	3.5	3.6	3.8	3.9	4.0	4.2	4.3	4.5	4.7	4.8	5.0	170
180	0.8	1.2	1.7	2.0	2.3	2.6	2.9	3.1	3.3	3.6	3.7	3.8	3.9	4.0	4.2	4.4	4.5	4.7	4.9	5.2	5.3	5.4	5.6	180
190	0.9	1.4	1.9	2.2	2.5	2.9	3.2	3.4	3.7	4.0	4.1	4.2	4.4	4.5	4.7	4.9	5.0	5.3	5.4	5.6	5.9	6.0	6.2	190
200	1.0	1.5	2.1	2.4	2.8	3.2	3.5	3.8	4.1	4.4	4.5	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2	6.5	6.7	6.9	200
210	1.1	1.7	2.3	2.7	3.1	3.5	3.9	4.2	4.5	4.9	5.0	5.2	5.4	5.6	5.8	6.0	6.2	6.4	6.6	6.9	7.2	7.4	7.7	210
220	1.2	1.8	2.6	3.0	3.4	3.9	4.2	4.5	4.9	5.3	5.5	5.7	5.9	6.1	6.4	6.6	6.9	7.1	7.3	7.6	7.9	8.2	8.5	220
230	1.3	2.0	2.8	3.3	3.8	4.3	4.6	5.0	5.4	5.8	6.0	6.2	6.5	6.7	7.0	7.2	7.4	7.7	8.0	8.3	8.6	8.9	9.2	230
240	1.5	2.3	3.1	3.6	4.1	4.7	5.0	5.4	5.8	6.3	6.6	6.8	7.1	7.3	7.6	7.8	8.1	8.4	8.7	9.0	9.3	9.6	10.0	240
250	1.6	2.4	3.3	3.9	4.5	5.1	5.5	5.9	6.4	6.9	7.1	7.3	7.6	7.9	8.2	8.5	8.8	9.1	9.4	9.7	10.1	10.4	10.8	250
260	1.6	2.5	3.4	4.0	4.7	5.3	5.7	6.2	6.6	7.1	7.5	7.7	8.0	8.3	8.6	8.8	9.2	9.5	9.9	10.2	10.6	10.9	11.3	260
270	1.7	2.6	3.6	4.2	4.8	5.5	5.9	6.4	6.9	7.4	7.8	8.0	8.3	8.6	8.9	9.2	9.6	9.9	10.3	10.6	11.0	11.4	11.8	270
280	1.7	2.7	3.7	4.3	5.0	5.7	6.1	6.6	7.1	7.7	8.0	8.3	8.6	8.9	9.3	9.6	9.9	10.3	10.6	11.0	11.4	11.8	12.2	280
290	1.8	2.8	3.9	4.5	5.2	5.9	6.4	6.9	7.4	8.0	8.3	8.6	8.9	9.2	9.6	9.9	10.2	10.6	11.0	11.4	11.8	12.2	12.6	290
300	1.9	3.0	4.0	4.7	5.4	6.1	6.4	7.0	7.6	8.3	8.5	8.9	9.2	9.6	9.9	10.3	10.6	11.0	11.4	11.8	12.2	12.7	13.1	300
310	2.0	3.1	4.2	4.9	5.6	6.3	6.5	7.2	7.9	8.7	8.9	9.2	9.6	9.9	10.3	10.6	11.0	11.4	11.8	12.2	12.7	13.1	13.6	310
320	2.0	3.2	4.3	5.1	5.8	6.5	7.0	7.6	8.4	9.0	9.3	9.6	9.9	10.3	10.7	11.1	11.5	11.9	12.3	12.7	13.1	13.6	14.1	320
330	2.1	3.3	4.5	5.2	6.0	6.8	7.4	8.0	8.7	9.4	9.6	10.0	10.3	10.7	11.1	11.5	11.9	12.3	12.7	13.2	13.7	14.2	14.7	330
340	2.2	3.4	4.6	5.4	6.2	7.0	7.7	8.3	9.0	9.7	10.0	10.3	10.7	11.1	11.5	11.9	12.4	12.8	13.2	13.5	14.2	14.7	15.2	340
350	2.3	3.5	4.8	5.6	6.4	7.3	7.9	8.6	9.3	10.0	10.3	10.7	11.1	11.5	11.9	12.3	12.8	13.2	13.7	14.1	14.6	15.2	15.8	350
360	2.3	3.6	5.0	5.8	6.6	7.5	8.2	8.9	9.6	10.3	10.7	11.0	11.4	11.9	12.3	12.7	13.2	13.7	14.2	14.6	15.1	15.7	16.3	360
370	2.4	3.8	5.3	6.1	6.9	7.8	8.5	9.2	9.9	10.6	11.0	11.4	11.8	12.2	12.7	13.1	13.6	14.1	14.6	15.1	15.7	16.2	16.8	370
380	2.5	3.9	5.1	6.3	7.1	8.0	8.7	9.4	10.2	10.9	11.3	11.7	12.2	12.6	13.1	13.6	14.0	14.6	15.0	15.6	16.2	16.7	17.2	380
390	2.6	4.0	5.5	6.4	7.3	8.3	9.0	9.7	10.5	11.3	11.7	12.1	12.6	13.0	13.5	14.0	14.5	15.0	15.5	16.1	16.7	17.3	17.9	390
400	2.7	4.1	5.6	6.6	7.5	8.5	9.3	10.0	10.8	11.7	12.1	12.5	13.0	13.4	13.9	14.4	14.9	15.4	15.9	16.5	17.0	17.6	18.2	400
410	2.8	4.3	5.8	6.8	7.8	8.8	9.6	10.4	11.2	12.0	12.5	12.9	13.4	13.9	14.4	14.9	15.4	16.0	16.5	17.1	17.8	18.4	19.1	410
420	2.9	4.5	6.0	7.0	8.0	9.1	9.9	10.7	11.5	12.4	12.9	13.4	13.8	14.3	14.9	15.4	15.9	16.5	17.0	17.6	18.2	18.9	19.7	420
430	3.0	4.6	6.2	7.2	8.3	9.4	10.2	11.0	11.9	12.8	13.3	13.8	14.3	14.8	15.3	15.8	16.4	17.0	17.6	18.2	18.9	19.6	20.3	430
440	3.1	4.7	6.3	8.4	8.5	9.6	10.4	11.3	12.3	13.2	13.7	14.1	14.7	15.2	15.8	16.3	16.9	17.5	18.1	18.7	19.4	20.1	20.9	440
450	3.2	4.8	6.5	7.6	8.7	9.9	10.8	11.7	12.7	13.6	14.0	14.5	15.1	15.6	16.2	16.8	17.4	18.0	18.6	19.3	20.0	20.7	21.5	450
460	3.3	4.9	6.7	7.8	9.0	10.2	11.1	12.0	13.0	14.0	14.4	14.9	15.5	16.0	16.7	17.2	17.9	18.5	19.1	19.8	20.5	21.3	22.1	460
470	3.4	5.1	6.9	8.1	9.3	10.5	11.4	12.4	13.4	14.4	14.8	15.3	15.9	16.5	17.1	17.7	18.3	19.0	19.7	20.4	21.1	21.9	22.7	470
480	3.5	5.2	7.1	8.3	9.5	10.8	11.7	12.8	13.7	14.8	15.2	15.8	16.4	17.0	17.6	18.3	18.9	19.5	20.2	20.9	22.6	22.5	23	480
490	3.6	5.4	7.3	8.5	9.8	11.1	12.1	13.1	14.1	15.2	15.7	16.3	16.9	17.5	18.1	18.7	19.4	20.1	20.8	21.5	22.3	23.1	23.9	490
500	3.7	5.5	7.5	8.8	10.1	11.3	12.4	13.4	14.5	15.6	16.1	16.8	17.4	17.9	18.6	19.2	1.99	20.6	21.4	22.1	22.9	23.7	24.6	500
510	3.8	5.7	7.7	9.0	10.4	11.5	12.7	13.8	14.9	16.0	1.66	17.2	17.8	18.4	19.1	19.8	20.5	21.2	22.0	22.7	23.6	24.4	25.3	510
520	3.9	5.8	7.9	9.2	10.7	12.0	13.0	14.1	15.3	16.4	17.0	17.7	18.3	18.9	19.6	20.3	21.6	21.7	22.6	23.3	24.2	25.0	25.9	520
530	4.0	6.0	8.1	9.5	10.9	12.4	13.4	14.5	15.0	16.8	17.4	18.1	18.7	19.4	20.1	20.8	21.6	22.2	23.2	24.0	24.8	2.57	2.66	530
540	4.1	6.2	8.4	9.8	11.3	12.7	13.8	14.9	16.0	17.3	17.9	18.6	19.2	19.9	20.6	21.4	22.2	22.9	23.8	24.6	25.5	26.4	27.3	540
550	4.2	6.4	8.6	10.1	11.6	13.1	14.2	15.3	16.5	17.8	18.4	19.1	19.8	20.5	21.2	22.0	22.8	23.6	24.4	25.3	26.2	27.2	28.1	550
560	4.3	6.7	8.9	10.4	11.9	13.5	14.6	15.8	16.9	18.3	18.9	19.7	20.3	21.1	21.8	22.6	23.4	24.3	25.1	26.0	26.9	28.0	28.9	560
570	4.4	6.9	9.2	10.8	12.2	13.9	15.0	16.2	17.4	18.8	19.5	20.3	20.9	21.7	22.4	23.3	24.1	24.9	25.8	26.7	27.7	28.8	29.7	570
580	4.5	7.2	9.6	11.2	12.6	14.4	15.5	16.7	17.9	19.3	20.2	21.0	21.6	22.4	23.1	24.1	24.9	25.7	26.6	27.5	28.6	29.7	30.6	580



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