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ADVENTURE AND BEAGLE,

BETWEEN

THE YEARS 1826 AND 1836,

DESCRIBING THEIR

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AMINATION OF THE SOUTHERN SHORES

OF

SOUTH AMERICA,

AND

HE BEAGLE'S CIRCUMNAVIGATION OF THE GLOBE.

G98
F56
Rarebook
F
2936
.F56
1839
Appendix(v.2)

APPENDIX

TO

VOLUME II.

LONDON:
HENRY COLBURN, GREAT MARLBOROUGH STREET.

1839.

National Oceanic and Atmospheric Administration

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APPENDIX

TO THE

SECOND VOLUME.

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MEMORANDUM.

THE greater number of the articles in this Appendix are placed as required for reference while reading the volume to which they belong (vol. ii.); and the arrangement, or rather non-arrangement, of the rest, depended upon circumstances which I could not alter; though quite aware how disorderly the group of documents would appear.

If they should ever require to be reprinted, or even if a part should demand further attention from me, it will be easy to dispose them differently.

DIRECTIONS TO THE BINDER

FOR PLACING THE PLATES.

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ABSTRACT

OF

METEOROLOGICAL JOURNAL.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
November, 1831.					Inches.	Inches.	°	°	°	Lat. Long.
5	9 A.M.					29·60	53			Baths, Devonport.
6	..					29·40	52			..
8	..					29·80	51			..
10	..					29·4	49			..
11	..					30·5	49			..
12	..					30·4	53			..
13	..					30·2	52			..
14	..					30·6	51			..
15	..					30·2	51			On board the Beagle*
16	..					29·9	48			..
17	..					29·9	47			..
18	..					29·8	46			..
19	..					29·9	47			..
22	..					29·95	54			..
23	..					30.05	58			..
24	..					30·06	60			..
25	..					29·98	61			..
26	..					30·03	61			..
27	..					30·05	59			..
December.										
1	..					30·26	55			Barn Pool
2	..					30·4	56			..
3	..					30·17	57			..
5	..					29·9	62			..
6	..					29·7	61			..
7	..					29·3	60			..
8	..					29·4	60			..
9	..					29·5	61			..
9	2·30 P.M.					29·45				..
10	9 A.M.					29·63	63			..
12	..					29·2	61			..
14	..					29·8	63			..
18	..					29·6	58			..
19	10 A.M.					29·8	57	46		..
..	Noon					29·85		48		..
..	3 P.M.					29·9		48		..
27	6 ..	E.	5	g d	30·66	30·54	47	46		At sea, lost sight of Eddystone
..	8 ..		5	c g	30·70	30·52	48	47		
..	10 ..		5	c g	30·73	30·53	49	47		
..	Midt.	S.E.	4	c g q	30·63	30·51	51	48		
28	2 A.M.	..	5	b p	30·62	30·52	50	48		
..	4 ..	S.E. by S.	5	b p	30·65	30·52	50	48		
..	6 ..				30·69	30·46	47	46		
..	8 ..		4	b v	30·66	30·50	50	47		
..	10 ..	S.E.	5	b c y	30·69	30·51	49	48		
..	Noon		5	b c y	30·65	30·51	49	48		48·6 N. 6·47 W.
..	2 P.M.	S.E. by S.	4	c	30·67	30·49	49	48		
..	4 ..		4	o g	30·63	30·47	49	48		
..	6 ..		5	o g	30·64	30·44	50	49		
..	8 ..		5	o	30·62	30·48	50	48		

* Beagle at sea 15th, returned next morning.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
December.					Inches.	Inches.	°	°	°	Lat.	Long.
28	10 P.M.	S.E.	5	c o	30·60	30·48	50	48			
..	Midt.	..	5	c o	30·58	30·44	50	49			
29	2 A.M.	..	5	c o	30·58	30·40	50	48			
..	4 ..	..	5	c o	30·51	30·37	50	49			
..	6 ..	..	5	c o g	30·55	30·40	50	48			
..	8 ..	S.E. by E.	5	c o g	30·54	30·33	50	50			
..	10 ..	..	5	c p	30·53	30·38	52	51	54		
..	Noon	..	5	c o	30·50	30·26	53	51		45·32 N.	9·30 W.
..	2 P.M.	S.S.E.	5	c	30·50	30·31	53	51			
..	4 ..	..	5	b c	30·46	30·29	53	51	54		
..	6 ..	..	5	o g	30·42	30·27	54	50			
..	8 ..	..	5	b c	30·40	30·29	52	51			
..	10 ..	..	5	b c q	30·40	30·24	52	51			
..	Midt.	..	5	b c q	30·36	30·23	52	52			
30	2 A.M.	..	5	c q	30·35	30·24	53	51			
..	4 ..	..	5	c q	30·32	30·21	53	51			
..	6 ..	E.	5	b c	30·32	30·21	53	50		At sea.	
..	8 ..	..	5	b c	30·32	30·21	53	52		..	
..	10 ..	..	5	c q	30·35	30·20	56	53	54 56*	..	
..	Noon	S.E.	5	c p	30·32	30·17	55	53		43·00 N.	12·01 W.
31	..	N.E. by E.	5	b c v	30·32	30·24	58	56	57 58	40·39	13·39
January, 1832.											
1	Noon	E.N.E	2	b c v	30·40	30·32	61	57	60 59	38·24	15·03
2	..	N.W.	6	b c	30·20	30·00	61	59	60	37·29	15·32
..	4 P.M.	N.N.W.	8	m o q	30·11	30·00	58	56	59		
..	Midt.	..	7	g p l	30·22	30·03	59	56			
3	Noon	N.	6	b c q	30·40	30·25	60	59	62 65†	34·38	16·37
4	..	W.N.W.	6	b c q	30·30	30·14	66	65	66	32·58	16·07
5	..	N.W. by N.	4	b c v	30·48	30·38	66	64	68	29·54	16·11
6	..	W.	2	b c v	30·40	30·35	67	66	68	28·28	Off Santa Cruz.
7	..	S.W. by W.	1	b c	30·40	30·34	69	67	68	Santa Cruz. N. 61 W. 12 m.	
8	..	N.E.	2	b c	30·46	30·39	73	69	68	26·45 N.	16·40 W.
9	..	S.S.E.	5	b c v	30·40	30·38	68	67	69 70	25·05	18·18
10	..	S.E.	4	b v	30·20	30·25	71	69·5	70	22·51	20·00
11	..	N.W. by N.	4	b c	30·24	30·17	71	70	71	21·55	20·22
12	..	N.N.W.	2	o l t	30·23	30·17	70	69	69	20·29	21 16
13	..	E.	2	b m	30·18	30·19	73	71·5	71	19·18	22·00
14	..	..	4	b	30·22	30·16	74	71	71	17·30	23·28
15	..	..	5	b m	30·16	30·14	71	70	72 73	15·23	23·46
16	..	..	2	b c m	30·20	30·18	72	71	73 72·5	15·05	23·23
17	..	N.N.E.	5	b c	30·21	30·20	75·5	73·5	72	Port Praya.	
18	..	E. by N.	4	b c q	30·20	30·23	77	75	72·5	..	
19	6 A.M.	N. by E.	4	b c	30·24	30·23	70	68		..	
..	Noon	..	5	b c	30·22	30·22	78	75·5	72·5	..	
20	..	E. by N.	5	b c	30·22	30·28	78	76	72·5	..	
21	..	N.E.	2	b c v	30·20	30·24	80	79	72·5	..	
22	..	N.E by E.	4	b c	30·30	30·27	80	76	73 72·5	..	
23	..	..	4	b c	30·30	30·30	78	76	72·5	..	

* Temperature of water was taken at 10 A.M. and 4 P.M. from this date.

† Black case thermometer used for temperature of water from this date.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat.	Long.
January, 1832.											
24	Noon.	N.E.	5	b c q	30·29	30·31	78	76	71·5 72	Port Praya.	
25	..	..	4	b c q	30·29	30·29	73	73	72	..	
26	..	..	5	b c q	30·24	30·21	73	73	71 72	..	
27	..	..	5	b c q	30·15	30·17	73	72	71·5 72	..	
28	..	..	2	c g q	30·15	30·18	73	71	71	..	
29	..	E.	2	b c q	30·11	30·14	76	74	71·5 72	..	
30	..	..	4	b c	30·16	30·18	75	77	72	..	
31	..	..	2	b c	30·18	30·25	79	80	72	..	
February.											
1	Noon	N.N.E.	5	b c q	30·15	30·24	82	79	72 71·5	..	
2	..	N.	4	o c q p m	30·30	30·32	74	72	71	..	
3	..	N.E.	5	b c q	30·26	30·22	76	75	72	..	
4	6 A.M.	..	5	b c q	30·19	30·20	72	71			
..	Noon	..			30·20	30·21	76	75	72	..	
..	6 P.M.	..	4	b c l	30·20	30·20	75	73			
5	Noon	N.N.E.	4	b c q m	30·19	30·19	73	76	71·5 72	..	
6	..	N.E.	5	b q	30·19	30·22	77	76	72	..	
7	..	..	5	b m q	30·16	30·20	77	76	72	..	
8	..	..	4	b q	30·11	30·15	77	76	72 72·5	Sailed 3 P.M.	
9	..	E.N.E.	4	b c	30·12	30·14	78	77	73·5 74	13·33 N.	25·05 W.
10	..	N.E. by E.	4	b v	30·10	30·14	76	74	75·5 76	11·52	26·34
11	..	E.	4	b c	30·04	30·08	78	77	78 79	9·23	26·46
12	..	..	5	o	30·04	30·06	80	79	80 80·5	6·34	27·32
13	..	..	4	b c	30·00	30·04	83	81	81·5	4·03	27·21
14	..	S.E.	2	o g	30·02	30·07	78	77	82 81·5	2·43	27·50
15	..	S.E. by E.	4	b c v	30·03	30·04	82	82	81	1·15	28.50
16	..	S.E.	1	b c	30·06	30·11	83	82	81 82	Isl. St. Paul N. 71 E. 1½ m.	
17	..	E.S.E.	2	b c	30·09	30·15	82	81	82	0·14 S.	30·08 W.
18	..	S.E.	2	b c q v	30·15	30·19	82	83	81·5	1·30	30·49
19	..	S.E. by E.	4	b c v	30·13	30·21	81	80	81·5 82	3·11	31·47
20	..	S.E.ly	4	b c v	30·12	30·16	83	82	82	Fernando Noronha.	
21	..	..	2	b c	30·14	30·17	84	84	82 83	3·17 S.	32·06 W.
22	..	N.E. by N.	2	b c	30·06	30·13	84	83	82 82·5	4·06	32·03
23	..	E.	1	b c	30·07	30·14	84	83	83 82·5	5·29	32·01
24	..	..	5	b c q	30·03	30·07	82	81	82·5	7·25	31·55
25	..	E.S.E.	4	b c	30·06	30·14	80	80·5	82·5	9·38	32·25
26	..	E. by N.	2	o g	30·10	30·15	81	80	82	11·26	34·01
27	..	E.S.E.	4	b c q	30·10	30·12	83	82	81·5 82	12·41	36·20
28	..	..	4	b c v	30·18	30·23	83	82	81 82	Bahia.	
29	..	S.E.	2	b c q	30·47	30·24	78	78	81	..	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
March, 1832.					Inches.	Inches.	°	°	°	Lat.	Long.
1	Noon.	W.	2	r	30·25	30·28	76	75		Bahia.	
2	..	S.	2	c o	30·26	30·28	78	76		..	
3	..	S.E.	2	o c q r	30·26	30·28	78	74		..	
4	..	N.N.E.	4	b c	30·19	30·29	83	82		..	
5	..	VBLE.	4	b c	30·17	30·22	83	82		..	
6	..	S.E.	4	b c	30·18	30·20	85	83		..	
7	..	..	4	b c q	30·14	30·20	83	82		..	
8	..	..	4	b c	30·14	30·18	82	80		..	
9	..	..	2	b c	30·12	30·19	83	81		..	
10	..	N.	4	b c q	30·14	30·21	82	81		..	
11	..	S.E.	4	b c	30·23	30·26	83	81		..	
12	..	..	2	b c	30·13	30·17	79	77		..	
13	..	..	4	b c q	30·11	30·19	82	80		..	
14	..	..	4	b c v	30·10	30·20	82	80		..	
15	..	N.	4	c o	30·14	30·21	80	74		..	
16	..	S.E.	4	b c	30·19	30·20	83·25	80·5	81 82	13·06 s.	Off Bahia.
17	..	..	4	b c	30·20	30·25	83	82		Bahia Harbour.	
18	..	..	4	b c	30·20	30·22	82	81	83	..	
19	..	VBLE.	2	b c p	30·18	30·18	81	80	82	13·40 s.	38·31 w.
20	..	S.E.	1	b c v	30·12	30·20	84	83	82 82·5	13·29	38·25
21	..	N.N.E.	1	b c	30·19	30·22	84	82	82·25 83	14·20	38·07
22	..	N.E. by N.	4	b c	30·22	30·23	82	81	82 81·5	15·21	37·20
23	..	E.	1	b c	30·18	30·20	83	81·5	81 82	16·28	36·44
24	..	VBLE.	4	b c	30·15	30·18	83	81	81·5 82	17·12	36·19
25	..	..	5	b c	30·14	30·18	84	82·5	81·5 82	18·17	35·34
26	..	S.E. by S.	4	b c	30·19	30·18	83	85	82	18·06	37·04
27	..	E	2	b c	30·25	30·26	83	84	81 81·5	17·43	37·15
28	..	N.N.E.	4	b c	30·24	30·22	84	83	80	18·09	38·22
29	..	E.	4	b c q p	30·28	30·28	83	82	78	Off the Abrolhos Isl.	
30	..	E. by N.	2	b c	30·32	30·30	82	80·5	78	..	
31	..	E.S.E.	4	b c	30·39	30·37	82	81	81·5	19·52 s.	38·36 w.
April.											
1	..	N. by E.	4	b c g q	30·34	30·32	80	78	80 80·5	22·13	38·57
2	..	E.N.E.	4	b c p	30·35	30·32	79	77	80*	23·22	40·53
3	..	E.S.E.	2	b c	30·34	30·34	78	79	75* 76	23·18	42·37
4	..	VBLE.	2	b c	30·32	30·32	82	82	76	Standing into Rio Harbour.	
5	..	..	1	b c	30·27	30·27	80	79	76·5 76	Rio de Janeiro.	
6	..	—	0	b c	30·28	30·20	79	82	76 77	..	
7	..	..	0	b c	30·20	30·20	80	78	76 77·5	..	
8	..	N.E.	2	b c	30·27	30·26	84	83	78	..	
9	..	N.N.E.	1	b c	30·26	30·24	85	82	78	..	
10	..	..	4	b c	30·20	30·22	80	78	77 76	..	
11	..	N.	1	b c m	30·23	30·23	83	85	76 78	..	

* Temp. of water at 10 A.M. 3d April, 5 degrees lower than 4 P.M. 2d April.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
April, 1832.					Inches.	Inches.	°	°	°	Lat.	Long.
12	Noon.	s.	2	b c	30·26	30·24	80	78	76 77	Rio de Janeiro.	
13	..	s.w.	2	b c	30·30	30·30	76	75	75 75·5	..	
14	..		1	b c o m	30·34	30·31	76	75	76 75·5	..	
15	..	N.w.ly.	1	c o g	30·30	30·30	76	74	76	..	
16	..	s.e.	1	b c	30·34	30·26	73	73	75 75·5	..	
17	..	N.e.	1	b c	30·30	30·28	74	72	74·5 75	..	
18	..	s.	2	b c	30·32	30·28	77	76	76	..	
19	..	s.e.	1	b c	30·32	30·25	76	75	76	..	
20	..	N.w.	2	b c	30·17	30·16	76	75	76	..	
21	..	s.e.	1	b c	30·20	30·18	78	77	77	..	
22	..	vble.	2	o g r	30·33	30·29	70	69	75 74·5	..	
23	..	w.	2	b c	30·43	30·35	68	67	73 74	..	
24	..	s. by w.	2	b c p	30·36	30·38	70	69	74	..	
25	..	s.e.	2	b c	30·37	30·26	70	68	75	..	
26	..	s.	2	b c	30·36	30.32	73	72	75 75·5	..	
27	..	N.	2	b c	30·30	30·27	75	73		..	
28	..	s.e.	2	b c	30·25	30·20	76	75		..	
29	8 A.M.		2	b c	30·26	30·23	74	73		..	
..	4 P.M.	s.	2	b c	30·28	30·24	78	77		..	
30	Noon.	w.N.w.	1	b c	30·37	30·34	78	77		..	
May.											
1	..	s.	1	b c p	30·38	30·36	80	79		..	
2	..	—	0	b c	30·38	30·31	78	77		..	
3	..	s.	2	b c	30·20	30·19	79	77		..	
4	..	N.e.	2	b c	30·15	30·14	83	82		..	
5	..	s.	2	o g p	30·35	30·28	73	73		..	
6	..	N.e.	1	c g	30·37	30·32	76	75		..	
7	..	..	2	b c	30·27	30·24	78	77		..	
8	..	s.w.	1	c o p	30·32	30·26	76	76		..	
9	..	..	2	b c	30·33	30·30	73	72		..	
10	..	N.e.	2	b c	30·46	30·38	67	76	74·5	..	
11	..	s.w.	4	b c	30·35	30·33	74	72	74·5	22·52 s.	41·47 w.
12	..	w.s.w.	5	b c	30.32	30·23	74	73	77 78	20·16	39·47
13	..	w.N.w.	3	b c	30·24	30·27	77	76	78	18·29	38·59
14	..	s.s.w.	4	b c	30·31	30·30	77	76	79 79·5	16·55	38·45
15	..	e.s.e.	6	c o q p	30·32	30·26	80	78	80·5	14·23	38·32
16	..	e.	4	b c o	30·30	30·29	80	79		Bahia.	
17	..	s.e.	2	b c	30·33	30·28	82	81		..	
18	..	..	4	b c	30·32	30·30	81	82		..	
19	..	..	2	b c q	30·30	30·29	80	79		..	
20	..	..	2	b c q p	30·28	30·28	81	80		..	
21	..	s.	2	c o r	30·26	30·26	76	74		..	
22	..	w.	2	b c	30·26	30·23	78	77		..	
23	..	e.s.e.	4	b c	30·28	30·26	81	80		..	
24	..	vble.	1	b c o	30·28	30·25	78	76		13·43 s.	38.27 w.
25	..	e. by s.	4	b c	30·27	30·25	79	78		15·10	38·26
26	..	N.w. by N.	4	b c	30·23	30·22	80	79		17·00	38·20
27	..	s. by e.	2	b c	30·23	30·21	77	75·5°		19·18	38·16

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat.	Long.
May, 1832.											
28	Noon.	s. by w.	5	q p r	30·33	30·27	75	70	76·5 76	19·40 s.	38·31 w.
29	..	E.S.E.	1	c o p	30·37	30·35	73	71	77 76·5	19.47	38·31
30	..	N.E.	2	o g r	30·38	30·32	72	70	76·5 76	20·10	38·31
31	..	N.N.E.	4	c o	30·32	30·28	76	74	77	21·03	39·59
June.											
1	..	VBLE.	4	b c	30·29	30·21	75	74	77·5	23·04	40·31
2	..	..	1	b v	30·30	30·28	75	73	74 75	22·56	41·17
3	..	S.E.	1	b c	30·36	30·27	75	76	73·5	23·05	42·41
4	..	N.	1	b c	30·25	30·20	76	75		Rio de Janeiro.	
5	..	—	0	b c	30·32	30·26	75	75		..	
6	..	S.	2	b c	30·27	30·35	81	79		..	
7	..	S.E.	2	b c	30·58	30·50	78	79		..	
8	..	—	0	b c	30·58	30·52	75	85		..	
9	..	S.E.	2	b c	30·56	30·51	76	80		..	
10	..	..	2	b c	30·58	30·50	73	73		..	
11	..	S.E.	1	b c	30·48	30·44	75	75		..	
12	..	N.E.	2	b c	30·52	30·44	75	75		..	
13	..	W.N.W.	2	b c	30·58	30·50	73	72		..	
14	..	—	0	b c	30·36	30·44	76	78		..	
15	..	S.	1	b v	30·52	30·47	74	76		..	
16	..	..	2	b c	30·45	30·35	71	76		..	
17	..	N.w.byw.	2	b c	30·47	30·40	69	70		..	
18	..	—	0	b c	30·40	30·38	74	73		..	
19	..	S.	2	b	30·42	30·30	71	82		..	
20	..		2	b c	30·48	30·38	73	85		..	
21	..	N.	2	b c	30·47	30·39	73	76		..	
22	..	N.E.	2	b c v	30·32	30·25	72	71		..	
23	..	N.	2	b	30·30	30·25	72	71		..	
24	..	—	0	b c	30·38	30·33	76	74		..	
25	..	VBLE.	1	b c	30·50	30·42	75	74		..	
26	..	N.N.W.	2	c m	30·51	30·46	73	72		..	
27	..	VBLE.	1	b c	30·48	30·41	74	74		..	
28	..	—	0	b c v	30·44	30·41	75	75		..	
29	..	N.N.W.	2	b c	30·50	30·45	76	76		..	
30	..	N.E.	1	b c	30·51	30·48	75	82·5		..	
July.											
1	..	S.E.	1	b c	30·50	30·44	74	75		..	
2	..	N.E.	2	b c	30·49	30·40	72	73		..	
3	..	S.S.E.	1	b c	30·43	30·33	70	70		..	
4	..	S.E.	2	b v	30·30	30·30	76	75		..	
5	..	N.	4	b m	30·34	30·28	73	73		Running out of Rio Harbour.	
6	..	S.W.	2	b c m	30·40	30·33	73	71	70·5 74·5	23·22 s.	43·11 w.
7	..	S.w.by s.	2	c o p	30·51	30·41	70	68	72·5 73	23·38	43·23
8	..	VBLE.	2	b c	30·49	30·40	72	69	72 72·5	24·09	43·01
9	..	W.N.W.	1	c o	30·49	30·36	70	68	73 73·5	24·17	43·35
10	..	S.S.W.	4	b c q	30·38	30·32	70	69	74·5	25·01	42·47
11	..	—	0	b c	30·26	30·16	72	70	75	26·01	42·57
12	..	VBLE.	2	b c	30·39	30·28	70	69	73 72·5	26·39	44·08
13	..	S.	2	b c	30·44	30·36	69	68	72·5	27·08	45·44

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
July, 1832.					Inches.	Inches.	°	°	°	Lat.	Long.
14	Noon.	E.N.E.	2	b c	30·46	30·38	71	70	72 72·5	27·20 s.	46·22 w.
15	..	W.N.W.	5	c g r	30·22	30·11	69	67	71	29·48	47·50
16	2 A.M.	S.W.	7	b c g	30·06	30·20	66	64			
..	Noon.	..	4	c o p q	30·32	30·13	64	62	70·5 68·5	30·12	48·03
17	..	N.N.E.	2	b c	30·45	30·35	68	67	68·5 69·5	30·00	48·18
18	..	N.N.W.	6	q	30·39	30·26	69	66·5	71 70·5	31·37	49·17
19	..	—	0	b c	30·38	30·27	68	66	69·5 68·5	33·16	50·10
20	..	S.	4	b c	30·39	30·25	62	59	61·5 61·0	33·47	50·59
21	..		2	b c m	30·33	30·19	63	61·5	59·5 56·5	34·15	52·17
22*	..	VBLE.	4	c o g r	30·20	30·05	60	58	56·5	34·59	53·19
23	..	..	4	o g	30·33	30·12	53	51	56	Cape Sta. Maria. N.42 E.11m.	
24	..	..	4	b c	30·50	30·28	54	52	56	.. N.½E.15m	
25	..	E.	4	b c	30·50	30·30	55	55	56 56·5		
26	..	S.	2	b c	30·46	30·28	57	56	56 58	Monte Video.	
27	..	—	0	b c	30·35	30·23	56	55·5		..	
28	..		4	b c	30·36	30·16	54	53		..	
29	..	E. by S.	5	r	30·56	30·52	51	48		..	
30	..	E.	2	b c	30·60	30·53	55	53·5		..	
31	..	N.E.	2	b c	30·56	30·40	59	57		..	
August.											
1	..	N.	4	b c	30·45	30·27	58	59	56·5 58·5	Off Atalaya Church.	
2	..	N.E.	4	b c	30·32	30·16	61	60	58	Off Buenos Ayres.	
3	..	N.N.W.	5	b c	30·28	30·14	62	60·5	57	Off Point Indio.	
4	..	N.	2	b c	30·28	30·16	66	64		Monte Video.	
5	..	..	4	b c	30·11	30·00	62	59		..	
6	..		2	b c	30·26	30·15	69	68		..	
7	..	S.	1	b c p	30·31	30·20	66	66		..	
8	..	E.	6	c o g h	30·30	30·10	57	54·5		..	
9	..	..	5	g o r	30·10	29·92	56	55		..	
10	..	S.E. by E.	2	o g m	30·29	30·10	58	56		..	
11	..	E.	2	c o h	30·29		57			..	
12	..	..	4	o g r	30·25		55			..	
13	..	..	5	c o g p	30·24		58			..	
14	8 A.M.	S.	1	b c m	30·15	30·01	58	57		..	
..	4 P.M.	..	2	b c	30·13	29·99	61			..	
15	Noon.		2	b c	30·34	30·14	57	56		..	
16	..	S.W.	4	c o r	30·28	30·08	61	60		..	
17	..	..	5	b c q	30·57	30·31	50	47		..	
18	..	S.S.W.	5	b c q	30·64	30·38	47	46		..	
19	..	N.N.W.	5	b c q	30·52	30·27	53	52·5		..	
20	..	N.W. by W.	4	b v	30·53	30·30	57	54·5	54·5 53·5	35·31 s.	56·52 w.
21	..	N.N.W.	2	b c	30·54	30·33	56	58	54·5 56·0	35·27	56·59
22	..	N.W. by N.	4	b c	30·36	30·19	57	55·5	54 56	36·23	56·36

* Thunder and lightning early in the morning.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
August, 1832.					Inches.	Inches.	°	°	°	Lat.	Long.
23	Noon.		4	b c	30·34	30·14	58	55·5	53	37·08 s.	56·49 w.
24	..	N.N.E.	2	b c	30·34	30·23	55	55	53	37·26	56·58
25	..	N.W.	4	b c m	30·10	30·03	60	58	53 54	38·10	57·25
26	6 A.M.	N.E. by N.	2	b c m t l	30·08	29·91	54	54			
..	Noon.	E.	2	g m r o	30·00	29·88	55	53	53	38·28	57·58
..	6 P.M.	E.N.E.	4	c o m r	29·87	29·69	56	54			
27	4 A.M.	S.S.W.	7	g o c q r	29·88	29·68	52	51			
..	Noon.		6	b c	30·10	29·81	51	50	51 50	38·36	57·13
..	8 P.M.	S.	7	b c q	30·24	29·96	49	48			
28	Noon.	E.N.E.	4	g o m	30·43	30·14	52	51	52 52·5	38·27	57·54
29	..	VBLE.	2	c o g r	30·30	30·08	55	52	52 52·5	38·36	57·57
30	4 A.M.	..	1	o g r l	30·11	29.95	53	52			
..	Noon.	..		o g m					53 52·5	38·36	57·58
..	8 P.M.	S.	4	o g r	30·04	29·84	52	51			
31	Noon.	S.W.	5	b c q	30·18	29·96	52	51	52	38·39	58·42
September.											
1	Noon.	S.W.	4	b c	30·52	30·27	52	51	52	38·44	58·35
2	2 A.M.	N. by w.	5	b c	30·50	30·27	48	47			
..	Noon.	N.W.	9	b c	30·32	30·12	59	56	52	38·51	59·13
..	10 P.M.		4	b c q	30.27	30·08	59	53			
3	Noon.	S.E.	4	o g m	30·43	30·17	51	50	51·5	38·53	60·10
4	..	E.	4	o g	30·72	30·42	48	47	50	39·10	61·00
5	..	N.E.	4	o g	30·55	30·30	50	49	50	39·12	61·12
6	..	..	4	o g	30·30	30·10	58	57	51 51·5	Off Blanco Bay.	
7	..	E.S.E.	4	o g m	30·17	29·97	53	51·5	52 52·5	Blanco Bay.	
8	..	S.S.W.	4	b c	30·02	29·84	55	55	52 52·5	..	
9	..	W.	2	o g p	30·13	29·94	54	50·5	51·5 52	..	
10	..	..	2	b c	30·23	30·00	53	53	52 52·5	..	
11	..	N.W.	4	o g q	30·28	30·09	55	55	52 52·5	..	
12	..	..	1	c g	30·29	30·09	55	55	52	..	
13	..	S.E.	5	b	30·47	30·26	54	54·5	52 52·5	..	
14	..	—	0	b c	30·35	30·20	56	56	52	..	
15	..	S.W.	4	c o	30·30	30·11	55	54	52·5 53	..	
16	..		1	b v	30·52	30·37	53	54·5	52·5 53	..	
17	..	N.	4	b c	30·60	30·38	55	54	52 53	..	
18	..	W.N.W.	4	b c	30·44	30·24	61·5	60	52·5 54·5	..	
19	..	N.W.	4	b c m	30·18	30·08	68	67	54·5 56·5	..	
20	..	N.	2	b c	30·07	29·96	67	70	55 56	..	
21	..	W.S.W.	4	b c q	30·08	30·03	60	63	55 56·5	..	
22	..	S.S.W.	2	o g	30·26	30·10	64	65	57	..	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
September, 1832											
23	Noon.	s.wly.		b v	30·44	30·26	58	57	56·5	Blanco Bay.	
24	..	N.N.E.	5	b c q	30·32	30·15	61	61·5	56 56·5	..	
25	6 A.M.	S.S.W.	1	o g		29·90	59·5*	59			
..	Noon.	W.	2	b c q	30.10	29·99	65	64	56·5	..	
..	6 P.M.		2	b c	30·08	29·96	60	60			
26	Noon.	N.W.	4	c o	30·27	30·11	58	57	56 56·5	..	
27	..	W.	2	b c	30·25	30·12	61	61	56·5	..	
28	..	N.W.	2	b c	30·03	29·90	62	62	56·5	..	
29	..	E. b. S.	4	c o m	30·46	30·24	55	53	55 54		
30	..	N.E.	5	b c	30·48	30·21	55	61	54·5	Off Blanco Bay.	
October.											
1	Noon.	—	0	q r l t	30·09	29·85	57	55	54·5 56	..	
..	2 P.M.	VBLE.	2	b c g	29·90	29·72	56	55			
..	Midt.	N.W.b.W.	2	c m l	29·86	29·74	57	56			
2	Noon.	S.W.b.W.	6	m d r	29·99	29·77	58·5	56·5	56	Off Point Hermoso.	
3	6 A.M.	S.S.E.	7	o q	30·44	30·22	49	47		..	
..	Noon.	S.E.	4	b c q	30·61	30·26	50	48	53·5 54	..	
4	..	N.N.W.	5	b c q	29·95	29·89	57	56	54 54·5	..	
5	..	VBLE.	1	b c v	30·16	30·00	57	56·5	54·5 56·5		
6	6 A.M.	N.W.	5	b c m	29·94	29·80	58	56			
..	6 P.M.		4	b c l t	29·77	29·67	67	66	57 58	Blanco Bay.	
7	Noon.	W.	5	b c	30·02	29·93	64	62·5	57·5 57	..	
8	..	S.S.W.	4	b c	30·56	30·38	55	54	57 57·5	..	
9	..	N.	4	b c	30·41	30·29	63	61	58	..	
10	6 A.M.		6	b c q	29·97	29·82	59	57			
..	Noon.	E.N.E.	2	b c	29·99	29·90	65	64	58	..	
11	..	W. b. N.	2	b c	30·06	29·92	60	59	58	..	
12	..		2	b c v	30·16	30·08	61	59·5		..	
13	..	S.S.E.	5	b c q	30·57	30·34	53	51·5		..	
14	..	S. b. W.	4	b c q	30·70	30·44	49	48		..	
15	..		4	b c		30·51	52	45		..	
16	..	—	0	b v		30·45	53	54		..	
17	..	N.	2	b c v	30·32	30·34	62	61·5	56·5 57	..	
18	..	W.N.W.	1	b c	30·26	30·25	66	70	57·5 58	Off Blanco Bay.	
19	..	E.b. N.	1	b c	30·16	30·17	63	62	58·5 58	Off Mount Hermoso.	
20	..	N.	1	b c	30·14	30·16	60	60	55·5 58	39·34	59·37
21	..	N.E.b.E.	4	c o g q	30·03	30·03	57	59	56	39·20	59·02
..	4 P.M.	N.E.	4	o g r t l	29·98	29·96	56	55·5			
22	Noon.		2	c o g	29·88	29·89	56	55·5	52·5 53	39·49	58·24
23	..	N.W.	2	f	30·18	30·13	54	52·5	53 56	38·51	57·10
24	..	N.E.	4	c m	30·22	30·16	55	56	56 56·5	38·11	56·56

* 25th Septr. there was much lightning early in the morning and late at night.

Day.	Hour.	Winds.	Force.	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
							°	°	°	Lat. S.	Long. W.
October, 1832.											
25	Noon.	s. b. e.	5	b v	30·19	30·18	58	59	58·5 61	36·18	56·22
26	..	e.s.e.	2	c	30·36	30·36	60	58·5	61·5	Monte Video.	
27	..		4	b c	30·21	30·25	63	61·5		..	
28	..		4	b c	30·03	30·11	65	62		..	
29	..	w.s.w.	4	b c q r	30·05	30·07	62	56·5		..	
30	..	..	5	b v m	30·08	30·10	63	62	62 62·5	..	
31	..	n.n.w.	4	b c v	30·15	30·20	67	65	63 64·5	35·22	Pt. Piedras.
November.											
1	Noon.	w. b. n.	1	b c	30·05	30·13	69	67·5	67 68·5	35·47	Off Ensenada.
2	..		4	b c	30·02	30·05	71	70	71	Off Buenos Ayres.	
..	6 p.m.	n.n.e.	5	o g r q l t	30·00	30·06	67	65·5			
3	2 a.m.	e.n.e.	4	g r l	30·00	30·04	65	64			
..	Noon.	n.e.	6	c g q	30·01	30·08	68	64		..	
4	..	..	4	c o	29·95	30·06	71·5	69·5		..	
5	..	..	4	b c v	29·91	30·04	74	74		..	
6	6 a.m.	e.n.e.	4	c g q	29·86	29·95	69	69		..	
..	Midt.	vble.	5	o g r t l	29·76	29·86	68	66·5		..	
7	Noon.	w.n.w.	1	c g	29·78	29·94	73	71		..	
8	..	n.w.b.w.	2	b c	29·81	29·95	71	69		..	
9	..	s.w.	1	b c	29·95	30·12	72·5	70		..	
..	6 p.m.		2	o g q r l t	29·92	30·07	69	68			
10	Noon.	s.s.w.	4	b c g	29·28	30·30	62	60		..	
11	..	s s.e.		b c	29·37	30·38	57	56·5	67·5 69	34·41	57·45
12	..	n.e. b. n.	4	b c	29·38	30·44	64	63	68·5 68	34·45	57·28
13	..	e.	4	b c	29·41	30·45	64	64·5	64·5	35·08	56·35
..	6 p.m.	vble.	7	b c q	30·33	30·34	64	63·5			
14	Noon.		5	b c	30·20	30·28	66	64	64 64·5	Monte Video.	
15	..	e.s.e.	2	b c	30·03	30·16	72	68·5		..	
16	..	s.w.	4	b c	30·02	30·09	67	65		..	
17	..	..	5	c g q	30·04	30·05	60	57·5		..	
18	..	s.s.w.	4	b c	29·99	30·04	63·5	60		..	
19	..	s.s.e.	1	b c	29·90	30·05	60	67		..	
20	..	s.e.b. e.	2	b c	29·98	30·12	70	68		..	
21	..		1	b c v	30·15	30·28	70	67·5		..	
22	..	s.e.	2	b c v	30·25	30·31	67·5	65		..	
23	..	s.	1	b c v	30·14	30·28	70	68·5		..	
24	2 p.m.	e.	4	b c v	30·03	30·22	74	73·5		..	
25	Noon.	n.w.b. n.	2	b c	29·90	30·19	76	75		..	
26	..	s.w.	4	b c	29·70	29·98	80	78		..	
..	Midt.	s.e.	6	o g q l	29·62	30·00	73	72	79		
27	Noon.	..	4	o g	29·90	30·00	62	61	73	..	
..	Midt.		4	b c q l	30·00	30·09	64	62	71		
28	Noon.	s.e. b. e.	4	b c v	30·10	30·18	64·5	64	70	34·52	
29	..	e.	1	b c v	30·22	30·35	66	64	69	35·25	56·08
30	..	n.	4	b v	30·09	30·18	66	67	61·5	37·42	56·18
December.											
1	Noon.	n.n.w.	4	b c	29·94	30·04	66	67	60 61	39·20	58·10
..	Midt.	..	6	o c g q l	29·78	29·92	64	63			
2	Noon.	s.e.	5	b c q	29·87	29·96	62	61	60·5 60	40·03	59·43
3	..	s. b. w.	1	b v	29·92	30·04	65	65	64·5	40·22	61·48

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
December, 1832.											
4	Noon.	W.N.W.	4	b c v	29·70	30.00	77	75	64·5 66	40·48	62·06
5	..	S. b. W.	4	b c	29·70	29·81	64	63·5	61 62·5	42·16	61·26
6	..	W.S.W.	2	b c	29·67	29·73	65	64	61·5	42·54	61·20
7	..	VBLE.	4	b c v	29·72	29·80	64	61	60 60·5	43·34	61·22
8	..	W. b. N.	4	b c m	29·88	29.92	62	60	58·5	44·52	62·01
9	..	W.	5	b c	29·68	29·82	61	60·5	56·5 57	46·17	63·22
10	..	N.W.	5	b c	29·52	29·53	61	57	54 55	48·21	64·02
11	..	S.W.b.W.	6	b c m q	29·12	29·05	54	52·5	51 49·5	51·03	65·05
..	Midt.	W.S.W.	7	b c	29·41	29·30	47	46			
12	Noon.	..	7	b c q	29·59	29·48	47	46·5	49	50·36	65·28
13	..	S. b. W.	5	b c q	29·92	29·79	48	46	49 50	50·32	65·48
14	..	S.W.	1	b c	29·40	29·40	55	54	48 50·5	51·58	66·53
15	..	VBLE.	2	b m	29·51	29·47	46	45	45·5 47	53·01	67·18
16	..	N.W.	4	b c	29·62	29·65	49	49	48	53·47	Cape Peñas, S.22 E.3 m.
17	..		5	b c q	29·18	29·10	54	54	48·5 48	54·34	Off Cape San Vicente.
..	Midt.	S.	6	c o g q	29·28	29·32	44				
18	Noon.	S.E.	4	b c o g	29·50	29·36	49	46	47·5 46·5	Good Success Bay.	
19	..	S.W.	4	b c q	29·92	29·84	53·5	51·5	47 48	..	
20	..	W.	2	b c	29·81	29·75	58	56	48·5 49	..	
21	..	S.E.	4	b c	29·99	29·91	49	49	48	55·00	Off Valentyn Bay.
22	..	N.W.	4	b c	29·86	29·77	53	51	48 48·5	55·51	
..	10 P.M.	W.	7	b c g r q	29·72	29·62	49	47			
23	Noon.	..	5	o g q r	29·66	29·54	47	45	46·5	56·27	68·00
24	..	S.W.	5	b c g	29·70	29·60	47	46·5	47·5	San Martin Cove.	
25	..	..	4	b c	29·71	29·62	54	51	48	..	
..	Midt.	..	7	b c q	29·48	29·46	52	51		..	
26	Noon.	S.	2	c g q	29·59	29·49	47	45·5	47	..	
27	..	W.	2	o c m	29·72	29·59	47·5	45	47	..	
28	..	W.S.W.	4	c g q	29·94	29·81	45	43	46·5	..	
29	..	..	4	o g q p	29·56	29·47	48·5	47	47 47·5	..	
30	4 A.M.	S.	6	o q	29·34	29·22	47	45·5		..	
..	Noon.		1	o d	29·65	29·53	44	42	47 47·5	..	
31	..	W.	4	c o g	29·50	29·41	50	47	48·5 48	Cape Spencer, N.5 m.	
January, 1833.											
1	..	VBLE.	5	c o q	29·52	29·38	47	46	47 48	Off Diego Ramirez.	
2	..	W.	7	b c q	29·30	29·20	47	46	47	..	
3	..	S.W.	1	o c g	29·32	29·16	43	44	42 43·5	57·03	69·16
4	..	W.	2	c o	29·38	29·23	45	44	44 43·5	56·48	69·32

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
January, 1833.											
5	Noon.	W.	4	b c q p	29·56	29·41	44	45·5	45 48·5	56·22	69·34
6	..	..	6	o c g q	29·80	29·64	50	48	49 45·5	56·15	69·23
7	..	W.N.W.	2	c o m	29·44	29·32	48	46	45·5 46·5	56·42	70·57
..	Midt.	..	8	b c q p	29·26	29·12	46	45			
8	2 A.M.	N.E.	10	c g q h p	29·25	29·07	42	43			
..	Noon.	W.N.W.	7	b c q	29·41	29·26	46	45·5	44·5 44	57·06	71·31
9	6 A.M.	..	7	c o q g	29·46	29·28	44	43			
..	Noon.		5	b c	29·56	29·36	45·5	44·5	44	57·18	71·07
10	8 A.M.	N.W.	8	o g q	29·23	29·08	45	44			
..	Noon.			b c m q	29·38	29·25	47	46	46	56·37	71·09
..	4 P.M.	W. b. S.	8	b c q	29·44	29·29	45	44·5	45·5		
11	Noon.	S.W.	7	b c q p	29·44	29·26	47	45·5	48	55·47	70·08
..	Midt.	W. b. S.	8	b c q p	29·58	29·43	45	43·5			
12	2 A.M.	..	7	b c q	29·58	29·42	45	44			
..	4 ..	..	6	b c q	29·58	29·42	46	44·5			
..	6 ..	..	7	o g r q	29·57	29·40	46	45			
..	8 ..	..	7	o g q r	29·52	29·37	46	45			
..	10 ..		8	c o g q	29·49	29·29	46	45	47·5		
..	Noon.		7	c o r g u	29·44	29·26	47	45		56·09	69·20
..	2 P.M.	N.W.	8	c o q r	29·32	29·14	48	46·5			
..	4 ..		10	c o q r	29·26	29·14	47	46	46·5		
..	6 ..		7	c o q r	29·26	29·10	47	46			
..	8 ..		7	c o q r	29·23	29·04	47	46			
..	10 ..		10	b c q	29·16	29·04	46	45			
..	Midt.		10	b c q	29·16	29·04	47	46			
13	2 A.M.		11	o g q h r	29·14	29·00	47	46			
..	4 ..		11	o g q p	29·14	28·98	47	46			
..	6 ..	W.S.W.	10	o g q p	29·17	28·91	47	45			
..	8 ..		10	o p g q	29·20	29·00	46	45			
..	10 ..		11	o c g q r	29·25	29·04	46	44	48		
..	Noon.		11	o c g q p	29·30	29·14	46	44		56·20	69·10
..	2 P.M.		11	b c p	29·37	29·14	47	46			
..	4 ..		11	b c p q h	29·40	29·24	47	46	47·5		
..	6 ..		8	b c q p h	29·40	29·28	47	46			
..	8 ..	S.W.	6	b c q	29·40	29·20	47	46			
14	4 A.M.	N. b. E.	2	b c	29·06	28·97	47	45·5			
..	8 ..	W.S.W.	6	b c q	28·93	28·89	54	52·5			
..	Noon.		10	b c q	28·89	28·90	55	53·5	48·5	Windhond Bay.	
..	4 P.M.	S.W.	8	b c q p	29·14	29·12	48	47	48·5		
..	8 ..		4	b c q p	29·34	29·24	46	45			
15	Noon.	..	6	b c q p	29·74	29·66	52	50·5	48·5 50	Goree Road.	
16	..	N.W.b.W.	4	b c	29·78	29·74	56·5	55	51·5 50	..	
17	..	S.W.	6	b c q p	30·06	29·96	49	46·5	50	..	
18	..	S.	1	b c	29·57	29·54	55	53	49 49·5	..	
19	..		7	b c		29·60	50	47·5	48·5 49·5	..	
20	..		5	b c q		29·87	48	45·5		..	
21	..	S.W.	1	c m p		29·84	53·5	51·5	50 50·5	..	
22	..	N.N.W.	5	b c		29·74	68	63·5	52 54	..	
23	..	S.W.	1	b c		29·50	62	60·5	50·5 54	..	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
					Inches.	Inches.	°	°	°	Lat. S. Long. W.
January, 1833.										
24	Noon.	S.	2	c m q d		29·70	52·5	51	51 50·5	Goree Road.
25	..	N.W.	2	b c p		29·80	52·5	50·5	50·5 51·5	..
26	..	S.W.	5	b c		30·18	54	53	51 52	..
27	..	N.W.	4	b c		30·15	62·5	59	52 55·5	..
28	..	S.E.	2	b c		30·00	60	59·5	53·5 55·5	..
29	..	N.	1	c o q		29·88	67	64	53·5 55·5	..
30	..	..	2	c m		29·52	62	59·5	53·5 55·5	..
31	..	N.W.	5	b c		29·52	62	59·5	53 55	..
February.										
1	Noon.	S.S.W.	4	c g r		29·46	54	52·5	52 52·5	..
2	..	N.W.	5	b c q		29·33	61	58	52·5	..
3	..	..	4	b c		29·17	61	57·5	51 52	..
4	..	S.S.W.	5	b c		29·44	53	51·5	50·5 51·5	..
5	..	—	0	b c r		29·57	50	47	51·5 51	..
6	..	N.N.E.	2	c g r		29·35	51·5	49·5	51 51·5	..
7	..	W.	4	b c q		29·38	61·5	59·5	51·5 52	..
8	..	S.W.	5	b c p	29·40	29·36	48·5	46	51·5 51	..
9	..	..	5	c q		29·44	52·5	49·5	50·5	..
10	..	N.W.	2	o g r	29·17	29·18	55	54	50·5 52	Windhond Bay.
11	..	S.W.	5	b c q	29·09	29·07	51	48·5	49·5 50	Nassau Bay.
12	..	S. b. W.	4	b c q	29·38	29·34	50	48	49 50	Packsaddle Bay.
13	..	N. b. E.	1	b c	29·63	29·62	52·5	50	50 50·5	..
14	..	VBLE.	1	b c	29·62	29·62	53·5	51·5	51	..
15	..		4	c m p d	29·50	29·46	50	48	50 50·5	..
16	..	—	0	c g	29·73	29·68	49·5	47·5	50·5	..
17	..	N.E.	2	b c g	29·98	29·94	53	50·5	50·5 51	..
18	8 A.M.	VBLE.	1	b c o	29·67	29·59	54	54		Gretton Bay.
..	4 P.M.	S.S.W.	5	b c o	29·76	29·76	51	52	51·5 51	..
19	Noon.	W. b. N.	1	b c	29·80	29·81	56·5	53·5	51 52	..
20	..	W.	5	b c q p	29·62	29·55	45	43·5	49·5 50	..
21	2 A.M.	S.W.	5	o q p h	29·60	29·57	40	38·5		..
..	Noon.	..	7	b c q p	29·58	29·58	46	44	50 49·5	Oglander Bay.
22	..	..	4	b c p	29·55	29·56	53·5	52	49·5 50·5	Good Success Bay.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
February, 1833.											
23	Noon.	w.s.w.	4	o g p	29·48	29·46	54	51	50 50·5	Good Success Bay.	
24	..	..	1	c g	29·50	29·50	53	50·5	50	..	
25	..	s.s.w.	6	b c q	29·22	29·23	52·5	50·5	50	..	
26	..		5	b c	29·36	29·27	50	49	48 47	54·15	64·27
27	2 P.M.		1	b c	29·75	29·70	44	43	46 47	53·18	63·20
28	Noon.	w.b.s.	5	b c q p	29·31	29·20	49	48	46 46·5	53·20	58·34
March.											
1	..	s.s.w.	4	b c o	29·46	29·45	46	46		Berkeley Sound.	
2	..	s. b. w.	4	c o q p	29·19	29·16	51	47·5	50·5	..	
3	..	w. b. s.	4	c g q	29·19	29·22	56	53·5	51	..	
4	..	w.	4	b c	29·56	29·61	53	51	50·5	..	
5	..		6	b c q	29·57	29·60	54	52	50	..	
6	..	s.w.	5	b c q	29·95	29·93	48·5	46·5	49·5	..	
7	..	w.	4	c g q	29·81	29·81	51·5	48·5	49·5 50	..	
8	6 A.M.	s.e. b. e.	4	c r	29·01	29·00	46	43·5		..	
..	Noon.	s.s.e.	6	c q m r	29·18	29·15	47	43·5	49 48	..	
9	..		4	b c q p	29·51	29·55	48	47		..	
10	8 A.M.	w.b. s.	4	b c q p	28·84	28·85	41	40		..	
..	Noon.	s.s.w.	6	b c q p s	29·00	28·86	41	38	47	..	
..	6 P.M.	s.	11	b c q h	29·09	29·06	40	37·5		..	
11	Noon.	w.	6	c q	29·58	29·56	46·5	45	47·5	..	
12	..	s.w.b. s.	2	b c	29·65	29·64	51·5	48·5	47·5	..	
13	..	n.	1	b c	29·79	29·76	52·5	50·5	48 48·5	..	
14	..	w.b.n.	4	c g q	29·13	29·22	57·5	55	49·5 50	..	
15	..		2	b c	29·10	29·22	61	58	50 50·5	..	
16	6 A.M.	w.s.w.	4	b v	29·56	29·54	43	42·5		..	
..	Noon.	w.b. s.	9	b c q	29·49	29·54	54	52	49·5	..	
..	6 P.M.	..	6	b c q	29·52	29·56	52	50·5		..	
17	Noon.	w.s.w.	5	b c	29·71	29·76	55·5	52·5	49·5	..	
18	2 A.M.		6	c t l r							
..	Noon.	n.w. b. n.	6	b c m q	29·01	29·06	53·5	51·5	50 49·5	..	
19	..	w. b. s.	5	b c	29·16	29·16	53	50·5	49·5	..	
..	Midt.		4	b c	28·64	28·72	47	46		..	
20	2 A.M.	s.s.w.	9	b c q r d	28·86	28·86	41	40		..	
..	Noon.	s.w.	6	b c q	29·26	29·21	46	43·5	48 48·5	..	
21	..	—	0	b c	29·58	29·55	47·5	45·5	48·5 49·5	..	
22	..	e. b. s.	4	c g r	29·74	29·71	46	43	48	..	
23	..	s.s.w.	5	b c g	29·96	29·93	47·5	46	48	..	
24	..	w.	4	b c	30·15	30·15	49	47	48	..	
25	..	n.	2	c g	29·73	29·75	50	49	48·5 49	..	
26	..	w.b. s.	5	b c q	29·41	29·43	50	48	48	..	
27	..	s.s.e.	1	b c	29·48	29·48	46	44·5	47·5	..	
28	..	w.b. s.	5	b c	29·46	29·45	45·5	44	47 47·5	..	
29	..	..	4	b c p	29·38	29·39	48·5	47	48 47·5	..	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
March, 1833.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
30	Noon.	w.s.w.	6	b c q h	29·32	29·28	43·5	41	46·5	Berkeley Sound.	
31	..	s.w.b.w.	6	b c q	29·40	29·27	43	40·5	46·5	..	
April.											
1	Noon.	s.w.	4	b c	29·95	29·82	45	43	46	..	
2	..	w. b. s.	2	b c	30·00	29·93	46	44	46 46·5	..	
3	..	..	2	b c	29·85	29·74	46·5	45	46·5	..	
4	..	s. b. w.	4	o g p h	30·04	29·92	41	39	45	..	
5	..	s. b. e.	5	b c	30·20	30·07	44·5	43	45	..	
6	..	s. b. w.	4	b c q p r h	30·28	30·15	44	42·5	46	..	
7	..	N.E.	5	c o q	29·90	29·75	45	43	47	50·28	59·10
..	6 P.M.	..	12	c q t	29·32	29·20	42	40			
..	Midt.		4	c o p r	28·20	28·90	44	44			
8	4 A.M.	s.e.	8	c o q	28·06	28·94	45	42			
..	8 ..	..	4	c o g q	28·26	28·48	43	42			
..	10 ..	..	9	b c q	28·29	28·60	46	45			
..	Noon.	..	7	b c q	28·73	28·50	45	42		49·04	59·55
..	2 P.M.	..	10	o c q	28·86	28·76	46	42			
..	4 ..		8	o c q	28·90	28·74	45	42			
..	8 ..	s.w.	6	c o	29·60	28·96	43	41			
9	Noon.	s.e.	4	b c p	30·36	30·24	45	43	48 50	47·12	61·36
10	..	w.s.w.	1	b c v	30·62	30·54	51	48·5	53 54·5	45·15	62·50
11	8 A.M.		7	o c g q	30·27	30·17	54	53			
..	Noon.	N.N.W.	5	b c	30·12	30·02	56	54	54	44·59	63·01
..	8 P.M.	N.W.	4	b c	29·98	29·94	55	55	54·5		
12	Noon.	s.e.	6	c o p	30·22	30·12	53	51	56·5 57·5	43·01	62·20
13	..	vble.	4	c o	30·28	30·22	55	53	58 60	River Negro.	
14	..	N.E.	4	b c	30·30	30·22	56	54	59 59·5	41·08	62·37
15	..	..	2	b c	30·17	30·14	57	56	58·5 61	41·16	62·52
16	..	vble.	5	b c	30·41	30·38	54	53	59	41·58	64·33
17	..	N.	1	b c	30·23	30·20	58	55	59·5	42·23	64·19
18	..	N.W.	4	b c	30·20	30·18	60	60	60 60·5	41·46	62·32
19	..	..	5	b c	29·92	29·96	63	62	60 60·5	41·19	63·38
..	Midt.	N.W.b.N.	6	b c q	29·73	29·73	65	65			
20	4 A.M.		8	c o g q l	29·70	29·65	65	62			
..	Noon.	s.w.b.w.	6	b v	29·76	29·70	65	64	60·5 60	40·41	60·34
21	..	N.N.W.	4	b c m	30·03	30·03	61	61	57·5 57	39·33	58·15
22	..	N.W.	4	b c m	29·72	29·70	63	62	58·5 59·5	37·49	58·11
23	..	W.	4	c o	29·94	29·92	62	60	58·5	37·56	56·20
24	10 A.M.	N.E.	6	c o g t l r	29·80	29·78	64	62			
..	Noon.		5	c g r	29·68	29·68	63	61		36·56	55·36
..	2 P.M.	N.E. b.E.	8	o c r p q	29·56	29·60	64	62	61·5		
..	10 ..	—	0	o g l t r	29·56	29·64	65	63			
25	4 A.M.	..	0	o g l p	29·64	29·70	64	62			
..	Noon.	vble.	4	c o	29·82	29·82	63	60	60 63·5	37·07	55·27

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
April, 1833.					Inches.	Inches.	°	°	°	Lat. S. Long. W.
26	Noon.		4	o c	30·21	30·15	61	57	64 62	Monte Video.
27	..	S.S.E.	5	o c q	30·34	30·32	57·5	55·5	61·5 61	..
28	..		4	b c	30·45	30·43	60	58	64	Maldonado.
29	..	N.N.E.	4	c g r	30·35	30·37	66	64	64·5 64	..
30	..	S.S.E.	4	c o	30·19	30·20	65	64	63·5	..
May.										
1	..	N.	1	b c	30·18	30·21	69	67·5	64·5 65·5	..
2	..	N.N.E.	1	b c g	30·12	30·16	67·5	65	65 64·5	..
3	8 A.M.	N.	2	b c o l t	30·06	30·10	68	65		..
..	Noon.	VBLE.	1	b c p o t	30·05	30·12	71	68·5	63·5	Monte Video.
..	6 P.M.		0	c o p l	30·05	30·11	67	64·5		..
4	Noon.	N.N.W.	5	b c	29·95	30·02	76	72·5	65	..
5	..	..	5	b c	29·90	29·93	77	75		..
6	..	N.	5	c q r l t	29·78	29·87	70	67	64·5	..
7	2 A.M.	S.S.E.	8	o c q p g	29·97	29·97	62	60·5		..
..	Noon.	S.E.b.S.	5	b c g q	30·29	30·26	63	61	63·5 63	..
8	..	S. b. E.	4	b c	30·48	30·47	58·5	56·5	62	..
9	..		4	b c	30·44	30·44	58	56		..
10	..	S. b. W.	4	b c	30·32	30·32	58	56	60	..
11	..	W.N.W.	2	b c g	30·33	30·31	58	58·5	58·5	..
12	..	N.W.	4	b c	30·15	30·14	59	60		..
13	..	VBLE.	1	b c	30·13	30·19	63·5	67		..
14	..	N.E. b. E.	4	c g	30·04	30·05	64	62	58·5	..
..	6 P.M.	..	5	o c q l	29·91	29·97	63	61·5		..
15	Noon.	N.N.E.	2	b c p	29·48	29·57	65·5	63·5	59·5	..
..	6 P.M.	N.N.W.	6	c q r l	29·45	29·52	63	61	62	..
16	Noon.	S.W. b. W.	5	b c q	29·82	29·79	59·5	58	60	..
17	..	S.E. b. S.	1	b c g	30·09	30·07	59	57·5	59 59·5	..
18	..	S.W.	4	c o	30·14	30·12	61	59	61	Maldonado.
19	..	W.S.W.	4	b v	30·32	30·32	60	58	60	
20	..	N.N.W.	4	b c v	30·32	30·32	64	62·5	58·5 60·5	
21	..	N.	5	b c	30·40	30·37	67	65	58·5 60·5	Monte Video.
22	..	..	2	b c	30·34	30·37	69	65·5	60·5 63	..
23	..	N.E.	4	b c m	30·33	30·39	64	62	61 62·5	
24	..	..	4	b c v	30·38	30·42	67	65·5	62 64	Maldonado.
25	..	N. b. W.	2	b c	30·29	30·34	70·5	68	65 65·5	..
26	..	N.N.W.	5	b c	30·19	30·26	72	70·5	65 65·5	..
27	..	N.W.	4	b c	30·20	30·23	73	70	65 66	..
28	..	S.	1	b c	30·17	30·23	67	67·5		..
29	6 A.M.	N.	5	c g t l r	29·96	30·04	63	61		..
..	Noon.	N.W.	2	c g	29·93	29·98	65	62		..
..	6 P.M.	W.S.W.	2	c g d	29·97	30·03	64	62·5	64·5	
30	Noon.	S.E.b.E.	7	b c q g	30·13	30·15	63	61·5	63	..

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
					Inches.	Inches.	°	°	°	Lat. S. Long. W.
May, 1833.										
30	6 P.M.	E.	7	b c q	30·14	30·18	62	60·5		Maldonado.
31	Noon.	E.b. N.	6	o c m	30·17	30·21	65	63		..
June.										
1	6 A.M.	N.E.b. E.	10	o c m q	29·94	30·01	62	61	64	
..	Noon.	N.E.	9	o c q w m	29·90	29·95	65	63	64	..
..	6 P.M.	N.E. b. N.	4	c g r	29·81	29·89	65	63	64·5	
2	6 A.M.	S.W. b. S.	8	c g q r	29·94	29·95	58·5	55·5		
..	Noon.	S.W. b. W.	6	b c g	30·02	30·03	61	59	63·5	..
..	6 P.M.	W. b. S.	5	b c	30·10	30·10	59	58		
3	Noon.	W.	2	b c	30·22	30·24	62	69	62·5	..
4	..	E.	5	c g	30·22	30·24	61	59·5	61 61·5	..
5	..	S.E. b.E.	5	o g q r	29·94	29·95	58	56·5	62·5	..
6	..	S.S.E.	6	o g q m	29·84	29·86	61	59·5	62·5	..
..	8 P.M.	..	7	o g q d	29·88	29·92	59	58		
7	Noon.	W. b. S.	4	b c	29 97	29·98	60	60	60·5	..
8	..	W.	2	b c	30·06	30·08	59	58	59 59·5	..
9	..	N.W.	2	o g	29·72	29·74	56	54	58	..
..	2 P.M.	..	2	c g	29·66	29·68	57	56	59	
10	8 A.M.	W.	11	b c q	29·86	29·84	50·5	50		
..	Noon.	W. b. S.	10	b c q	29·96	29·94	53	51·5	56·5	..
..	4 P.M.	W.S.W.	10	o c g q	30·04	30·01	54	52·5		
11	Noon.	W.	1	b c	30·32	30·28	49	51	56·5	..
12	..	N.N.E.	2	b c	29·96	29·96	53·5	53	55·5	..
..	Midt.	W.	4	b c l	30·09	30·03	58	56	56	
13	Noon.	S.W.	4	b c m	30·21	30·20	60	58·5	56 56·5	..
14	..	N.	1	b v	30·32	30·32	60	60	56	..
15	..	N.N.E.	2	o g	29·90	29·92	61	59	59	..
16	..	S.W.	5	b c q	30·21	30·21	55	54	56·5 56	..
17	..	E.S.E.	1	b c	30·44	30·43	52	51	56·5 55	..
18	..	N.W.	4	b c	30·34	30·29	54	52	54	..
19	..	..	4	b c	30·25	30·22	59	58	53 54	..
20	..	..	2	b c	30·19	30·20	69	66	54·5	..
21	..	W. b. S.	1	b c v	30·32	30·32	61	61	54·5 55·5	..
22	..	N.	2	b c v	30·30	30·31	72	67·5		..
23	..	..	2	c o p	30·23	30·25	60	58	54·5	..
24	..	N.N.W.	5	b c	30·04	30·08	70	69	58	..
25	..	S.	2	o c q p	30·02	30·14	62	60	56·5	..
26	..	N.	2	b c g	29·98	30·02	60	59		..
27	..	W. b. N.	5	b c q	30·16	30·16	54	57	54·5 56	..
28	..	W.N.W.	4	b c	30·10	30·12	60	58		..
29	..	VBLE.	2	b c q	29·88	29·95	60	60	55 55·5	..
30	..	S.S.E.	4	o g	30·06	30·09	54	53	54·5 54	..
July.										
1	..	S.S.E.	6	o q g	30·17	30·14	54	52	54·5	..
2	..	S.	4	b c	30·33	30·34	52	51	53·5	..
3	..	S.E.	2	g o	30·48	30·46	54	53	52·5	
4	10 A.M.	S.W.	2	o r	30·34	30·43	48	47	51·5 52	..

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
July, 1833.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
5	Noon.	S.W.	5	b c	30·35	30·31	50	48	51 52·5	Maldonado.	
6	8 A.M.	..	2	b c g	30·40	30·36	47	46	51	..	
7	Noon.	S.E.	4	o c p	30·27	30·27	53	51	51	..	
8	..	..	5	b c	30·46	30·44	51	50	51	..	
9	..	..	5	o g	30·36	30·32	50	48	49·5 49		
10	8 A.M.	S.	5	o g q d	30·30	30·26	47	45·5		Monte Video.	
11	Noon.	S.W.	5	o c g	30·26	30·22	48	47·5	47·5	..	
12	..	W. b. S.	5	b c v	30·44	30·40	48	47		..	
13	..	W.N.W.	4	b c v	30·42	30·40	53	55	46·5	..	
14	..	N.W. b.W.	5	b c	30·29	30·30	54	55	49 50·5	Maldonado.	
15	..	W.N.W.	4	b c	30·16	30·20	58	60	49·5	..	
16	6 A.M.	N.	1	b c	30·10	30·15	50	49	51 52	..	
17	8 ..	S.E.	4	b c m	30·28	30·32	51	50	50·5	..	
18	Noon.	S.W.	1	c f	30·12	30·14	58	57·5	52	..	
19	..	E.	1	b f f	30·25	30·30	51	50	50 50·5	34·55	54·29
20	..	N.	5	b c	30·15	30·16	55·5	55	50	35·14	53·17
21	..	N.E.	4	b m	29·97	30·03	56	56	52 54·5	34·56	
22	..	N.	4	b c q	29·82	30·90	62	61	53 54·5	Maldonado.	
..	Midt.	N.E.	4	b c q l	29·58	30·74	64	63			
23	Noon.	W.	5	o g q p	29·64	30·68	56	54·5	52·5	..	
24	..	N.	4	b c	30·02	30·05	55	53	52	..	
25	..	S.	4	o g d m	29·95	29·95	53	51	51 51·5	35·28	
..	6 P.M.	S.S.W.	7	b q p	30·04	30·01	52	51·5			
26	Noon.	..	4	b c	30·39	30·39	50	49·5	51	35·33	
27	..	W. b. N.	4	b c q	30·34	30·35	49	48	46·5 45·5	35·57	
28	..	N.W.	4	b c	30·29	30·24	48	47	44·5 45	38·09	
29	..	W.	4	b c	30·06	30·01	48·5	48	45 46	39·54	
30	..	N. b. W.	5	b c q	29·88	29·80	49	48·5	46 45·5	40·55	
..	8 P.M.	S. b. W.	7	b c q	29·98	29·89	46	45			
31	Noon.	VBLE.	1	b c	30·21	30·18	48	50	45·5	40·56	
August.											
1	Noon.	N.W. b. N.	7	b c q m	29·86	29·82	50	48	48·5 50	41·19	
2	..	W. b. S.	2	b c	30·10	30·10	54	53·5	51·5 52	41·24	
3	..	N.E. b. N.	4	b c	30·12	30·11	54	53	49·5 50	Off River Negro.	
4	..	N.W.	2	b c	29·93	29·93	52	50·5	49		
5	..	S.			30·18	30·12	52	50	46 48·5	41·02	
6	..	—	0	b c	30·28	30·30	52	51	48·5 49	40·21	
7	..	E. b. N.	2	b c	30·25	30·30	51	49	47·5 48·5	40·08	
8	..	W.N.W.	4	b c	29·98	30·02	53	51·5	51	41·18	
9	..	S.	4	o c g	30·08	30·08	48	48	52 51	41·14	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
August 1833.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
10	10 A.M.	S.W.	1	o g	30·04	30·01	44	43	51 51·5	Off Port San Antonio	
11	Noon.	S.S.E.	4	b c	30·10	30·10	47	46	51 51·5		
12	..	N.W.	4	b c	30·10	30·10	47	48	50·5 48	41 12	
13	..	E. b. N.	4	b c	30·08	30·12	47	46·5	48·5 50	Off River Negro.	
14	..	N.N.W.	6	o g q p	29·67	29·65	49	48·5	50	42·10	63·00
15	..	S.E. b. E.	6	o g r	29·72	29·67	47	46	50	41·40	61·58
16	..	N.W. b. N.	4	b c	29·93	29·83	47	46·5	50	41·27	Off River Negro
17	8 A.M.	S.S.W.	9	o g q m	29·68	29·63	49	47·5	49·5		
..	Noon.	S.	6	o g q p	29·84	29·82	49	48	49		
18	..	N.N.W.	5	o g r	30·07	30·03	45	43	49·5		
19	..	N.	2	o g	29·76	29·76	50	50	49		
20	..	W.	2	b c	29·83	29·82	50	49·5	49·5	41·08	
21	..	N.W. b.W.	5	b c q	29·94	29·90	53	51·5		39·54	
22	..	W.S.W.	2	c g	29·96	29·95	50	49	49·5 49	39·03	
23	8 A.M.	S. b. E.	4	o c r	30·00	30·04	48	47	48		
24	Noon.	S.W.	4	b c	30·27	30·26	48	47	47 49·5	Standing up Blanco Bay.	
25	..	N.W.	6	b c q	30·15	30·14	51	50	48 49	Blanco Bay.	
26	..	S.S.W.	5	b c q	30·08	30·11	52	51	48·5		..
27	..	E.S.E.	1	b c	30·41	30·46	52	51	48·5		..
28	..	W.N.W.	4	b c m	30·10	30·19	57	55	49 48		..
29	..	N.W.	5	b c m	29·90	30·08	58	57			..
30	..	W.N.W.	2	b c	29·92	30·01	60	59			..
31	..	N.	2	b c m	29·97	30·04	61	63·5			..
September.											
1	Noon.	—	0	b c	30·12	30·18	57	77	50		..
2	..	W.S.W.	5	b c	29·98	30·04	52	56	50		..
3	8 A.M.	..	4	b v	30·23	30·24	45	44	49·5 49		..
4	Noon.	W. b. N.	4	b q	29·97	30·10	63	67	50 52		..
5	..	S.S.E.	4	b c m	30·37	30·45	55	63	51·5		..
6	..	N.W.b.W.	5	b c q	30·22	30·19	54	53	50 50·5		..
7	..	W.N.W.	5	b m	29·71	29·77	57	57	50·5	39·11	
..	8 P.M.	N.N.W.	2	o c	29·56	29·51	57	55			
8	8 A.M.	S.S.W.	6	b q	29·94	29·98	50	49			
..	Noon.	S.	6	b q	30·03	30·08	51	50	49·5	39·30	Off Brightman Inlet.
..	4 P.M.	..	9	b c q m	30·24	30·19	53	48	49·5		
9	Noon.	W. b. S.	4	b c	30·22	30·24	50	48	49 50	40·00	
10	4 A.M.	N.	5	b q	29·95	30·04	48	49			
..	Noon.	N. b. W.	7	c g q m	29·95	29·95	49	48·5	49·5 50	39·53	
11	4 A.M.	N.N.W.	5	b q	29·81	29·87	50	48			
..	Noon.	..			29·90	29·96	54	55	50·5 51	40·15	
12	..		4	o c	30·01	30·03	48	48		40·12	
13	..	N. b. E.	1	b c	30·04	29·93	54	52.5	47·5	39·45	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
September, 1833.											
14	Noon.	S.S.W.	5	o g t	29·69	29·72	50	48	48 48·5	39·05	
..	Midt.		6	o c q m	29·96	30·06	52	49			
15	Noon.	S.	4	b c m	30·10	30·17	53	52	51 54	36·42	
16	..	E.S.E.	4	b c	30·12	30·18	55	53·5	56·5 56	Monte Video.	
17	..	S.E. b. E.	5	b c q	30·02	30·12	55	56	56 55·5	..	
18	..	..	6	c q m	30·04	30·13	56	55	54·5 54		
19	..	..	7	c m q r	30·00	30·00	54	53·5	53·5		
..	Midt.	E.S.E.	9	o g q r	29·81	29·96	55	54		Maldonado.	
20	4 A.M	S.E. b. E.	6	o g q r m	29·77	29·90	55	54			
..	Noon.	S.W.		b c q	29·83	29·96	57	56·5	53·5 54·5	..	
21	..		4	b c q	30·04	30·15	56	56	55·5		
22	..	N.W. b. N.	4	b c g	29·93	30·11	64	65	56·5	Monte Video.	
23	10 A.M.		5	b c	29·71	29·96	71	71	58*	..	
24	2 A.M.	E.N.E.	6	b c g l	29·85	30·02	58	58	59		
..	Noon.	E.S.E.	5	c g q	29·88	29·93	57	57	55 54	36·27	
25	..	E. b. N.	1	b c v	30·00	30·07	56	57	54 54·5	36·29	56·26
26	..	S. b. W.	5	b c	30·12	30·17	51	51	50·5 51·5	37·37	57·03
27	..	N.W.	2	b m	30·07	30·11	58	57	50·5 52	38·05	57·19
28	..	S.S.E.	6	b c m	30·17	30·21	52	48	50·5 52·5	37·46	56·58
29	..	N.E.	2	b c	30·44	30·49	52	51	53 54		
30	10 A.M.	N. b. E.	4	b c q	30·30	30·36	53	52	54·5 57	36·14	56·42
October.											
1	Noon.	N.E.	4	b c	29·96	30·03	61	62	57 58	Off Sanborombon Bay.	
2	4 A.M.	S.E.	6	c o l t q	29·50	29·66	60	59		..	
..	Noon.	..	5	c g	29·65	29·73	59	58	57·5 58·5	..	
3	..	S.S.E.	6	b c m	30·06	30·16	55	54	58 57·5		
4	..	E.	5	c o q	29·96	30·10	60	58	57·5 58	Monte Video.	
5	..	S.W.	4	c g m	29·82	30·94	58	57	57·5 58	..	
6	..	W.S.W.	4	b c	29·94	30·14	60	60	57·5	Maldonado.	
7	..	W.	1	b c	30·00	30·20	63	61·5	56·5	..	
8	..	E	4	b c	30·07	30·20	59	58	57·5 57	..	
9	..	VBLE.	2	c g	29·72	29·88	61	60	57·5	..	
..	10 P.M.	S.E.	1	o g t l	29·56	29·82	62	60			
10	Noon.	S.W. b. W.	1	o r	29·66	29·84	57	56·5	56·5	..	
11	..	E.	2	o c	29·96	29·05	60	59	56·5 57·5	..	
12	10 A.M.	E.S.E.	4	b c m	29·96	29·14	66	68	58·5	..	

* Temperature of water taken at 9 A.M. and 6 P.M. from this date.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
October, 1833.					Inches.	Inches.	°	°	°	Lat. S. Long. W.
13	Noon.	—	0	o r	30·14	29·24	52	51	56·5 56	Maldonado.
14	..	S.E.	5	b c	30·16	29·30	59		56·5	..
15	..	E.	4	b c q	30·24	29·40	59	57	57 57·5	..
16	8 A.M.	E.N.E.	5	b c q	30·16	29·30	60	59	57 55	..
17	10 A.M.	W.N.W.	2	o g r t l	29·65	29·87	58	57	54	..
18	Noon.	W.S.W.	4	b c	29·76	29·91	61	58·5	54 54·5	..
19	..	E.	1	b c	29·90	30·12	67	65·5	56·5 62	..
20	..	S. b. W.	4	o c	29·98	30·16	62	61	59 61·5	
21	..	S.S.E.	4	b c	30·24	30·36	61	60	61 62	
22	10 A.M.	N.E.	2	b c	30·19	30·31	59	57	61·5 62	Monte Video.
23	Noon	W.S.W.	2	b c	29·91	30·20	67	67	63·5	..
24	..	N.E.	4	b c q		30·10	74	73	64·5 67	..
25	..		5	o g q	29·49	29·80	70	70	62	..
..	4 P.M.	N.W.	4	o g q l t	29·19	29·58	74	73	°	
..	5 ..	W.N.W.	9	g r q l t						
26	Noon	S.S.W.	4	b c	29·72	29·96	68	68	65	..
27	..	E.N.E.	5	b c g	29·92	30·18	67	62		..
28	..	S.W.	5	b c q	29·54	29·81	67	67		..
29	..	..	5	b c q	29·98	30·10	56	56		..
30	..	S.E.	1	b c	30·15	30·36	61	61		..
31	10 A.M.	E.N.E. E.	5	b c q	30·01	30·21	61	60	60·5	..
..	8 P.M.	E.N.E.	6	c q p	29·77	29·99	58	57		
November.										
1	Noon.	E.S.E.	2	c g m	29·81	30·01	60	60		..
2	..	S.	1	b c	29·86	30.06	63	62		..
3	..	S.E.	4	b c	30·14	30·27	58	58		..
4	..	S.S.W.	1	b c m	30·14	30·40	63	62		..
5	..	N.N.E.	4	b v	29·94	30·24	66			..
6	..	S.W.	4	b c m	29·59	29·94	71	70		..
7	..	E.S.E.	5	o c m	29·87	30·12	65	64		..
8	..	E.	5	o m q p	29·85	30·05	64	63		..
9	..	S.E.	2	b c m	29·75	30·02	62	62		..
10	..	E.N.E.	4	b m	29·80	30·09	68	67		..
11	..	S.E.	2	b c v	29·80	30·15	69	71		..
12	..	N.E.	5	b c m q	29·70	30·04	72	70		..
..	10 P.M.	—	0	o c r t l	29·64	30·00	68	67		
13	6 A.M.	N.E.	4	o c r t l	29·51	29·81	66	64		
..	Noon.	W. b. S.	4	b c q	29·50	29·82	70	70		..
14	..	E. b. S.	2	b c m	29·77	30·07	67	66		..
15	..	W.	4	b c q m	29·78	30·13	70	70		..
16	..	S.W.	1	b c m	29·93	30·33	73	72		..
17	..	W.	4	b c m	29·61	30·08	79	79		..
18	..	S.E.	2	b c m	29·87	30·25	70	69		..
19	..	N.N.W.	1	b m*	30·28	30·28	72	71		..
20	..	N.	4	b c m	30·10	30·16	75	75		..
21	..	S.	5	b c m q	30·29	30·24	67	66		..
22	..	S.E. b. S.	1	b c m	30·46	30·40	66	65		..

* 10 A.M. 19th, set Sympr. by Barom.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
November, 1833.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
23	10 A.M.	N.N.E.	4	b c m q	30·37	30·37	71	71			
24	Noon.	S.	2	b c m	30·11	30·23	78	78			
25	..	N.W.	5	b c m q	29·86	30·10	85	84			
26	10 A.M.	S.W.	2	b c m	29·90	30·06	81	80			
..	Midt.	VBLE.	7	o g q r l t	29·94	30·01	72	73			
27	6 A.M.	E.	6	o c q r l	29·98	30·00	68	67		Monte Video.	
..	Noon.	N.N.E.	4	b c	29·86	30·00	77	75		..	
28	..	E.S.E.	4	o m	29·79	29·94	78	77		..	
..	4 P.M.	E. b S.	4	o g t p	29·76	29·89	73	72		..	
29	2 A.M.	S.W.	2	q o r l t	29·82	29·93	71	70		..	
..	Noon.	S.	4	b c q	30·05	30·08	72	71		..	
30	..	S.S.E.	2	b c m	30·20	30·26	71	70		..	
December.											
1	8 A.M.	N.	2	b c m q	30·15	30·15	69	67		..	
2	Noon.	W.	5	b c q	29·91	30·04	77	76		..	
3	..	N.N.W.	2	o c q m	29·90	30·04	76	75		..	
4	..	S.	4	m	30·05	30·09	72	70		..	
5	..	N.	1	b m	30·08	30·20	75	74		..	
6	..	N.W.	2	b c m g	29·99	30·06	75	75			
7	..	W.	4	b c m	29·85	30·01	77	76		35·28	56·32
8	2 A.M.	S.	1	b c g t l	29·57	29·78	76	74			
..	Noon.	VBLE.	2	b c m	29·54	29·64	74	73		36·46	56·25
..	10 P.M.	S. b. E.	7	b c g m l	29·80	29·70	61	60			
9	Noon.	S.E.	5	o r q	29·88	29·74	58	56		37·12	56·09
10	4 A.M.	..	5	o c m r l	29·83	29·67	54	55			
..	Noon.	S.S.W.	4	b c	29·83	29·70	59	60		37·10	56·36
11	4 A.M.	W. b. N.	8	b c g l	29·85	29·74	56	55			
..	Noon.		7	b c	30·05	29·85	60	58·5		37·56	56·49
12	..	W.	1	b c m	30·28	30·19	63	62		37·49	
13	..	E.N.E.	4	b c	30·24	30·15	62	61		39·02	57·13
14	..	W.	2	b c m	29·84	29·74	60	59		41·15	58·24
15	..	..	4	b c m	29·92	29·82	59	58	54 50	42·13	58·38
16	..		4	o c q	29·66	29·46	53	52	48·5 51	43·27	59·23
17	..	S. b. W.	4	b c	29·73	29·53	54	53	48·5 51·5	43·29	59·28
18	..	VBLE.	4	b c q	30·05	29·83	49	47	50·5	43·31	59·48
19	..	W.	4	b m	30·28	30·00	56·5	55	53·5	43·18	60·00
20	..	N.W.	4	b c q	30·10	29·90	57	57	53 54	44·12	60·46
21	..	E.S.E.	4	b c q	30·39	30·20	55	54	54 53·5	45·13	62·52
22	..	N.W.	4	b c m	30·23	30·05	57	56	53 52	46·31	64·05
23	..	E.	2	b c m	30·12	30·03	57	58	50 52·5	47·38	65·29
24	..	S.S.E.	4	b c	30·12	30·04	69	68	53 55	Port Desire.	
25	..	N.E.	4	b c	30·13	30·06	62	61·5	53·5	..	
26	..	S.	7	b c q m	29·78	29·73	64	63	54	..	
..	4 P.M.	S.S.E.	10	b c q m	29·88	29·78	57	56	53·5	..	
27	Noon.	S.	7	b c q	30·19	30·02	52	52	53·5	..	
..	2 P.M.	..	8	b c q	30·16	30·04	54	54		..	
28	Noon.	W.	4	o g	30·20	30·10	55		53	..	
29	..	E.N.E.	5	b c	30·30	30·13	58	57	53·5	..	
30	..	N.N.E.	4	o c	30·17	30·07	58	58	53·5 53	..	
31	8 A.M.	N.E.	4	o c	30·00	29·98	55	54	53·5	..	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Lat. W.
January, 1834.											
1	Noon.	S.S.E.	6	o g q	30·18	30·00	53	52	52·5	Port Desire.	
2	..	S.E.	4	b c	30·40	30·20	54	53	52·5	..	
3	..	W.	2	b c	30·62	30·38	57	54	52	..	
4	..	N.E.	4	b c	30·15	30·05	61	60	53 51	..	
5	..	N.	2	b f	29·74	29·76	64	63·5	51·5		
6	..	VBLE.	1	b c m	29·36	29·52	62	61	50·5 51	48·37	66·01
7	..	S.W.	4	b c m	29·81	29·79	64	63	51·5 53	48·46	
8	..	..	5	b m	29·88	29·88	69	68	53 50·5	48·17	66·44
9	..	W.N.W.	4	b c m q	29·63	29·69	72	71	52 54·5	Off Port St. Julian.	
10	..	W. b. N.	4	b c m q	29·76	29·81	73	72	54·5	Port St. Julian.	
11	8 A.M.	W.	8	b c q	29·62	29·62	67	71	55		
..	..	W.S.W.	4	b c q	29·59	29·67	70	72	55·5	..	
12	..	N.E.	4	b c m	29·86	29·83	63	62	55 56·5	..	
13	..	N.W.	4	c q m	29·54	29·51	63	62	56	..	
..	8 P.M.	S.E.	2	c m q p t l	29·64	29·65	60	59			
14	Noon.	E.	4	b c q m	29·76	29·76	59	57	57	..	
15	..	S. b. W.	6	o c p	29·72	29·70	58	57	56	..	
..	4 P.M.	S.	9	b c q	29·56	29·56	61	61			
16	Noon.	..	8	c q m p	29·92	29·82	59	58	55	..	
17	..	E.	2	o m	29·96	29·88	61	61·5	55	..	
18	..	N.N.E.	6	o m r q	29·90	29·76	53	52	54·5 54	..	
19	..	S.E.	4	c o q	30·02	29·85	52	51	52·5 51·5		
20	..	E.S.E.	4	b c	29·88	29·78	57	56	52·5 54·5	Off Port Desire.	
21	10 A.M.	W.N.W.	4	b c	29·93	29·88	64	63	55	Port Desire.	
22	Noon.	W.	4	b c q m	29·76	29·80	68	67	56 55·5		
23	..	W. b. N.	5	b c	29·52	29·55	69	67	55	48·20	
..	Midt.	W. b. S.	7	b c m q	29·79	29·74	56	55	53		
24	Noon.	W.	4	b c	30·04	29·94	55	54	52·5 53·5	49·37	66·03
25	..	N.N.W.	4	b c o	29·79	29·71	58	56	51·5 52·5	51·16	67·19
26	..	N.	4	b c	29·40	29·44	67	65·5	53		
..	10 P.M.	S.W.	7	o c g q p	29·37	29·30	57	56			
27	Noon.	W.N.W.	7	b c q	29·42	29·35	61	61	53	Possession Bay.	
..	4 P.M.	W.S.W.	10	b c q	29·50	29·46	60	59			
28	10 A.M.	..	8	b c q	29·76	29·66	57	59	52·5	First Narrow.	
..	Noon.	S. b W.	5	b c q	29·80	29·70	57	56	52·5		
29	..	W.S.W.	6 10	b c q	29·64	29·48	56	55	52·5		
..	6 P.M.	S.W.	8	b c q	29·68	29·60	57	56	51	Gregory Bay.	
30	Noon.	W.S.W.	4	b c q	29·82	29·70	53	52	50·5 49·5	Second Narrow.	
31	..	E. b. S.	4	b c m	29·74	29·64	52	51	50 50·5	Shoal Harbour.	
February.											
1	Noon.	N.W.	1	o c	29·88	29·80	59	57·5	49·5 50·5	Off Cape Negro.	
2	..	N.	2	b c m	29·76	29·76	59	59	51·5 50	Port Famine.	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
February, 1834.					Inches.	Inches.	°	°	°	Lat. S. Long. W.
3	Noon.	N.	4	o g p	29·61	29·51	57	56	50 49·5 48·5	Port Famine.
*4	..	W.S.W.	5	b c q	29·54	29·44	56	56	49 48 48	..
5	..	S.	1	c m p	29·68	29·63	53	51·½	48·5 48 48	..
6	..	S.S.W.	6	b c q	30·17	30·04	53·5	52·5	49·5 50 47·5	..
7	..	N.	1	b c	30·34	30·25	53	54	49·5 51·5 50·5	..
8	..	E.N.E.	2	c m r	29·98	29·88	54	51·5	51 51 49·5	..
9	..	N.	2	b c m p	29·93	29·84	55	53	50 53 48·5	..
10	..	S.E.	2	b c	30·16	30·04	55	54	53·5 51·5 50·5	..
11	..	..	1	b c m	30·01	29·96	57	56	51·5 51·5 50·5	
12	..		1	b c	29·94	29·84	58	57·5	53·0 53·5 52·5	Second Narrow.
13	..	S.W.	5	b c q	29·97	29·88	58	60	54 53·5 53	First Narrow.
14	..	N. b. E.	4	b c m	30·13	30·04	58	57	54 53	52·33
15	..	N.E.	4	b c m	29·52	29·48	57·5	56·5	55	52·33
..	4 P.M.	N.W.	4	o g q r t l	29·50	29·50	58	56	52·5 52·5	
16	Noon.	N.N.E.	4	b c	29·46	29·38	56	56	52 54·5	52·47
..	Midt.	S.W.	6	b c q	29·60	29·52	50	48	53·5	
17	Noon.		5	c o q	29·62	29·54	54	53	53 53·5	Off San Sebastian Bay.
..	10 P.M.	N.N.W.	7	b c g	29·20	29·32	54	53·5	53·5	
18	Noon.	W. b. S.	5	b c	29·24	29·36	55	53·5	53 52 52·5	..
19	..	N.N.E.	2	b c	29·41	29·30	54	53	51·5 53·5 51·5	54·01
20	..	S.S.E.	5	b c q	29·90	29·69	46	44	49·5 49·5 50·5	
21	..	S.	5	b c q	30·04	29·88	48	46	49 49·5 49	San Vicente Bay.

* Temperature of water taken from this at 8 A.M., 1·30, and 7 P.M.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
February, 1834.									49		
22	Noon.	s.s.w.	5	b c q p	30·23	30·01	47	46	45·5	Strait Le Maire.	
									47·5		
									46·5		
23	..	N.W.	4	o c	30·16	30·02	50	48	46·5	..	
									46		
									50·5		
24	..	N.N.W.	4	b c p	29·86	29·72	52	51	50·5		
									50·5		
25	..	W.S.W.	5	o c q p	29·85	29·74	50	49	49·5	Off Wollaston Island.	
									49·5		
..	Midt.	S.W.	6	o c q r	29·56	29·51	49	47	50		
									49		
26	Noon.	..	10	c q p	29·60	29·49	47	42	49	..	
									48		
									48·5		
27	..	..	7	b c q p	29·86	29·70	47	46	49·5		
									49		
									49*		
28	..	VBLE.	2	o c d	30·00	29·90	54	53	50·5		
									50		
March.											
									50*		
1	Noon.	W.S.W.	2	b c	29·90	29·83	58	54	51	Cove in Beagle Channel.	
									50·5		
									50		
2	..	VBLE.	1	b c m	29·57	29·52	57	55	52·5	Beagle Channel.	
									51		
									48·5		
3	..	S.W.	2	b c	29·50	29·30	51	49	48·5	..	
									48		
									47·5		
4	..	W.	4	b c	29·52	29·38	49·5	50·5	48	..	
									48		
5	..	N.W.	1	b c v	29·72	29·66	53	55	47·5	Off Woollya.	
									51		
									51		
6	..	..	2	o c q	29·52	29·50	59	58·5	51·5	.	
									50·5		
									49		
7	..	S.E.	6	o c q p	30·16	29·96	45	43·5	48·5		
									48·5		
									46·5		
8†	..	N.W.	4	o c	30·18	30·01	46	45	48	54·26	
									44·5		
									46·5		
9	..	S.W.b.S.	6	b m	29·82	29·70	51	50	48	52·58	59·17
									49		
..	8 P.M.	S.W.	10	b c m q	29·85	29·64	49	48			..
10	2 A.M.	..	10	b c q	29·80	29·58	46	45			
									48·5		
..	Noon.	S.W. b.W.	4	b c	29·76	29·63	51	52	50·5	Berkeley Sound.	
									50·5		
									51		
11	..	S.b.W.	5	b c q	29·70	29·60	53	51·5	51·5	..	
									51		

* Compared Water Thermometer with Registering ditto Feb. 28th, Noon, R.T. 55·5, W.T. 54·5.
March 1st, Noon. R.T. 58·5, W.T. 7·5.

† From 8th March, Temperature of Water taken at 9 A.M., 1·30, and 6 P.M.

Day.	Hour.	Winds.	Force.	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
March, 1834.					Inches.	Inches.	°	°	°	Lat. S. Long. W.
									51·5	
12	Noon.	w.b.n.	5	b c m q	29·62	29·57	58	57	52·5	Berkeley Sound.
									51·5	
									51·5	
13	..	w.	5	b c	29·46	29·46	60·5		52·5	Port Louis.
									51·5	
..	6 p.m.	s.s.w.	5	c m q r	29·52	29·40	52	49		
14	Noon.	s.w.	5	b c q p	29·81	29·70	48	46·5	50·5	..
									50·5	
15	..	w. b. s.	6	c m q r	29·44	29·35	48·5	46	50·5	..
									50	
									49	
16	..	..	6	b c q	29·63	29·52	49	47	49·5	..
									49	
									48	
17	..	s.s.w.	6	b c q p	29·66	29·50	44	41·5	47·5	..
									47	
18	..	s.	1	c m d q	29·68	29·54	44	43	47	..
19	..	s.s.w.	4	c q p	29·77	29·62	47	45	47	..
20	6 a.m.	w.n.w.	6	c m q r	29·57	29·46	47	45		
..	Noon.	s. b. w.	8	b c q	29·59	29·47	49	47	47·5	..
									47	
..	6 p.m.	s.s.w.	9	b c q	29·64	29·51	43	42	46·5	
21	6 a.m.	s.w.	9	b c q p	29·57	29·43	43	41	45·5	
..	Noon.	s.s.w.	10	b c q	29·59	29·45	44	42·5	46	..
..	6 p.m.	s. b. w.	8	b c q p	29·64	29·47	40	38	45·5	
22	6 a.m.		7	c o q p	29·97	29·83	42	39	45	..
..	Noon.	s.s.e.	4	b c q	30·16	29·99	45	43·5	45·5	..
									45	
23	..	w. b. s.	4	b c g	30·35	30·23	43	47	44·5	..
									46·5	
24	..	n.w. b.w.	5	c m	30·16	30·05	50	49	47	..
									47	..
									46·5	
25	..	n.n.w.	2	c g	29·98	29·90	51	49	47	..
									47	
									47	
26	..	e.	1	b c g	29·92	29·84	53	51	47·5	..
									47·5	
									47·5	
27	..	n.e.	1	c g	29·97	29·92	52	51	48	..
									47·5	
									47	
28	..	w.s.w.	2	b c	29·94	29·85	54	53	48	..
									48	
									46·5	
29	..	n.w.	2	b c g	30·03	29·93	50	49	48	..
									48	
30	..	s.s.w.	2	b c	29·66	29·60	53	50·5	48·5	..
									47	
31	..	—	0	b c	29·80	29·70	52	50·5	48·5	..
April.										
									47·5	
1	Noon.	n.w. b.w.	4	b c g	29·74	29·65	51·5	49·5	48·5	..
									48	
2	6 a.m.	n.n.w.	7	c q r	29·15	29·09	48·5	46	47·5	..
..	Noon.	w.	4	b c q p	29·06	28·97	48	44·5	47·5	
..	9 p.m.	s.w.	1	c r	28·90	28·84	43·5	41	47	
3	6 a.m.	s.b. w.	11	c q r	29·35	29·05	43	42·5		..

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
April, 1834.											
3	Noon.	s.s.w.	8	o c q p	29·52	29·37	41	39·5	46·5		
..	6 P.M.	s. b. w.	10	c q p	29·58	29·49	40	38	45·5	Port Louis,	
4	6 A.M.	..	6	c g	29·93	29·67	37	36·5	45		
..	Noon.	s.s.w.	6	c g q o	29·93	29·73	41·5	39·5	43·5	..	
..	6 P.M.	s. b. w.	4	b c q g	29·98	29·82	40	39	44·5		
5	6 A.M.	s.w.	5	c q	30·07	29·90	40	39	44		
..	Noon.	s.s.w.	8	c q	30·08	29·95	47	45·5	45·5	..	
..	Midt.	s.w.	4	o c	30·09	29·98	45	44			
6	Noon.	w.n.w.	6	o c g	29·86	29·74	49	48	46 47	Berkeley Sound.	
7	6 A.M.	w.	2	b f	29·50	29·38	45	44	47·5 46·5	..	
..	Noon.	w.s.w.	4	b c m	29·55	29·55	53	52	47·5 46	..	
8	6 A.M.	s.w.	9	b c q	29·86	29·70	47	45	45		
..	Noon.	s.s.w.	7	b c q p	30·03	29·83	47	46	45 44·5	50·02	58·08
9	..	n.n.w.	4	b c	30·15	29·98	48	47	45·5 46	49·14	59·55
10	..	n.w.	5	b c q	29·49	29·38	50	49	47 47·5	50·06	63·29
11	..	w.s.w.	4	b c	29·77	29·67	52	51	47·5 48	50·10	64·09
12	..	w.n.w.	2	b c m	29·99	29·98	51	50	47·5 47·5 48	49·46	65·05
13	10 A.M.	n.	9	b c q	29·54	29·50	55	55	47·5 49		
..	Noon.	..	7	b c q	29·67	29·60	54	53	49·5	River.	
..	Midt.	n.n.w.	5	b q	29·68	29·72	51	50	49	Santa Cruz.	
14	Noon.	w.	7	b c	29·68	29·69	59	59	48 49·5	..	
15	..	w.b.s.	4	c g	29·77	29·77	58½	53	48·5 47·5 49	..	
16	..	—	0	b c	30·16	30.02	47·5	47·5	48·5 48·5	..	
17	..	s.	4	b c m	29·83	29·77	46	45	47·5 47·5	..	
18	..	s.s.e.	4	b c q	30·03	29·92	47	45	46 47	..	
19	..	s.	1	b c g	30·34	30·19	47	46	46·5 46·5	..	
20	..	n.n.w.	1	b c m	30·33	30·22	45		46 45·5 47·5	..	
21	..	—	0	b c m	30·33	30·21	48	46	46·5 45 47	..	
22	..	vble.	1	b c q	30·09	30·07	59·5		47 46·5 48·5 48·5	..	

Day.	Hour.	Winds.	Force.	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
April, 1834.					Inches.	Inches.	°	°	°	Lat. S. Long. W.
									48*	
23	Noon.	W.S.W.	2	b c q	30·11	30·02	55·5*	53	48·5	Santa Cruz.
									47·5	River.
									46	
24	..	W.	4	b c	30·12	30·04	53	51	48	..
									47·5	
									46·5	
25	..	W. b. N.	1	b c m	30·09	30·03	55½	53	48·5	..
									48·5	
									46·5	
26	..	N.N.W.	1	b c	30·00	29·93	53	51	48·5	
									49	
27	..	W.	1	c g	29·93	29·89	52	52	46·5	..
									48	
28	..	—	0	b m	29·62	29·66	57·5	53·5	48·5	..
									46	
29	..	W. b. N.	4	b c q	29·55	29·52	52	51	47·5	..
									48	
									45·5	
30	..	S.W.b.W.	6	b c q	29·45	29·39	52·5	50·5	47	..
									47	
May.										
									46	
1	..	N.W.	1	b c	29·36	29·33	52	53	47·5	..
									47	
..	9 P.M.	W.	6	b c q	29·42	29·39	47	45		
									45·5	
2	Noon.	S.W.	2	c g m	29·60	29·53	49	47	46·5	..
									46·5	
									44·5	
3	..	N.W.	1	b c g	29·70	29·63	50	49	46	..
									46·5	
4	..	S.W.	9	b c q	30·01	29·93	48	46	44	..
									45·5	
..	3 P.M.	..	10	b c q	30·05	29·98	50·5	48·5	45·5	
5	6 A.M.	S.W.b.W.	6	b c q	30·16	30·07	44	42	44	
..	Noon.	S.W.	10	b c q	30·07	30·08	57		46	..
..	6 P.M.	..	8	b c q	30·07	30·07	52	50	45·5	
									45	
6	Noon.	..	5	b c q	30·07	30·07	57·5		46	..
									46	
									45	
7	..	..	8	b c q	29·96	29·91	54		46	..
									46	
..	6 P.M.	E.S.E.	7	c q r	30·03	29·98	43	40		
									42·5	
8	Noon.	S.W.b.W.	1	b c	30·41	30·30	44	42	44·5	..
									44	
									42	
9	..	N.W.	4	b m	30·45	30·34	44	41	45	..
									43·5	
10	..	S.E.	2	b m	30·36	30·31	49	48	42	..
11	..	W.	4	b c m	30·24	30·16	44	43		..
									44·5	
12	..	N.	4	c g	†29·67	29·79	51	49	46·5	
									46·5	

* From 23d April, Temperature of Water taken at 9 A.M., 1·30, and 5 P.M.

† 12th May, changed Sympr.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
May, 1834.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
13	6 A.M.	S.W.	7	b c q	29·69	29·65	44	42	45		
..	Noon.	S.W.b.W.	7	o q p	29·65	29·65	44	43	45·5 45	51·48	64·58
14	4 A.M.	VBLE.	5	o c q p h	29·49	29·45	39	38	43·5		
..	Noon.	S.b.W.	5	b c q	29·50	29·47	39	38	44 43·5	52·08	64·28
15	..	S.S.W.	5	o g q p	29·25	29·27	43	42	46 46	52·28	66·47
..	6 P.M.	S.S.E.	7	b c q	29·47	29·50	43	42	46		
..	Midt.	S.	9	b q	29·60	29·58	45	43			
16	Noon.	W.	5	o c q	29·69	29·69	44	43	45·5 44·5	52·17	Off Cape Virgins.
17	..	S.S.E.	4	b c	29·55	29·58	44	43	45 44·5 44		..
18	..	W.	4	b c m	29·72	29·65	45	43	45 44·5	52·27	66·35
19	..	E.S.E.	1	o g m	29·19	29·38	49	47	44 44 43		
20	..	S.	4	o m f	29·24	29·32	46	45	41 46 45		
21	..	S.W.	5	b c q	29·72	29·74	45	44	45·5 45·5 45		
22	..	N.W.	4	b c	29·85	29·89	47	46	44·5 45 45·5	52·28	
23	..	W.S.W.	4	b c	29·68	29·70	44	43	43·5 45 44·5		
24	..	S.W.	5	b c q	29·81	29·82	43	42	43·5 42·5		
25	..	..	5	b c	29·78	29·74	44	42	42·5 43		First Narrow.
..	Midt.	W.S.W.	7 8	c o q	29·36	29·40	42	41	42·5		
26	Noon.	..	7	o c g q	29·53	29·52	41	40	41 41·5		
..	6 P.M.	S.W.	8	b c q	29·56	29·57	38	37	41·5		
27	6 A.M.	S.W.b.S.	9	b c q	29·68	29·67	37	36	40·5		
..	Noon.		6	b c q	29·82	29·80	39	38	41·5		
..	6 P.M.	..	7	b c	29·78	29·76	40	39	40·5 39		
28	Noon.	S.	5	b c q	30·08	30·10	38	37	40·5 41 40		
29	..	N.	5	o g m	30·20	30·20	33	32	40 39		Gregory Bay.
30	..	N.E.	6	o g q r	29·82	29·81	39	38	41·5 40 41		
31	..	N.	4	o c m	29·96	29·96	40	38	43 43		Off Cape Negro.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
June, 1834.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
1	Noon.	E.N.E.	4	o c r	29·53	29·61	41	39·5	43 42 38·5	Port Famine.	
2	..	W.	4	b c	29·58	29·65	49	45	43·5 42·5 42·5	..	
3	..	—	0	b c	29·64	29·88	44	43	40 37·5	..	
4	..	N.E. by E.	4	c m r	29·93	29·97	43	41·5	43 39 38	..	
5	..	—	0	g c d	29·75	29·74	41	39	39·5 38 37	..	
6	..	..	0	f m	29·74	29·69	41	39	39 40·5 36·5	..	
7	..	..	0	b c m	29·71	29·65	40	39	39 38 43·5	..	
8	9 A.M.	S.W.	2	b c	29·63	29·52	40·5	38·5	44 45* 45	..	
9	Noon.	W.N.W.	4	c m q	29·34	29·35	43	43	45	Magdalen Channel.	
..	6 P.M.	N.W.	4	b c q p l	29·38	29·27	41·5	40			
10	Noon.	N.E.	2	o c	29·34	29·29	43	42	45 45·5 46·5	Cockburn Channel.	
11	..	N.	5	o g m p	29·20	29·16	45	44	47·5 44·5 44		
12	..	W.S.W.	5	b c q	29·20	29·09	42·5	42·5	44 44 44·5	55·10	74·26
13	..	S.S.W.	4	b c q	29·60	29·49	41	40·5	45·5 47 47·5	53·14	77·12
14	..	VBLE.	4	b c q p	30·06	29·95	46·5	46	48·5 48·5 50·5	50·45	78·09
15	..	W.	4	o c q p	30·15	30·07	49	48	51 49 49·5	48·45	75·17
16	..	W.N.W.	6	b c q	29·98	29·93	50	49	49·5† 49 50	48·51	77·34
17	..	VBLE.	1	o c m	30·17	30·10	53	48·5	50 50·5 49·5	47·29	77·43
18	..	W.b.N.	1	o c q	29·98	29·87	56	55	50 49·5 50	46·53	78·59
19	..	N.b.W.	2	b c	30·02	29·97	51	50	51 51	46·01	78·54
20	..	N.	8	o c q p	29·98	29·90	52	51	50·5 51·5	45·30	78·54
21	..	S.W.b.W.	2	o c m	29·82	29·76	50	49	51	45·20	78·16
22	6 A.M.	N.W.	7	b c q	29·45	29·42	50	49	51	44·39	76·44
..	Noon.	..	10	b c q	29·24	29·18	52	50			
..	4 P.M.	N.	11	o q p	29·02	28·97	51	49			

* Taken carefully at 9·30 A.M. 9th June, because the ship passed through a meeting of tides between Cape Froward and Magdalen Channel.

† 16th, lost Water Thermometer overboard; and employed another agreeing with Six's Self Registering.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
June, 1834.											
22	Midt.	W.N.W.	9	b c q p	29·13	29·18	51	50	52		
23	Noon.	N.W.	5	b c q	29·52	29·49	53	52	52 51·5	44·29	76·13
24	..	N. b. W.	5	b c	29·68	29·67	53	52	51·5 51·5	44·20	76·16
25	..	N.W.	5	o c q	29·70	29·64	54	52·5	52 51·5	44·03	76·02
26	..	W.	2	o c m p	29·63	29·58	53	52	52 51·5	43·11	73·52
27	..	W.N.W.	5	b c q p	29·51	29·37	52	51·5	51 51·5	42·54	75·10
..	8 P.M.	N.W.	9	o c q p	29·48	29·35	51	50	51·5		
28	Noon.	S.W.	5	b c q	29·90	29·48	52	51·5	52 52	42·17	74·54
29	..	N.N.E.	5	o c q	29·77	29·69	50	49·5	50 50·5	St. Carlos, Isl. Chilóe.	
30	..	E.	1	o g r	29·40	29·37	50	49	50·5 49·5	..	
July.											
1	..	W.	2	b c	29·99	29·92	50	46	47·5 49	..	
2	..	W.S.W.	6	b c q	30·02	29·94	53	51	48·5 50·5	..	
3	..	VBLE.	1	b c p	30·16	30·11	48·5	49	50·5 49·5	..	
4	...	S.W.b.W.	4	b c q p	30·04	29·95	47	45	49 49·5	..	
5	..	S.E.	2	b c	30·41	30·31	44	40	49 48	..	
7	..	N.E. b. N.	5	o c	29·94	29·79	42	41	48 47·5	..	
8	...	N.b.W.	5	c q p	29·76	29·70	52	50	48 49·5	..	
9	...	N.W.	2	c m	29·52	29·49	54·5	53	49·5 50	..	
10	..	N.N.W.	2	c m	29·68	29·64	54	53	50 51·5	..	
11	..	N.N.E.	1	b c g p	29·76	29·70	52·5	51	49·5 51	..	
12	..	N.	2	c g m	29·48	29·46	53	52	51·5 50·5 51	..	
13	..	W.N.W.	5	b c	29·53	29·52	52	50	51 50·5	..	
14	..	..	5	b c q	29·95	30·04	52	50	50 51	..	
15	..	N.N.W.	5	b c q p	29·80	29·81	51	50	52 51·5	41·48	75·28
16	...	S.W.	4	b c	30·09	30·10	53	51·5	51 52·5	40·27	75·44

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
							°	°	°	Lat. S.	Long. W.
July, 1834.											
16	Midt.	N.	7	o c q r	29·96	30·06	50	48			
17	6 A.M.	W.N.W.	7	q r	29·76	29·86	55	53			
..	Noon.	W. b. N.	4	c q r	29·80	29·82	55	52	53	40·09	76·18
									53·5		
18	..	N.N.W.	4	b c q	29·87	29·95	54	53	54	38·23	75·29
									53·5		
									53·5		
19	..	W.N.W.	5	b c q	29·80	29·86	56	55	54	36·23	73·56
									54		
									54		
20	..	VBLE.	4	o c q p	29·93	29·99	55	52·5	55	34·21	73·04
									55·5		
21	..	W.N.W.	6	c q r	29·86	29·92	56	55	54·5	33·29	72·14
									54		
									54		
22	..	VBLE.	1	b c	30·11	30·15	54	53	55		
									55		
									53·5		
23	..	S.W.	2	b v	30·02	30·09	58	57	55	Valparaiso.	
									55		
									53·5		
24	..	S. b. E.	1	b c	30·15	30·19	56	54	55	..	
									54·5		
25	..	VBLE.	1	b c m	30·10	30·09	57	56		..	
26	..	S.	4	b c m	30·02	30·06	53	52		..	
27	..	..	2	b c	30·04	30·09	53	51·5		..	
28	..	N.N.W.	1	b c	29·91	29·96	51·5	48·5		..	
29	..	S.E.	1	b c	30·06	30·03	53	51		..	
30	..	W.S.W.	2	b c	29·93	29·96	53·5	50·5		..	
31	..	E.S.E.	1	c g r	30·38	30·10	54	52		..	
August.											
1	..	N. b. E.	1	b m	29·90	30·06	60			..	
2	..	—	0	b c m	29·84	29·88	60	59		..	
3	..		1	b c g	29·98	30·04	56	55		..	
4	..	N.	2	b c	29·89	30·99	56·5	52·5		..	
5	6 A.M.	E.N.E.	2	o g	29·94	30·95	52	50		..	
6	9 A.M.	—	0	b m	30·07	30·06	50	48		..	
7	Noon.	..	0	b m	29·85	29·98	57	53·5		..	
8	..	N.W.	1	b c	29·77	29·89	57	53·5		..	
9	..	N. b. W.	2	b c g	29·96	30·03	56	54		..	
10	..	—	0	b c	29·80	30·03	62			..	
11	..	..	0	c o g	30·08	30·14	57	56		..	
12	..	S.W.	2	b c	29·92	30·04	59	57		..	
13	..	—	0	c g	29·92	29·97	56	55		..	
14	..	N.W.	2	b c	30·03	30·10	58	57		..	
15	..	—	0	b c	29·94	30·06	60	56		..	
16	..	E.	1	c g	29·80	29·95	61·5	59·5		..	
17	..	S.S.E.	1	c g	29·70	29·83	62	59·5		..	
18	..			c g	29·76	29·85	56	56		..	
19	..	N.E.	1	o c m r	29·95	30·03	54	53		..	
20	..	—	0	c m	29·85	29·91	56	56		..	
21	..	N.W.	1	b c g	29·93	30·00	59	57		..	
22	..	W.S.W.	2	b c m	29·79	29·93	59	60		..	
23	..	N.N.W.	5	c o r	29·82	29·91	54	53·5		..	
24	..	..	4	b c	29·93	30·00	59			..	
25	..	N.W.	2	b c	30·04	30·12	58			..	
26	..	S.	5	b c	30·10	30·11	58	53·5		..	
27	..	S.S.W.	6	b c	29·89	30·01	55	52		..	
28	..	W.	5	b c	29·87	30·00	57	52·5		..	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
August, 1834.					Inches.	Inches.	°	°	°	Lat. S. Long. W.
29	Noon.	W.	2	b c	29·92	30·08	57	54		Valparaiso.
30	..	..	4	b c o g	29·99	30·10	57	56		..
31	..	S.S.W.	4	b c	29·78	30·00	59·5	57		..
September.										
1	Noon.	—	0	b c m	29·61	29·85	60	58		..
2	..	E.	1	c o g	29·90	30·00	60	59·5		..
3	..	N.E.	1	b c	29·70	29·90	61	59		..
4	..	W.S.W.	2	c m	29·83	29·96	59	58		..
	..	S.	4	b c g	29·87	29·99	58	55		..
	..	..	4	b	29·80	30·00	63	58		..
7	..	N.E.	1	b c	29·72	29·98	60	58		..
8	..	S.W.	6	b c	29·81	30·00	58	55		..
9	..	N.	2	c g	29·85	29·97	58	56		..
10	..	..	4	c g	29·82	29·99	59·5	57·5		..
11	..	E.	4	c g r	29·88	29·94	48	48		..
12	..	N.N.W.	2	b c	30·25	30·32	55	53		..
13	..	W.S.W.	2	c p d	30·09	30·22	55	52·5		..
14	..	N.W.	1	b c v	29·75	30·01	62	57		..
15	..	—	0	b v	29·77	29·99	63	57·5		..
16	..	VBLE.	1	b m	29·68	29·96	63	59		..
17	9 A.M.	N.W.	1	b c m	29·77	29·97	58	55		..
18	Noon.	E.S.E.	1	b c	29·71	29·98	61	57		..
19	..	S.W.	4	b c	29·89	30·05	56·5	54		..
20	..	S.S.W.	5	b c q	29·89	30·08	57	54·5		..
21	..	S.W.	6	b c q	29·90	30·11	59	57		..
22	..	S.S.E.	5	b c m	29·63	30·03	70	65		..
23	..	N.E.	2	b c m	29·63	29·89	60	59		..
24	..	W.N.W.	1	c g	29·62	29·88	58	58		..
25	..	N.W.	2	c g	29·60	29·87	61	58·5		..
26	..	N.	4	c g	29·77	29·96	58	56		..
27	..	S.W.	5	b c	29·79	30·04	61	57		..
28	..	W.S.W.	4	b c g	29·76	30·00	60	57		..
29	..	S.W.	4	b c q	29·77	29·99	58	55·5		..
30	..	W.N.W.	2	b c	29·62	29·92	66	62		..
October.										
1	Noon.	S.W.	4	b c	29·76	29·98	58	55·5		..
2	..	W.	4	b c	29·72	29·91	57	54		..
3	..	S.W.	5	b c	29·80	30·09	58	56·5		..
4	..	..	5	b c q	29·91	30·13	57	55		..
5	..	S.	5	b c	29·84	30·13	60	58		..
6	..	N.E.	2	b c	29·65	30·01	65	62		..
7	..	S.W.	4	o g	29·70	29·90	59	58		..
8	..	N.	1	c g	29·58	29·89	57	56		..
9	..	N.W.	2	b c g	29·72	29·97	60	59		..
10	..	S.W.	4	b c	29·69	30·00	64	61		..
11	6 A.M.	S.E.	1	b c	29·83	30·06	54	52·5		..
12	Noon.	S.S.W.	5	b c	29·75	30·11	65	60		..
13	..	S.W.	5	b c	29·57	29·99	65	61		..
14	..	S.S.W.	5	c g q	29·58	30·00	60	59·5		..
15	..	S.W.	5	b c q	29·77	30·12	61	60		
16	..	S.S.W.	4	b c q	29·64	30·12	65	63		
17	..	..	5	b c q	29·60	30·07	63	61·5		..
18	..	—	0	f	29·55	29·99	60	60		..
19	..	N.	1	b c	29·43	29·90	63	62		..
20	..	..	1	c g m	29·69	30·00	60	61		..
21	..	..	2	f w	29·66	29·97	59	60		..
22	..	..	2	c f	29·58	29·95	61	60		..
23	..	..	2	b c m	29·50	29·88	63	61		..
24	..	S.W.	2	c m	29·67	29·97	58	57		..

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
October, 1834.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
25	Noon.	S.S.W.	4	b c q	29·54	30.06	67	67		Valparaiso.	
26	..	VBLE.	1	b c m	29·42	29·96	70	68		..	
27	..	N.N.W.	1	b c	29·46	29·94	63	63·5		..	
28	..	N.	2	o c m f	29·63	29·97	61	60		..	
29	10 A.M.	N.W.	1	b c o	29·52	29·93	62	60		..	
30	Noon.	N.N.W.	2	b c m	29·56	29·96	64	63		..	
31	..	..	1	g d	29·68	29·96	56·5	56		..	
November.											
1	Noon.	S.W.	5	b c q	29·42	29·90	67	64		..	
2	..	W.	2	o f m	29·42	29·83	64	65		..	
3	10 A.M.	N.W.	2	o g	29·55	29·99	59	59		..	
4	Noon	S.W.	4	b c	29·63	30·07	63	61		..	
5	..	N.W.	2	b c v	29·44	29·95	65	65		..	
6	..	—	0		29·50	30·00	64	64		..	
7	..	S.W.	4	b c o	29·69	30·05	60	59		..	
8	8 A.M.	S.E.	2	o c g	29·67	30·07	61	60		..	
9	Noon.	VBLE.		c g	29·58	30·01	63	61		..	
10	..	S.W.	5	b	29·68	30·10	64	61	56·5 55 56·5	..	
11	6 A.M.	S.	7	b c q	29·72	30·14	58	58		..	
..	Noon	..	6	b c q	29·74	30·19	59	58	58 57 58·5 58·5	..	
12	..	S.S.E.	5	b c q	29·70	30·14	60	60	59·5 59 58	33·22	77·34
13	..	S.	4	b c q	29·66	30·04	61	60	59 59·5 58·5	33·43	76·20
14	..	S. b. W.	4	b m	29·60	30·03	61·5	60	59·5 60·5 61	31·16	76·08
15	..	W.ly.	2	b c	29·51	29·92	63	62	61 59·5 60	34·16	78·00
16	..	VBLE.	1	b c g	29·47	29·87	61	60	59 58·5 57·5	35·52	
17	..	S.S.E.	7	o g q m	29·42	29·84	55	54	57·5 58 58	36·51	77·34
18	..	N.b.W.	4	b c	29·48	29·85	59	58	56·5 57 56·5	37·40	78·00
19	..	E.N.E.	1	b c	29·62	30·00	58	57	54·5 57·5 56·5	39·51	78·02
20	..	S.E. b. E.	2	b c	*29·94	29·92	58·5	58	55·5 56·5 55·5	40·41	77·23
21	..	N.	4	b c q	29·87	29·81	60	59	56		
22	..	S.W.	5	o c q	29·98	29·85	52	49·5	55·5 55·5	San Carlos, Isl. Chilóe	
..	4 P.M.	..	7	b c q	30·08	29·98	54	55	55		
23	8 A.M.	..	1	b c	30·31	30·15	51	50	56·5	..	

* Index of Sympr. set four-tenths higher.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
November, 1834.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
24	4 A.M.	E.S.E.	1	b c	30·18	30·19	48	48	56 56·5	San Carlos, Isl. Chilóe	
25	Noon.	VBLE.	1	b c	30·05	30·03	58	58	56·5 56 58	..	
26*	..	S.	5	b c	30·26	30·25	55	54	53·5 55 54	41·42	Near
27	..	S.S.W.	7	b c q	30·15	30·12	54	55	54 54·5	41·41	the
..	Midt.	S.	8	o c q l	30·16	30·16	54	53			land.
28	Noon.	..	5	b c q	30·21	30·19	53·5	54	55·5 54·5	41·32	76·17
29	..	E.	2	b c	30·10	30·16	53	54	54 53	42·02	78·25
30	..	E.N.E.	4	c g q	29·94	29·88	54	54	53·5 54·5	43·25	77·38
December.											
1	Noon.	VBLE.	1	b c	29·82	29·97	61·5	62	55 57·5	44·26	76·38
2	..	N. b. W.	2	b c	30·03	30·05	60	59	56 57·5	44·29	75·30
3	..	N.N.W.	6	b c q p	29·83	29·	56	55	57 54 54·5	Chonos Islands.	
..	4 P.M.	N.E.	7	o c q p r	29·80	29·76	57	56	54·5		
4	Noon.	W.N.W.	7	b c q r	29·84	29·80	53·5	53	54 53	45·05	Close
5	..	S.W. b. W.	4	b c	30·06	30·00	58	58	54·5 54 53		to the
6	..	S.W.	5	b c p	30·20	30·23	55	54	51·5 51·5 51·5		shore.
7	..	S. b. W.	4	b c	30·24	30·23	55	55	52 51·5	San Pedro.	
8	..	W.	1	c g m	30·11	30·20	56	57	52	..	
9	..	N.	1	c g d	29·86	30·23	54		52·5	..	
10	..	N.E.	4	b c	29·99	30·21	58	57	52·5 53 51	..	
11	..	VBLE.	2	c g p	29·87	30·20	56	55	53·5 54·5 54	Near the land.	
12	..	W.N.W.	4	b c q	29·89	30·14	57	56	54·5 54	45·02	
13	..	W.	2	o c m	29·82	29·75	55	55	53 52·5 51·5	Vallenar Road.	
14	..	W.S.W.	8	b c q p	29·30	29·28	51	48	52 52	..	
..	4 P.M.	S.W.	10	b c q p	29·30	29·26	52	50	51·5	..	
15	Noon.	S.S.W.	7	b c q p	29·74	29·64	49	48	52·5 52·5	..	

* 26th November, Temperature of water from this day taken at 9 A.M. 1·30 and 7 P.M.

Day.	Hour.	Winds.	Force.	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
December, 1834.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
16	Noon.	S.W.	5	b c q p h	29·74	29·69	51	50	52 52·5 52·5 52·5	Vallenar Road.	
17	..	S. b. W.	4	b c	29·90	29·70	51	50	54 53·5 53·5		
18	..	..	4	b c	29·94	29·90	52	52	53·5 53 52	45·12	
19	..	S.S.W.	2	b c	29·98	30·02	50·5	50	52·5 52·5 53	45·13	
20	..	S.W.	4	b c	29·77	29·75	51	51	53·5 54	46·55	
21	..	W.	4	c g p q	29·82	29·78	51	50	53·5 53·5	Port San Andres.	
22	..	S.E.	2	b c q	29·72	29·66	56	55	55 54	..	
23	..	W.	5	b c q f	29·97	29·94	50	49	53 53		
24	..	S.W.	5	b c g	29·55	29·55	55	55	53·5 53	Christmas Cove.	
25	..	VBLE.	2	b c q p	29·34	29·29	53	53	54 54	..	
26	..	N.W.	5	o c q	29·67	29·60	50	49	52·5 52·5 53	..	
27	..	VBLE.	2	b c q p	29·61	29·55	53	52	52·5 53 53	..	
28	..	W.S.W.	4	b c	29·76	29·70	51	50	53 53·5 52·5	46·26	
29	10 A.M.	S.W.	5	b c q p	29·80	29·82	48	47	53 52·5 53	46·02	
30	Noon.	N.W.	2	o c g	29·93	29·92	54	53	54 53·5 54	Off Ynchemo Island.	
31	..	VBLE.	1	c o	29·73	29·65	59	59	55 54·5	..	
January, 1835.											
1	Noon.	N.W.	5	c g q r	29·45	29·72	54	53	54 54 53·5 52·5	Patch Cove.	
2	..	VBLE	2	c g q p	29·65	29·73	53	51	54 52·5 52·5	..	
3	..	N.W.	5	o g q r	29·64	29·60	52	52	53 53	..	
4	..	W.N.W.	1	o c	29·73	29·76	56	55	54 54	..	
5	..	N.N.W.	4	o g r	29·84	29·84	55	55	53·5 53·5		
6	..	S. b. W.	4	b c	29·90	29·90	55	55	53 53	Off Lemu Island.	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
January, 1835.					Inches.	Inches.	°	°	°	Lat. S. Long. W.
7	Noon.	w. b. s.	2	b c	29·88	29·91	54	54	53*	43·48
8	10 A.M.	N.	1	o c m r	29·76	29·87	58	57	55.5 54·5	Port Low.
9	Noon.	W.N.W.	1	b c g	29·78	29·88	58	57	53·5 54	..
10	..	N.W.	5	c g q r	29·47	29·85	57·5	56·5	54 54·5	..
11	..	..	3	c g q p	29·52	29·85	58	56	55 54·5 53·5	..
..	6 P.M.	..	8	c o m q r	29·24	29·82	54·5	53	53·5	
12	Noon.	S.W.	4	b c q p	29·75	29·82	56	55	53 53	..
13	..	N.W.	6	c m q r	29·60	29·81	55	54	52·5 52 52·5	..
14	..	S.W. b. s.	6	b c q	29·74	29·82	53	52	52 51·5 52	..
15	..	S.W.	2	b c	30·02	29·96	56	56	52 51·5 52·5	..
16	..	N.W.	4	c g	30·08	30·12	56	55	53·5 53 54·5	Off Huafo.
17	..	—	0	b c g	29·90	30·04	60	61	53 52·5 54·5	
18	..	S.	4	b c m	29·79	29·95	65	62·5	56 55·5 58	San Carlos.
19	..	S.W.	1	b c	29·98	30·00	60	59	54 53 59	Near the English Bank.
20†	..	..	2	b c m	29·88	30·01	65	64	57·5 59·5 60·5	San Carlos.
21	..	N.W.b.W.	4	c o r	29·70	30·01	60	59	59 58 57·5	..
22	..	S.W.	5	b c	29·97	30·01	63	63	57 58·5 58	..
23	..	W.S.W.	5	b c	29·84	30·02	65·5	68	57 58	..
24	..	..	2	b c	29·78	30·01	65·5		59·5 59·5	..
25	..	W. b. N.	2	b	29·70	30·03	65·5	66·5		..
26	..	..	4	b m	29·70	30·00	67	66		..
27	..	W.S.W.	4	b c	29·74	30·01	63	61		..
28	..	N.W.	4	c g q	29·57	30·01	64	63	58·5 58·5 58	..
29	..	W.N.W.	1	c g p	29·63	30·00	54	53		..
30	..	W.S.W.	4	b c	30·07	30·01	61·5	62		..
31	..	..	2	b c v	29·73	30·01	64	64·5		..

* 7th, Water Thermometer broken; new one nearly 1° lower than the Standard.

† Jan. 20th, 2 A.M., observed an eruption of Osorno.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
February, 1835.											
1	Noon.	N.W.	4	b c	29·76	30·02	66			San Carlos.	
2	..	W.S.W.	5	b c g q	29·77	30·00	60·5	59·5		..	
3	..	S.W.	4	g c p	29·82	30·01	55	53		..	
4	..	..	4	o c p	29·77	30·02	53	50	56 52 52	..	
5	..	S.S.W.	4	b c	29·62	30·02	53	53	51 54·5 51·5	41·23	Close
6	..	W.N.W.	2	b c	29·96	30·09	55	55	53 53 53·5	40·33	to the
7	..	N.N.E.	5	o q d	29·97	30·03	54	53	53 54·5 57·5		shore.
8	..	S.S.W.	1	b c m	29·82	30·06	59	58		40·11	
9	10 A.M.	E.	1	b c	29·85	30·05	61	60	59·5 61·5	Valdivia.	
10	Noon.	N.	4	b v	29·67	29·93	64	65		..	
11	..	N.N.W.	2	b c	29·55	29·85	65	68		..	
12	..	N.	5	b c	29·68	29·90	62·5	62·5		..	
13	..	W.	2	b c	29·71	29·98	67	67	61 62·5 63	..	
14	..	N.	5	b c	29·50	30·10	66	66		..	
15	..	S.W.	2	c g p	29·60	30·09	63·5	64		..	
16	..	N.	4	c g	29·58	29·80	62·5	63		..	
17	..	N.N.W.	4	b c g	29·69	29·89	62	61		..	
18	..	W. b. S.	2	c g	29·78	30·00	65	64		..	
19	..	S.E.	4	b c	29·70	30·04	66	64		..	
20*	6 A.M.	E	1	b c	29·70	29·99	60	59	59·5	..	
..	Noon.	N. b. W.	5	b c	29·66	29·98	66	67	62·5	..	
..	6 P.M.	VBLE.	4	b c q	29·59	29·92	66·5	66		..	
21	Noon.	N.E.	1	b c	29·68	30·04	66	65	59·5 63 59	..	
22	..	S.S.W.	4	b m	29·75	30·01	59	58	53·5 55·5 53·5	39·37	Near
23	..	S.	1	b c m	29·70	30·96	58	57	54·5 53·5 55·5	38·57	the
24	..	..	2	b c	29·72	30·95	58	58	54 54·5	38·45	land.
25	..	N.W.	4	o c f	29·74	30·93	57	58	56·5 56 55	38·17	Off Mocha.
26	..	N.	2	g q r	29·44	30·60	53	53	56 56 56·5		..
27	..	N.	4	b c	29·54	30·87	60	60	58·5 58 57·5	38·28	..
28	..	S.S.E.	1	b c r	29·59	30·17	61	59	57 58	38·18	..

* 20th February, 11·40 A.M., felt a severe shock of an earthquake.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
March, 1835.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
1	Noon.	N.N.W.	2	c m	29·60	30·17	66	65	58·5 58·5 57	Off Mocha.	
2	..	VBLE.	2	b c	29·67	30·17	62·5	63·5	57·5 59	37·59	Near
*3	..	S.W.	4	b c g	29·78	30·17	65	63	59·5 60·5 62·5	37·32	the land.
4	..	S.	5	b c	29·64	30·18	64	63	60 57·5 58	Concepcion Bay.	
5	..	..	5	b v q	29·59	30·18	69	69	57·5	..	
..	4 P.M.	S.S.W.	7 6	b q m	29·46	30·18	70	69			
6	Noon.	N.	2	b c	29·53	30·18	65	63		..	
7	..	N.N.W.	1		29·54	30·17	63	62	55·5 58	..	
8	..	S.	4	f	29·61	30·18	59	58	57 55·5 58	35·17	
9	..	VBLE.	1	m	29·64	30·18	61	60	59·5 59	33·54	72·34
10	2 A.M.	..	2	b c l t	29·56	30·18	62	61	61 60		
..	Noon.	N.W.	2	c g m	29·64	30·19	62	61	61 61	33·39	72·20
11	..	VBLE.	1	c o m	29·57	30·19	63	62	61 62	33·32	72·07
12	..	N.	1	o c d	29·53	30·18	62	61·5		Valparaiso.	
13	10 A.M.	S.S.W.	4	b c q	29·56	30·16	67	65		..	
14	Noon.	—	0	b v	29·40	30·18	70	69		..	
15	10 A.M.	S.W.	4	b v	29·33	30·17	70	66		..	
16	Noon.	—	0	c m	29·58	30·18	63	63		..	
17	..	..	0	b c m	29·44	30·18	65	64	55·5	..	
18	..	S.	5	b c	29·71	30·05	59	57	59·5 60·5 60	32·52	74·01
19	..	S.E. b. S.	6	b c	29·78	30·14	62	61	63 62·5	33·09	75·55
20	..	S S.E.	5	b c q	29·80	30·20	63	62	62·5 63 64	33·46	
21	..	..	6	b c q	29·70	30·08	64	63	64 63 62·5	33·49	77·00
22	..	..	5	o c g	29·67	30·04	64	63	63 63·5 64	34·11	79·03
23	..	..	5	b c q	29·80	30·	65	64	64·5 65	34·57	81·41
24	..	VBLE.	4	b c	29·75	30·10	65	64	65 65	35·13	79·53
25	..	..	4	b c	29·70	30·08	64	64	64·5 63 63·5 63	34·59	78·03

* 3d March, 10·26 A.M., felt a severe shock of an earthquake.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
March, 1835.					Inches.	Inches	°	°	°	Lat. S.	Lat. W.
26	Noon.	S.E.	4	b c m	*30·19			61	60 62 62	35·38	76·15
27	..	S.	4	c m q	30·13			56	57·5 54 56	36·28	73·54
28	..	..	1	o c m	30·28			59	53·5 55 54	Concepcion Bay.	
29	..	VBLE.	4	b c q	30·17			62		..	
30	..	S. S. W.	4	b c m	29·93			58	52 55·5 52·5	Standing out of the Bay of Concepcion.	
31	..	N.	5	b c m q	30·09			56	53·5 54		
April.											
1	Noon.	VBLE.	1	b c f	30·21			60	54 55 54·5	Island of St. Mary.	
2	..	..	1	b m	30·09			59	53 57·5	Concepcion Bay.	
3	..	S.	4	b c q	30·21			58		..	
4	..	..	4	b c m	30·12			61		..	
5	10 A.M.		4	b c	30·23			63		..	
6	Noon.	S.	2	b c m	30·14			65		..	
7	..	S.W.	2	b m	30·09			67	54·5 59·5	..	
8	..	N.	4	f	30·07			58	57 56 55·5 56·5		
9	..	N.E.	1	c m	30·22			55	56 56·5 56	South Harbour, in Santa Maria.	
10	..	..	1	b c m	30·22			58	55·5 56·5 53·5		
11	..	S.	1	b c m	30·22			59	56 56·5 56·5	Concepcion Bay.	
12	..	N.	1	b c	30·05			70		..	
13	..	—	0	b	30·10			59		..	
†14	10 A.M.	N.	4	f d	30·19	30·20		61		..	
15	..	S.	2	b c	30·20	30·24		57		..	
16	10 A.M.	..	2	b c	30·20	30·18		57	57 58 57·5	Tomé Bay.	
17	8 A.M.	—	0	c o	30·02	30·08		57	54·5 53·5 53·5	Coliumo Bay.	
18	9 ..	N. b. W.	5	c g	30·05	30·07		57	54 54 54·5	..	
19	9 ..	VBLE.	2	f	30·12	30·16		57	55 57 57	..	

* 25th March, P.M., set Sympr. five-tenths higher.

† From 14th April Cabin Thermometer used, which agreed with the Standard.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
April, 1835.					Inches.	Inches.	°	°	°	Lat. S. Long. W.
20	8 A.M.	S.	2	b f	30·16	30·20		57	55·5 55·5 53·5	35·35
21	8 ..	—	0	b m	30·13	30·17		54	54 54·5 54·5	35·19 { Off the River Maule.
22	Noon.	S.	4	b v	29·98	30·03		60	55·5 57 58	33·51
23	..	N.E.	2	o c	30·13	30·16		58	58·5 58 56·5	Off Valparaiso.
24	..	S.	4	b f	30·11	30·16		59	58 57·5 58·5	..
25	..	S.S.E.	2	o f	30·17	30·21		58	57·5 58 57·5	Off Horcon.
26	..	S.W.	1	o f	30·12	30·18		58	58 57 56	Horcon Bay.
27	..	S.W.	4	b c q	30·19	30·20		60	55 55 55·5	Port Papudo.
28	..	—	0	c g	30·21	30·23		54	55·5 54 55	..
29	..	S.S.W.	5	b c	30·20	30·25		59	55 55·5 56	Port Pichidanque.
30	..	S.	2	b m	30·13	30·17		59	55 55 56	{ Off Port Pichidanque.
May.										
1	Noon.	VBLE.	1	b c m	30·03	30·07		59	58·5 59·5 59·5	31·24
2	..	W.	1	c o m	30·12	30·19		59	60 58 58·5	Off Maytencillo.
3	..	S.W.	2	o g m	30·14	30·23		59	56·5 57·5 58·5	Off Lengua de Vaca.
4	..	S.	2	o c	30·18	30·24		58	57·5 58 58	Herradura.
5	..	..	2	c o	30·16	30·25		62	57 56·5 58	..
6	..	N.N.W.	2	b	30·13	30·17		59	56·5	..
7	..	N.W.	2	b	30·10	30·16		60		..
8	..	—	0	c o m	30·24	30·28		56		..
9	..	W.	4	b c	30·21	30·29		61		..
10*	..	W.S.W.	4	b c	30·23	30·29	56	54·5		..
11	..	..	2	b c	30·13	30·25	63			..
12	..	N.W.	4	c m	30·09	30·15	56	56		..
13	..	N.N.W.	4	c g	30·23	30·28	58	57		..

* From this date used deck Barom, with a correction added of 0·28, its average diff. from Cabin Barom.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
May, 1835.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
14	Noon.	N.N.E.	1	b c	30·21	30·30	63·5			Herradura.	
15	..	N.N.W.	1	b c g	30·16	30·27	64	65		..	
16	..	W.S.W.	4	b c	30·14	30·25	63	63		..	
17	8 A.M.	S.E.	1	c r	30·16	30·21	57	56			
18	Noon.	S.	5	b c v	30·14	30·26	65			..	
19	..	N.N.W.	2	b c v	30·06	30·14	58	57		..	
20	..	..	1	b c m	30·10	30·14	58	56		..	
21	..	N.W.	2	c m	30·06	30·15	57·5	56·5		..	
22	..	N.	1	c o m	30·09	30·13	57	57		..	
23	..	..	1	b c g	30·21	30·27	60	59		..	
24	..	S.W.	4	b c q	30·13	30·23	62	61		..	
25	..	—	0	c o d	30·20	30·24	57	56		..	
26	..	..	0	c g	30·26	30·28	59·5	58		..	
27	..	W.S.W.	4	b c v	30·10	30·31	63	59		..	
28	..	..	4	b c	30·03	30·26	61	60		..	
29	..	..	2	b c	30·16	30·15	60	59		..	
30	..	N.W.	4	b c	30·13	30·23	58			..	
31	..	W.N.W.	4	b c		30·23	61	59		..	
June.											
1	..	N.	2	c g w	30·16	30·26	57·5	57		..	
2	..	N.N.W.	4	b c	30·13	30·18	61	59·5		..	
3	..	S.W.	4	b c g	30·17	30·29	63	61·5		..	
4	..	N.N.W.	2	b c v	30·18	30·25	61			..	
5	..	—	0	c g	30·11	30·16	55·5	56		..	
6	9 A.M.	..	0	c o m	30·15	30·19	55	53·5	55·5	..	
7	Noon.	..	0	o m	*	30·25	58	56	56		
8	..	S.S.E.	5	b m q		30·45†	58	57	57 55·5	30·26	72·22
9	..	..	4	b c q		30·45	59	59	56 60 60 58·5	30·49	74·18
10	..	..	4	b c		30·46	61	61	61 62 62	31·11	75·44
11	..	S.	4	b c q		30·41	60	59	62 61·5	31·22	74·55
12	..	..	2	b c h		30·44	59	58	58 58 56·5	31·36	73·10
13	..	N.N.E.	4	o g m	30·54‡	30·47	56	56	57 56·5 55·5	Off Pichidanque.	
14	..	N.	4	o g	30·49	30·44	56	54	55·5 56 54	Valparaiso.	
15	..	—	0	c g	30·56	30·46	56	53·5	52·5 53·5	..	
16	..	N.	1	o m r	30·48	30·46	54·5	53		..	
17	..	S.E.	1	b c v	30·50	30·45	56			..	
18	..	N.	1	b c	30·56	30·44	59	58		..	
19	..	N.E.	1	c g	30·39	30·44	58	57		..	
20	..	N.W.	1	b c g	30·50	30·45	58·5	59		..	
21	..	—	0	b v	30·58	30·45	61	56		..	
22	..	N.N.W.	2	b c v	30·24	30·44	55·5	54·5		..	
23	6 A.M.	N.	8	b c g q	30·11	30·43	56	55		..	
	Noon.	N. b. W.	9	c g q	30·09	30·44	58·5	57·5		..	

* Symp. sent on board Schooner.

† Barometer tube loose: used it no more. ‡ New Sympr.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
June, 1835.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
23	6 P.M.	N.N.E.	9	c g q p	30·13			54		Valparaiso.	
24	4 A.M.	N.N.W.	6	o c q p l	30·18			55		..	
..	Noon.	N. b. W.	7	c g q	30·29			56		..	
..	9 P.M.	W.	1	b c q p l	30·45			52·5		..	
25	Noon.	W.S.W.	2	b c p	30·62			57		..	
26	..	VBLE.	1	b v	30·62						
27	..	N.	1	b c	30·50			57		..	
28	..	N.E.	1	c g	30·69			56·5	54 54·5	..	
29	..	W.	1	b	30·63		59		54 55·5	..	
30	..	S.	6	b c q	30·48	30·26*		60	58·5	30·17	73·23
July.											
1	..	..	4	o g q	30·38	30·17	61	57	59 58·5 58·5	27·41	71·39
2	..	—	0	o g m	30·30	30·12	61	58	58·5 58·5 58	Off Copiapó.	
3	8 A.M.	N.	4	b o	30·34	30·13	60	55·5	58·5 57·5 57·5	Copiapó.	
4	Noon.	—	0	c g	30·34	30·18	62		56·5 57 57	..	
5	..	S.S.W.	4	b c	30·37	30·18	60	57	56·5 57 56·5	..	
6	8 A.M.	S.	1	b c g	30·43	30·24	62·5	56	57 57	..	
7	2 P.M.	VBLE.	1	o g m	30·30	30·13	61·5	58·5	59·5 60	25·57	71·23
8	Noon.	—	0	o g m	30·28	30·14	62	59	60·5 60·5 60·5	25·32	71·29
9	..	VBLE.	1	o g	30·39	30·24	62	58	60·5 61 61·5	24·43	71·21
10	..	S. b. E.	4		30·44	30·31	63	60	62 62 62·5	23·18	71·26
11	..	S.E.b.S.	2	o c	30·30	30·18	64·5	61	62·5 61 61	20·49	70·54
12†	..	VBLE.	1	o g m	30·26	30·14	63·5	60	60·5 59·5 59·5	Off Iquique.	
13	..	S.	2	b c	30·29	30·18	64·5	62	60 59·5	Iquique.	
14	..	S.S.W.	4	b c	30·32	30·20	64·5	61	59·5 58 61	..	
15	..	VBLE.	2	o m	30·34	30·18	64	60	62·5 62·5 62·5	19·42	70·59
16	..	..	2	o m	30·32	30·22	65	62	62·5 61·5	18·47	72·19

* Cabin Barometer.

† July 12, 10·35 A.M., felt the shock of an earthquake.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality. Lat. S.	Locality. Long. W.
July, 1835.							°	°	°		
									63		
17	Noon.	s.	4		30·32	30·23	65·5	62	63	17·43	73·55
									62·5		
									62·5		
18	..	s.e.	4	b c	30·36	30·28	66	63	61·5	15·57	76·20
									60		
									60·5		
19	..	..	5	b c q p	30·31	30·18	65	61	59·5	12·55	77·19
									60		
									58·5		
20	..					30·20	65		60	Callao.	
									58·5		
21	..	s.	4	b c g	30·28	30·21	64	62		..	
22	..	w.	1	c g	30·31	30·24	65	63		..	
23	..	—	0	b c g	30·26	30·21	64	62·5		..	
24	..	s.	2	b c	30·25	30·20	64·5	61·5		..	
25	..	..	4	c g	30·27	30·19	64	61		..	
26	..	..	1	c g	30·25	30·18	64	61·5		..	
27	..	w.	2	b c	30·28	30·21	64	63		..	
28	..	s.	5	b c	30·30	30·21	65·5	62·5		..	
29	..	s.s.e.	4	b c g	30·32	30·28	66	65		..	
30	..	..	5	b c g	30·37	30·20	66	63·5		..	
31	..	s.	4	b c g	30·25			62		..	
August.											
1	..	w.n.w.	1	b c	30·21	30·18	66	63·5		..	
2	..	s.s.e.	4	c g	30·21	30·17	66	63·5		..	
3	..	w.s.w.	1	c g	30·25	30·18	65	60·5		..	
4	..	w.	2	c g	30·24	30·17	65	62		..	
5	..	s.	4	b c	30·26	30·21	64·5	65		..	
6	..	..	5	b c	30·26	30·21	65·5	63·5		..	
7	..	s.e.	4	b c g m	30·18	30·16	66	64	58·5	..	
8	..	n.w.	2	b c	30·20	30·16	65	63		..	
9	..	s.	2	b c g	30·23	30·20	65·5	62		..	
10	..	s.s.e.	5	b c g	30·26			60·5		..	
11	..	..	2	b c g	30·23	30·19	65	62		..	
12	..	s.	4	b c g	30·00*	30·21	65·5	62		..	
13	3 p.m.	w.	2	b c	29·96			65		..	
14	Noon.	s.	4	b c	29·97			62		..	
15	..	s.s.e.	4	b c g	29·97			61		..	
16	..	..	4	b c g	29·96			64·5		..	
17	..	s.	4	b c m	29·94			63		..	
18	..	..	5	c g	29·90			62		..	
19	..	w.	2	b c g	29·85	30·14†	63·5	63		..	
20	..	..	4	b c	29·85			61·5		..	
21	..	vble.	1	c g	29·81			65		..	
22	..	w.s.w.	1	b c g	29·92			63		..	
23	..	s	4	c m w	29·95			63		..	
24	9 a.m.	s.s.e.	2	b c g m	30·02	30·25		59		..	
25	Noon.	s.	4	b c	30·00			59		..	
26	..	..	2	b c g	29·93			64		..	
27	..	—	0	b c g	29·85			62		..	
28	..	s.w.	2	b c g	29·85			61		..	
29	..	s.	4	b c g	29·92			63		..	
30	..	..	5	b c g	29·93			63		..	
31	..	w.n.w.	2	b c g	29·89			62		..	
September.											
1	Noon.	s.w.	2	b c g	29·87			63		..	

* 12th August, changed Sympr. † 10 a.m.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
September, 1835.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
2	Noon.	s. b. w.	4	b c	29·89			63·5		Callao.	
3	..	s.	4	b c g	29·90			63		..	
4	9 A.M.	s.s.e.	4	b c g	29·96	30·20		61		..	
5	Noon.	..	4	b c g	29·89			61·5		..	
6	..	s.s.w.	4	b c g	29·96			63	57 57*	..	
7	..	s.s.e.	4	c g	30·03			61	57·5 58·5 60·5	..	
8	..	s.e.	5	o c	29·98			64	61·5 60 61·5	11·51	78·12
9	..	s.s.e.	4	o g m	29·90			64	62 63·5 63·5	9·58	79·42
10	10 A.M.	s.e.	2	o c	29·90	30·16		64·5	64 63 64	8·09	81·19
11	Noon.	s.s.e.	4	b c m	†29·17			64	64·5 64·5 64	6·52	83·19
12	..	s.e.	2	b c m	29·12			67	64·5 64·5 65·5	5·05	84·31
13	..	..	4	b c m	29·09			68·5	66·5 66·5 65	3·18	85·49
..	3 P.M.	..	4	b c m	29·03	30·07	70·5	67	66·5 66		
14	10 A.M.	..	4	b c m	29·12	30·18‡	70·5	67	67·5 68·5 67·5	1·53	88·13
15	..	s.	2		29·12	30·22	71	66	69·5 67 69·5	1·07	89·01
16	9 A.M.	s.s.e.	2	b c m		30·22	70·5		70·5 70·5 70·5	Off Barrington Isl.	
17	..	s. b. e.	2	c m p d	29·11	30·20	71	68·5	70·5 70·5 70	Stephens Bay, Chatham Island.	
18	..	s.s.e.	5	c o m q	30·09	30·23	72	70	68·5 71·5 71·5	..	
19	..	..	4	c g m	30·18	30·26	71·5	68·5	70·5 71 67·5	Working round the Island.	
20	..	..	4	b c	30·15	30·24	71·5	70	63 68·5 68·5		
21	..	vb l.e.	1	b c g	30·11	30·21	72	70·5	70 69·5 69	Stephens Bay.	
22	..	n.w.	2	b c		30·21	73		66·5 68·5	..	
23	10 ..	vble.	1	c g m	30·07	30·25	74	71		..	

* From Sept. 7th, Temperature of Water taken at 9 A.M., 1·30, and 6 P.M.

† Sept. 10th, changed Sympr.

‡ Sept. 14th, Barometer in cabin taken at 9 A.M. from this date.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality. Lat. Long. W.
September, 1835					Inches.	Inches.	°	°	°	
24	10 A.M.	S.E.	4	o c	30·16	30.23	71·5	68	67 67·5	Off Charles Island.
25	9 ..	S.S.E.	4	c o g	30·13	30·23	71·5	69	66 65·5	Post-office Bay.
26	..	S.E.	4	b c q		30·23	72	72	65	..
..	3 P.M.	..	4	b c g q	29·99	30·15	73	71·5	64	
27	6 A.M.	..	4	b c g	30·15			65	64·5 63·5	Black Beach Road.
28	9 A.M.	S.S.E.	4	b c g	30·18	30·27	71·5	66·5	63·5 66·5	
29	..					30·22	70·5		62	Albemarle Island.
..	Noon.	S.E.	5	b c g p q	30·07			67	58·5	s.w. extremity.
..	3 P.M.	..	6	b c m q	29·97	30·10	70·5	70	63·5	..
30	Noon.	W.S.W.	2	o c g	30·10	30·19	70·5	66	62 63·5 65·5	Elizabeth Bay.
October.										
1	9 A.M.	VBLE.	1	b c m	30·13	30·22	70·5	67	63·5 65·5	Tagus Cove.
2	..	..	1	b c g m	30·13	30·22	71	67	62 67·5	..
3	10 ..	W.	2	b c m	30·10	30·21	71·5	67	66 63 66	Banks Bay.
4	..	S.E.	4	b c m q	30·14	30·22		68	66 67 69	Off Abingdon Island.
5	..	S.	4	c m d	30·07	30·23	71·5	67	68·5 68 67·5	..
6	..	S.E.	4	o h	30·10	30·21	71	69	68·5 67·5 68·5 69	Off Towers (or Douwes) Island.
7	..	S.	4	o c g	30·12	30·20	71	66·5	70·5 68·5 66·5	Off Bindloes Island.
8	9 ..					30·22	70	68	64·5 66 65·5	James Island.
9	..	—	0	b c	30·07	30·21	72	66	67 69 67	..
10	..	S.E.	4	o c	30·14	30·24	70·5	65	67 68·5 69	..
11	..	S.	4	o c p	30·12	30·25	72	67	66·5 68·5	Chatham Island.
12	..	S.S.E.	2	b c g m	30·09	30·22	72	69	69 68·5	..
13	..	S.	4	o m p d	30·06	30·20	72	67	71 70 70	..
14	..	S.S.	4	o c q	30·08	30·21	72·5	68	70 68·5 69	Hood Island.
15	Noon.	S.	5	c g q m	30·04	30·17	72	69	66·5 65·5 64·5	Post-office Bay.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat.	Long. W.
October, 1835.											
16	10 A.M.	S.E.	4	c m q	30·07	30·23	72·5	69	65 65·5	Post-office Bay.	
17	9 ..	S.	4	b c	30·10	30·22	72·5	67	68·5 68 66	Albemarle Island, East side.	
18	10 ..	S.E.	2	b c h	30·00	30·19	72	70	66 69 70·5	Off James Island Sugar-loaf.	
19	9 ..	VBLE.	4	b c m	30·98	30·16	73	69	68·5 72 73	Close to Abingdon Island.	
20	10 ..	S.	2	b c m	30·98	30·16	74·5	72	73 75 75	Off Wenman Islet.	
21	9 ..	..	4	o c q p	30·02	30·17	75	71	74·5 74·5 74	0·51 N.	93·03
22	10 ..	VBLE.	2	b c g p	30·04	30·19	74·5	70	71·5 70·5 66·5	0·23 N.	96·53
23	..	S.E.	1	o c p q	30·07	30·22	73	66	65 66 66	0·30 S.	99·04
24	..	..	4	o c q	30·04	30·18	72·5	68	66·5 67·5 67·5	1·47 S.	100·19
25	..	..	4	b c q	30·09	30·18	72·5	69	67·5 67·5 68	3·04 S.	102·15
26	9 ..	E.S.E.	4	b c	30·03	30·19	73	70	68·5 70 70	4·54	104·34
27	10 ..	E. b. N.	4	b c	29·99	30·18	73·5	72	70·5 70·5 71	6·32	107·00
28	..	..	4	b c	29·95	30·16	73·5	74	72 73·5 73·5	7·18	109 48
29	..	E.	4	b c	29·95	30·19	75	73	72·5 72·5 73	7·49	112·06
30	..	..	4	b c h	29·95	30·20	76	75	74·5 73·5 73·5	8·34	114·34
31	9 ..	..	4	b c q	29·99	30·22	76·5	73	74·5	9·26	117·39
November.											
1	10 A.M.	E. b. S.	5	b c q h	30·00	30·23	77	78	75·5	10·14	120·35
2	..	E.N.E.	4	b c	29·88	30·19	77·5	79	75·5 76·5 76	11·03	123·27
3	8 ..	N.E. b. E.	4	b c	29·89	30·19	78·5	77	76 76·5 76·5	11·39	125·36
4	10 ..	E.N.E.	5	b c	29·86	30·17	78·5	77	76·5 77 77	11·56	128·03
5	..	N.E.	4	b c q	29·84	30·15	80	79	77·5	12·44	130·42

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
November, 1835.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
6	10 A.M.	N.b.E.	4	b c q	29·86	30·17	80	77	77·5 78	13·26	132·49
7	Noon.	N.	4	b c	29·82	30·17	81	79	77·5 77·5 77·5 76·5	14·05	134·43
8	8 A.M.	N.N.E.	2	o g q t l r	29·92	30·19	80	74	77 77·5 77·5	14·24	136·51
9	10 ..	..	4	o c p	29·80	30·14	80	76	78 77	14·38	138·44
..	11 ..		6	q r					77		
10	10 ..	..	5	o c q p	29·84	30·10	78·5	73	76·5 77	15·13	139·54
11	..	N. b. E.	4	b c	29·85	30·14	79	76	77 77 77·5	15·24	141·26
12	..	E.N.E.	4	b c	29·86	30·20	80·5	78	78 78·5	15·23	143·22
13	2 A.M.	..	4	o q r l t	29·82			77	78·5 77·5		
..	10 ..	..	4	b c q	29·92	30·24	81	80	78	15·44	145·12
..	4 P.M.	E.	4	b c	29·83	30·16	81·5	78	77·5		
14	9 A.M.	E. b. N	4	b c m	29·93	30·23	81	77	77·5 77·5 77·5 77	16·46	147·47
15	10 ..	..	5	b c m	29·92	30·25	81	78	76·5 77·5	Matavai Bay.	
16*											
17	9 ..	E.	4	b c q	29·89	30·27	80·5	79		..	
18	..	VBLE.	2	b c g	29·92	30·22	80·5	75		..	
19	10 ..	S.E.	2	b c	29·82	30·19	81	81		Papawa Cove.	
20	..	N.E.	2	b c m	29·80	30·13	80	78	78 79	..	
21	..	VBLE.	1	o c g	29·78	30·15	80·5	76	78·5 76·5	Matavai Bay.	
22	..	..	1	o c m t	29·76	30·12	78·5	79	77·5	..	
23	..	..	1	o c	29·78	30·13	79	80		..	
24	..	E. b. N.	4	b c p	29·76	30·14	79	77		..	
25	..	S.E.	4	b c q	29·76	30·11	79	78		..	
26	..	S.W.	1	b c	29·70			78	78·5 78 77·5	Port Papiete.	
27	..	S.S.E.	4	b c m	29·71	30·07	81	77	77 78·5 77·5	17·14	150·31
28	..	S.	1	b v	29·69	30·09	80	77	77·5 79 78	17·17	152·15
29	..	E. b. N.	4	b c	29·67	30·07	80·5	80	77·5 78·5 78·5	17·25	153·24
30	..	N.E.	2	b c	29·70	30·05	81·5	80	77·5 79·5 78·5	17·54	155·00

* Called this day Tuesday 17th Nov.

Day.	Hour.	Winds.	Force	Weather.	Sympr	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
December, 1835.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
1	10 A.M.	S.E.	2	b c	29·64	30·05	81·5	79	77·5 79	18·16	156·56
2	..	..	1	b c v	30·04*	30·10	81·5	77	78·5 78 80	18·35	158·13
3	..	..	4	b c	30·22	30·19	82	81	79·5 77·5 78·5	18·57	159·44
4	..	E.b. N.	4	b c g	30·28	30·18	81	78	78 77·5	20·00	162·29
5	..	N.E.	4	b c	30·19	30·16	81	77	77 78·5	21·00	164·55
6	..	N.E. b. E.	4	b c	30·20	30·19	82	79	78·5 78 77·5	22·02	167·00
7	..	E.	4	b c	30·26	30·20	81·5	78·5	75·5 75·5 75·5	22·58	169·39
8	..	..	5	o c p	30·30	30·18	80	74	74·5 73 73·5	23·56	172·00
9	..	E. b. N.	4	o c p	30·28	30·13	77·5	71	73 71·5 69·5	24·51	174·27
10	..	E.S.E.	6	b c	30·31	30·13	76·5	73	69·5 72 70·5	26·00	177·50
11	..	E. b. S.	4	b c	30·36	30·16	73	68·5	69 68 68·5	28·08	179·52
12	..	E.S.E.	1	b c	30·32	30·15	72·5	67	68 67 71·5	29·44	178·44
13	..	S.S.E.	5	b c	30·43	30·13	70·5	64	69·5 68 68·5	30·13	177·06
14	..	S.E.	2	b c q	30·55	30·29	69·5	66	69 65·5 66·5	31·46	175·42
15	..	E.S.E.	2	b c q	30·60	30·33	69·5	65	66·5 66·5 66·5	32·51	174·11
16	..	S.	4	b c	30·46	30·19	70	64	66 66·5 66	33·18	175·01
17	..	S.W.	7	b c q	30·27	29·92	67	61	65·5 64·5	34·20	175·36
..	4 P.M.	..	6	b c q	30·12	29·79	69	61·5	64 63·5		
18	10 A.M.	S. b. E.	7	b c q	30·37	29·94	67	57	63 63·5	34·26	174·57
19	2 ..	..	8	b c q	30·36			58	62·5		
..	10 ..	..	4	b c q	30·44	30·07	65·5	60	62·5 63	34·28	174·33

* 1st December, P.M., set Sympr. three tenths higher.

Day.	Hour.	Winds.	Force.	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. E.
December, 1835.									60·5		
20	Noon.	VBLE.	5	b c q	30·46	30·16	67	62	62·5 61·5 62	35·17	174·17
21	10 A.M.	—	0	b c m	30·60	30·30	68	66	63·5 63 61·5	Bay of Islands. New Zealand.	
22	Noon	S.	1	b c m	30·61	30·35	68	69	65·5 63·5	..	
23	..	N.N.E.	4	b c m	30·53			68	63·5 66·5	..	
24	10 A.M.	N.	2	b c	30·50	30·27	70	67		..	
25	..	VBLE.	1	o c r	30·53	30·27	70·5	66		..	
26	Noon.	E.S.E.	2	b c m	30·63			65		..	
27	10 A.M.	S.E.	4	b c	30·70	30·41	68	64		..	
28	..	..	4	b c	30·69	30·45	68	64		..	
29	Noon.	E.S.E.	4	b c q	30·60			65		..	
30	10 A.M.	E.	4	b c	30·41	30·19	69	65	66	..	
..	4 P.M.	E.N.E.	5	b c	30·32	30·06	69·5	62	65·5 63·5		
..	Midt.	N.E.	8	o q g r	30·10			63			
31	4 A.M.	..	10	o c q r	29·98			65	63		
..	10 ..	..	5	o c p	30·01	29·74	70·5	65	63·5	34·15	173·04
..	4 P.M.	..	1	o c p	30·00	29·75	72	65	63		
January, 1836.											
1	10 A.M.	N.	4	b c	30·20	29·95	70·5	65	64 58·5 65	Off Three Kings.	
2	4 P.M.	VBLE.	4	b c	30·04	29·85	71·5	67	65·5 64·5 64	34·21	170·02
3	10 A.M.	W.	4	b c	30·10	29·85	70·5	64	62·5 63·5 64	35·05	168·29
4	..	S.	5	b c q p	30·20	29·90	69	64	63 64·5 64·5	34·51	166·32
5	..	N.E.	1	o c	30·37	30·12	70	64	65·5 67·5 67	34·21	165·05
6	..	E.	1	b c	30·28	30·13	71	68	66·5 68 67·5	34·18	164·28
7	..	N.	2	b c	30·36	30·16	72·5	67	67 66·5 69·5	34·27	162·57
8	..	N.W.	5	b c q	30·20	30·06	73·5	72	70 67·5 68·5	35·10	160·21
9	Noon	S.	4	o c r	30·16	29·95	73	64	68·5 67 67·5	34·56	158·51
10	2 A.M.	..	8	b c q	30·22			63	68·5		
..	Noon.	..	6	b c q g	30·30	30·02	71	68	73	33·46	156·13
..	4 P.M.	S. b. E.	7	b c q	30·28	30·02	69·5	67	71·5 67·5		
11	10 A.M.	..	4	b c q	30·36	30·13	68	64	68 68	34·14	153·23

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
January, 1836.									68·5		
12	Noon.	E.	2	b c		29·99	71·5		70·5	Sydney Cove.	
									70·5		
13	9 A.M.	S.	1	c g t l p	30·19	30·04	71·5	63		..	
14	..	S.S.W.	2	c g p	30·20	30·03	72	64		..	
15	..	N.	2	b c g	29·87	29·79	73·5	70		..	
16	..	S.	2	b c	29·95	29·81	69	66		..	
17	..	W.S.W.	4	b c	30·01	29·84	68·5	65		..	
18	..	VBLE.	1	c g	30·21	30·08	71·5	69		..	
19	..	N.E.	1	c g	30·25	30·12	72	69		..	
20	..	..	1	b c	29·86	29·84	74	72		..	
21	..	VBLE.	1	b c g	29·83	29·80	75	72·5		..	
22	..	E.N.E.	2	b c	30·15	30·06	76	72		..	
23	..	N.E.	5	b c g	30·37	30·22	73·5	72		..	
24	..	N.W.	2	b c	29·97	29·96	74	72		..	
25	..	S.E.	4	c g p d	30·40	30·16	72	63		..	
26	6 A.M.	S.S.W.	1	b c	30·56			58·5		..	
27	9 A.M.	N.N.W.	1	b c g	30·69	30·43	71·5	64		..	
28	..	W.N.W.	1	b c g p	30·63	30·41	71·5	63		..	
29	..	N.E. by E.	2	b c	30·37	30·25	72·5	67		..	
									71		
30	Noon.	N.E.	4	b c	30·21	30·16	74	70	70·5	Port Jackson.	
									69·5		
									68		
31	10 A.M.	N.	4	o m	30·24	30·18	73·5	70	68	36·32	151·17
									67·5		
February.											
1	10 A.M.	N.	6	o c u p	29·78	29·73	73	67	62·5		
..	Noon.	..	9		29·70	29·58	74·5	67	62	39·19	150·22
..	2 P.M.	N. b. E.	10	o c q m							
..	4 ..	N. b. W.	5	o c q m	29·75	29·61	74	65	59·5		
2	2 A.M.	W.N.W.	8	b c q	29·89			57	56·5		
									58		
..	10 ..	..	5	b c v	29·92	29·66	68	56	57·5	42·01	149·21
									57		
									57·5		
3	..	VBLE.	4	b c q	30·22	29·94	64	56	58	42·48	149·56
4	..	W.N.W.	4	b c q	*29·64	29·55	65	56	56·5		
..	4 P.M.	W.	5	b c q p	29·62	29·54	64·5	56	56·5	Van Diemen's Land.	
..	Midt.	W.N.W.	6	b c q l	29·72			50	57		
									56·5		
5	10 A.M.	W.	5	b c q p	29·76	29·65	63	51	57·5	Storm Bay.	
									57		
6	..	VBLE.	2	b c q	29·82	29·74	62	51		Hobart Town.	
7	9 A.M.	S.W.	4	b c g	30·25	30·14	62·5	53		..	
8	..	VBLE.	1	c g	30·52	30·41	62·5	56		..	
9	..	..	1	b c	30·55	30·47	64	60		..	
..	Noon.	S.E.	5	b c	30·52	30·46	64	63		..	
10	9 A.M.	N.E.	2	b c	30·49	30·42	63	58		..	
11	..	N.N.W.	4	b c	30·14	30·19	65·5	67		..	
12	..	S.E.	4	b c g m	30·09	30·08	68	63		..	
13	..	E.	1	b c g	29·97	30·03	66·5	64		..	
14	Noon.	N.N.W.	6	b c q	29·55	29·77	69	74		..	
..	4 P.M.	N.W. b. N.	7	b c q	29·47	29·71	69·5	76		..	
..	9 ..	S.E.	7	b c q l	29·67			69		..	

* Feb. 3, P.M., Sympr. set two tenths lower.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality	
February, 1836.					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
15	9 A.M.	N.W. b N.	2	b c g	29·78	29·76	68	55·5		Hobart Town.	
16	..	N.W.	5	b c	30·00	30·01	66	61	57·5 59·5	..	
17	..	..	2	c g p	30·11	30·08	67·5	59·5	59 59·5 58·5	..	
18	10 A.M.	N.	4	b c	30·46	30·28	65	58	57·5 57·5	43·58	147·58
19	..	N.E. b N.	2	o d	29·86	29·89	66	59	56·5 56	44·07	145·14
..	4 P.M.	N.	4	o c p	29·86	29·85	67	56·5	54·5		
..	6 ..	S.	7	o c m p q	29·95			55			
20	10 A.M.	VBLE.	4	o c q	30·12	30·00	62·5	54	56 55 55	43·03	143·35
21	..	VBLE.	2	b c	30·32	30·16	62	51	53·5 54	42·55	142·03
22	..	E.	4	b c	30·37	30·26	62	54	54 54·5	42·29	139·46
23	..	N.E.	5	o g m	29·96	30·92	63·5	56	54·5 54 53	42·06	135·27
24	..	N.N.W.	4	o c u g	29·84	30·73	61·5	52	52·5 53·5	41·45	133·49
25	..	S.S.E.	1	b v	29·85	30·77	61·5	54	54 53·5 55	41·28	132·29
26	..	S S.W.	4	b c m	30·07	29·94	62	55·5	55 53·5 56·5	40·56	130·54
27	..	—	0	o c	30·22	30·14	62	56	56 55·5 55	40·34	129·01
28	..	VBLE.	6	o c d	30·05	30·00	62·5	56	54·5 55·5 56	40·12	127·05
29	..	..	1	o c p	29·92	29·88	61	50	55·5 56·5 56·5 57·5	39·38	125·29
March.											
1	..	VBLE.	4	o c	30·34	30·16	61	55	58 58 58·5	38·02	124·38
2	..	N.W. b. N.	4	b c	30·41	30·27	62	58	57·5 57 57·5	39·26	123·56
3	..	VBLE.	2	b c	30·45	30·36	63	59	59 59 58·5	38·03	123·20
4	..	..	1	o c g	30·36	30·33	64·5	60	58·5 59·5 60·5	37·39	122·57
5	..	N.N.E.	4	b c m	29·93	29·96	67	65	62 64 63	36·49	120·41
6	..	VBLE.	4	b c q	30·16	30·10	64·5	61·5	63·5 65·5 66·5	King George Sound.	

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
March, 1836.					Inches.	Inches.	°	°	°	Lat. S.	Long. E.
7	10 A.M.	E.S.E.	5	b c	30·13	30·19	66·5	63·5	66·5	King George Sound.	
8	9 ..	S.E.	4	b c	30·09	30·21	67	66		..	
9	..		4	b c q	29·80	30·02	68·5	68		..	
10	Noon.	W.N.W.	6	b c q	29·68	29·83	70	70		..	
..	6 P.M.	W.S.W.	7	b c q	29·78			60			
11	9 A.M.	VBLE.	1	c g	29·93	29·99	70	63		..	
12	..	W.N.W.	5	c g q p	30·19	30·12	67	53·5		..	
									62·5		
13	..	S.W.	6	b c q p	30·18	30·16	65	59	62·5	..	
									62·5		
									64		
14	..	S.	4		30·45	30·32	64·5	56	65	..	
									65·5		
									64		
15	10 ..	VBLE.	2	b c q	30·48	30·37	66	58·5	62	..	
									62		
									65·5*		
16	..	E.	2	b c	30·41	30·40	65·5	62	67·5	35·34	
									66·5		
									63·5		
17	..	N.E. b. N.	4	b v	30·13	30·20	67·5	65	68·5	35·02	114·00
									64		
									66		
18	..	VBLE.	1	b m	30·03	30·11	69·5	66	69·5	34·32	113·39
									68·5		
									66		
19	..	W. b. N.	4	b c q	30·14	30·17	70	65	66	32·43	112·58
									65·5		
									67·5		
20	..	S.	4	b c	30·27	30·29	69·5	64	68·5	30·34	111·14
									67·5		
									69		
21	..	S. b. E.	5	b c p	30·30	30·35	69·5	67	68·5	28·08	109·31
									71		
									72		
22	..	S.E. b. S.	5	b c q	30·18	30·30	72	71	72	25·38	107·27
									71·5		
									73·5		
23	..	S S.E.	5	b c	30·00	30·22	73·5	74	74	23·08	105·51
									73·5		
									73·5		
24	..	E.S.E.	4	b m	29·96	30·22	76·5	75	75·5	20·56	104·22
									75·5		
									75·5		
25	..	S.E.	4	b c	29·94	30·23	78	76	76	18·44	103·00
									76		
									76·5		
26	..	..	5	b c m	29·88	30·17	79	76	77·5	16·03	101·17
									78		
27	..	..	7	o c m q	29·75	30·07	80·5	77	79·5	13·22	99·07
..	4 P.M.	..	7	b c q	29·63	29·98	82	81	79·5		
									79		
28	10 A.M.	..	8	o c q p	29·70	29·98	82	75·5	78·5	12·28	97·49
..	4 P.M.	..	7	o c m q p	29·62	29·92	81	79			
29	10 A.M.	S.	7	o c m q	29·64	29·96	81	78	78·5		
..	Noon.	S.W.	6	o c m q p	29·61	29·88		78	79	12·25	97·31
..	8 P.M.	..	8	o c m q p	29·66			75	78·5		

* 16th March, 6 A.M., passed through a remarkable tide ripple, or meeting of waters.

Day.	Hour.	Winds.	Force.	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches	Inches.	°	°	°	Lat. S.	Long. E.
March, 1836.									78·5		
30	10 A.M.	W. b. N.	4	o c q p	29·71	30·02	81·5	76	79	11·49	9·30
									78·5		
									78·5		
31	..	N.W.	4	b c	29·70	30·04	82	79	79	12·18	97·15
April.									79·5		
1	..	N.E.	2	b c	29·75	30·09	82·5	80	78·5	12·08	97·01
									80		
2	..	E.S.E.	1	b c m	29·78	30·15	82·5	81	79·5	Keeling Island.	
									82·5		
3	9 A.M.	..	4	b c	29·82	30·18	82	80		..	
4	..	E.	4	b c	29·86	30·22	82·5	80		..	
5	8 ..	E. b. S.	6	b c q	29·84	30·21	82	80	79·5		
..	Noon.	E.S.E.	6	b c q	29·81	30·20	82·5	81	80	..	
..	6 P.M.	..	6	b c g q	29·78	30·15	82·5		79·5		
6	8 A.M.	..	7	b c q m	29·83	30·21	82	79	78·5		
..	Noon.	..	7	b c q m	29·83	30·21	82	80	79·5	..	
..	6 P.M.	..	7	b c q m	29·81	30·18	82·5	79	79·5		
7	6 A.M.	..	8	b c q	29·87						
..	9 ..	..	7	b c q m	29·87	30·23	82	79		..	
8	Noon.	S.E. b.E.	7	b c m q	29·81	30·23	82	80		..	
9	9 A.M.	..	6	b c q m p	29·85	30·20	81·5	79		..	
10	..	..	5	b c q m	29·84	30·18	81·5	78·5		..	
11	Noon.	..	5	b c q m	29·80	30·17	81*	79		..	
12	9 A.M.	..	5	b c g q p	29·82	30·16	80·5	78		..	
									78·5		
13	10 ..	E.S.E.	4	b c	29·74	30·14	81·5	79	79	12·12	94·38
									79		
14	..	..	4	b c p	29·80	30·16	81	76	78·5	12·37	92·19
									78·5		
15	..	E. b. S.	4	b c	29·76	30·11	81	79	78·5	12·59	89·56
									79		
									79		
16	..	E.	2	b c m	29·72	30·11	82	80	79·5	13·23	87·41
									79·5		
									79		
17	..	E.S.E.	4	b c	29·76	30·12	81·5	78	79·5	14·04	85·44
									79		
									77·5		
18	..	E.	1	o q c p	29·84	30·10	82	74	78	14·37	83·07
									78		
									78·5		
19	..	S.E.	5	b c q	29·81	30·11	80	77	79	15·18	80·10
									78·5		
									78		
20	..	E.S.E.	5	b c	29·73	30·15	81·5	79	78·5	16·02	76·50
									78·5		
									78		
21	..	S.E.	5	oc p q	29·76	30·11	81·5	80	79·5	16·48	73·37
									79		
									77·5		
22	..	N.E.	2	b	29·75	30·16	82	79	79	17·28	71·36
									78·5		
23	..	E. b. N.	2	b c m	29·77	30·16	82·5	79	78·5	17·39	69·49
									78·5		
24	..	..	2	b c v	29·81	30·20	82·5	80	79·5	17·55	67·58
									79		

* April 11th, lost Self-registering Thermometer in sounding.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches	°	°	°	Lat. S.	Lat. E.
April, 1835.									79		
25	10 A.M.	S.	4	b c u g	29·82	30·18	82·5	79	78·5 78·5 78·5	18·18	66·39
26	..	..	4	b c	29·85	30·20	81	78	78·5 78 78	18·33	64·14
27	..	S.S.E.	2	b c	29·85	30·21	80·5	78	78·5 78 78·5	18·32	61·50
28	..	S.E.	2	b c	29·89	30·23	81	77	79 78·5 78·5	19·30	59·44
29	..	..	4	b c p q	29·88	30·23	81	78	78	Mauritius.	
30	9 ..	S.W.	2	b c p	29·84	30·16	79	76		Port Louis.	
..	Noon.	E.	4	b c	29·81	30·15		78		..	
May.											
1	9 A.M.	S.E.	5	b c	29·89	30·22	79·5	78		..	
2	..	S.E. b. E.	5	b c q	29·95	30·23	78·5	78		..	
3	Noon.	E.S.E.	2	b c	29·81	30·22	79·5	81		..	
4	9 A.M.	—	0	b c	29·89	30·23	79	77		..	
5	..	E.N.E.	2	b c	29·91	30·21	78	76		..	
6	..	S.E.	2	b c q	29·96	30·24	77·5	75		..	
7	..	..	2	b c	29·95	30·31	77·5	76		..	
8	..	S.S.E.	5	b c q	30·05	30·37	77·5	76		..	
9	..	S.E. b. S.	4	b c	30·06	30·39	77·5	75		..	
10	10 ..	S.E.	5	b c q p	30·12	30·38	78·5	74	77·5 76	20·15	55·08
11	..	..	5	b c q p	30·16	30·45	78	76	76 76·5 76	21·57	52·06
12	..	..	5	b c q	30·28	30·50	78	74	76·5 76 75	23·58	49·03
13	..	VBLE.	4	b c	30·31	30·53	77	73	76 73·5 73·5	26·07	46·07
14	..	E.N.E.	2	b c	30·13	30·37	76·5	74	74·5 74 74·5	27·31	42·40
15	..	VBLE.	1	b c	30·06	30·32	77·5	74	75·5 75 73·5	27·30	41·01
16	..	..	1	b c	30·10	30·34	76·5	71	74 73·5 72	27·22	40·06
17	..	E.	2	b c	30·17	30·44	76·5	71	72·5 73·5 72·5	27·50	37·52
18	..	S.E.	4	b c g	30·26	30·46	77·5	73	73 72·5	28·15	35·09
19	..	E.N.E.	5	b c m	30·27	30·47	76·5	73·5	73·5 72·5	30·21	32·44
20	..	N.E.	5	b c	30·14	30·34	77	72	73·5 73·5	32·28	29·43
21	..	S.W.	7	o c q	30·08	30·16	75	67	71·5 70·5	33·49	27·28
22	..	N.E.	4	b c	30·26	30·31	73	62	63·5 63	34·29	25·27

Day.	Hour.	Winds.	Force.	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. E.
May, 1836.									63		
23	10 A.M.	N.N.E.	4	o c q	29·74	29·94	73	66	64 63 62·5	34·49	22·48
24	..	VBLE.	2	b c	30·12	30·21	72	63	63·5 62·5 63	34·43	22·41
25	..	N.W.b.W.	5	b c	30·20	30·26	68	61·5	62 62·5	35·29	21·58
26	..	N.W.	7 6	b c q	30·07	30·10	71	61	62 61·5	35·15	21·22
27	..		2	b c	30·14	30·20	68·5	62	62 61 60	35·06	20·24
28	..	S.W.	2	b	30·03	30·09	69	61	61·5 61	34·52	19·58
29	2 A.M.	N.W.	10	b c q l	29·73			60			
..	Noon.	..	9	o g q u	29·69	29·75	69	59	60·5	35·11	20·02
..	4 P.M.	..	10	b c q	29·68	29·78	68	58			
..	Midt.	W.	8	b c q	29·84			59			
30	10 A.M.	S.W.	5	b c q	30·16	30·14	67·5	60	60·5	35·12	19·42
31	..	VBLE.	2	b c r	30·35	30·36	67·5	57	60 61	Cape of Good Hope.	
June.											
1	9 A.M.		5	b c g	30·29	30·35	65·5	59		Simon Bay.	
2	..	—	0	b c	30·48	30·53	64·5	60		..	
3	..	S.S.E.	6	b c q	30·47	30·53	65	61		..	
4	..	—	0	b m		30·47	65	64		..	
5	..	..	0	b m		30·45	65			..	
6	..	VBLE	1	b c m	30·36	30·42	65	67		..	
7	Noon.	N.N.W.	6	b m q	30·10	30·37		75		..	
8	9 A.M.	W.	4	b c q	30·32	30·40	66·5	63		..	
9	..	S.S.E.	2	b c	30·45	30·51	64	57		..	
10	Noon.	N.W.	1	b c m	30·32			64		..	
11	..	E.	1	b c	30·09			63		..	
12	..	VBLE.	2	b c	30·16			60		..	
13	..	N.W.	4	b c q p	30·29			57		..	
14	..	N.N.W.	4	c o g q	30·25	30·33	63	60		..	
15	..	N.W.	4	b c m	30·12	30·22	63	60		..	
16	..	..	6	c o q r	30·00	30·08	63·5	57		..	
17	6 A.M.	S.b.E.	8	c g q p d	30·07	30·18	62·5	54	55·5	..	
..	Noon.	S.S.E.	5	b c q	30·24	30·33	62·5	56		..	
18	..	N.N.W.	4	b c	30·39	30·45	62·5	58	55·5 58·5	..	
19	10 A.M.	..	4	b c	30·15	30·20	63	57	58·5 58·5 60·5	34·57	17·08
20	6 ..	N.	9	o c q g	29·85			58			
..	10 ..	N.W.	9	b c q	29·92	29·93	65	58	61·5 59	34·57	16·55
..	4 P.M.	..	8	b c q	29·98	30·06	65·5	57	59·5		
21	10 A.M.	VBLE.	1	b c	30·36	30·38	65	59	59·5 60	33·35	16·55
22	..	..	2	b c m	30·30	30·35	65	58	59·5 59·5 60 59·5	32·47	17·12

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
June, 1836.					Inches.	Inches.	°	°	°	Lat. S.	Long. E.
23	10 A.M.	VBLE.	1	b c g	30·32	30·43	66	59·5	58·5 59·5 59·5 59·5	31·47	17·01
24	..	S.S.E.	2	b c m w	30·29	30·36	66·5	61	58·5 59·5 60·5	30·35	15·38
25	..	VBLE.	1	b c	30·24	30·34	67	60	60·5 61 61	29·18	13·44
26	..	S.	4	b c q	30·36	30·44	66	61	61·5 61·5	27·49	11·52
27	..	S.S.E.	5	o c g q	30·37	30·44	67	61	62·5	25·44	9·14
28	..	VBLE.	2	o c g	30·17	30·31	66	62	63·5 65	23·36	6·58
29	..	..	2	b c g	30·11	30·27	66·5	63	65·5 65 65	23·04	5·13
30	..	..	1	b c	30·17	30·45	68	65	66 65·5	21·59	4·49
July.											
1	..	..	2	o c	30·24	30·42	68·5	65	66 66·5	21·00	3·16
2	..	S.E.	4	o c g	30·16	30·39	69	67	67 67*	19·58	1·19 E.
3	..	VBLE.	2	o c q	30·14	30·37	69	65	67·5 67·3 67·3	18·56	0·24 W.
4	..	..	4	o c g q	30·14	30·33	69	65	68 68 68	18·14	2·04 W.
5	..	N.	1	b c	30·04	30·31	69·5	68	69 68·7 68·2	17·57	3·43 W.
6	..	VBLE.	2	b c	30·06	30·30	71	67·5	69 68·5 68	17·07	3·43
7	..	S.	4	o c	30·12	30·32	71·5	68	69 68·5 68·5	16·17	3·37
8	..	S.E.	4	b c q	30·15	30·42	72	69	68·5 68·5 68·5	St. Helena.	
9	9 ..	S.	4	b c q p d	30·15	30·39	71	67	68·5	..	
10	Noon.	S.S.E.	4	b c q p	30·11	30·35	71	68		..	
11	9 A.M.	..	4	b c g q p	30·11	30·39	71	67		..	
12	..	S.E.	4	b c g p	30·13	30·39	71	66		..	
13	..	..	2	b c q p		30·36		66		..	
14	..	..	2	b c	30·10	30·36	70·5	67	68·5 68 69·5	..	
15	10 ..	VBLE.	4	b c q p	30·02	30·26	71·5	65	70 70 70·5	14·11	7·53
16	..	S.	1	b c	29·90	30·20	72·5	68	71* 71 72	13·27	8·53
17	..	..	2	b c	29·97	30·28	73	72	72·5 72·3	12·17	10·15

* 3d and 16th, Temperature of water taken at night.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. S.	Long. W.
July, 1835.									73		
18	10 A.M.	S.E.	4	b c	30·00	30·31	74	70	74	10·27	12·04
									74		
									75		
19	..	..	5	b c q p	29·94	30·29	76	73	75·3	8·11	
									75		
20	Noon.	..	6	b c q p	29·89	30·30	76·5	76		Ascension.	
21	9 A.M.	..	4	b c g q p	29·93	30·29	75·5	72		..	
22	..	..	4	b c q	29·92	30·28	76	74		..	
									75·3		
23	Noon.	..	5	b c q	29·89	30·30	77	75	75	..	
									75·5		
									75·5		
24	10 A.M.	S.S.E.	4	b c q	29·98	30·33	76·5	73	75·5	9·08	16·52
									75		
									74·5		
25	..	S.E.	4	b c q	29·96	30·31	76·5	73	75	10·28	19·35
									74·5		
									74		
26	..	..	5	b c q	29·96	30·30	77	74	74·5	11·17	22·43
									75		
									74		
27	..	..	5	b c q	29·96	30·31	77	72	74·5	11·47	26·13
									74·5		
28	9 ..	VBLE.	4	b c		30·32	77		75	12·05	29·05
									75·5		
29	10 ..	E.	2	b c m	29·89	30·27	77·5	73	75·5	12·19	31·33
									76		
30	..	..	4	b c	29·85	30·24	77·5	74	76·5	12·44	34·14
									76·5		
31	..	..	4	b c	29·87	30·29	78	76	76	12·51	36·31
August.											
1	..		4	b c	29·90	30·32	78·5	75	74·5		
2	9 ..	S.S.E.	4	b c	29·90	30·32	78·5	75		Bahia.	
3	..	S.W.	4	b c	29·95	30·34	77·5	73		..	
4	..					30·32	77·5			..	
5	Noon.	S.S.W.	2	b c	29·90	30·32	77·5	75		..	
									74		
6	..	S.W. b. W.	4	b c	29·88	30·30	77	73	75·5	..	
									75		
									74		
7	10 A.M.	VBLE.	4	b c q	29·94	30·31	77	74	75·5	13·02	38·15
									75·5		
8	..	..	2	o g	29·92	30·31	77	74	75·5	12·55	37·47
9	..	..	4	b c	29·90	30·32	78	76	75·5	12·53	37·23
									76		
10	..	S.E.	5	b c q	29·90	30·31	77·5	74	76·5	11·30	36·17
									76·5		
									76		
11	..	VBLE.	4	b c q	29·94	30·31	78	74	76	9·45	35·20
									75·5		
									75		
12	..	S.E.	4	o c m g q p	29·90	30·26	77·5	73	76	7·58	
									75·5		
13	Noon.	..	6	b c q	30·11*	30·30	78·5	75·5		Pernambuco, Inner Harbour.	

* Set Sympr. 0·26 higher, 12th August, P.M.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
August, 1836.					Inches.	Inches.	°	°	°	Lat.	Long. W.
14	9 A.M.	S.E.	4	b c	30·14	30·29	78	75	75·5 76·5 76·5	Pernambuco, in the Roads.	
15	..	..	4	b c	30·12	30·28	78	76	76 76·5	..	
16	10 ..	E.S.E.	5	b c g p r	30·10	30·24	78·5	74	77 75·5 76·5 76·5	..	
17	..	S.E.	4	b c g		30·22	78·5	76	76 76·5 76·5	..	
18	..	E.	5	b c q	30·06	30·25	79·5	77	76·5 77	6·53 s.	34·30
19	..	S.E.	5	b c q	30·10	30·26	80	76	76·5 76·5 76	4·22 s.	33·30
20	..	..	4	b c q	30·11	30·30	80	78	76·5 76 76·5	1·58 s.	31·57
21	..	..	4	b c	30·09	30·24	80	75	75·5 76 76·5	0·15 N.	30·41
22	..	..	4	b c	30·07	30·25	79	76	77·5 77·5 77	2·08	29·35
23	..	..	4	b c q	30·06	30·26	80	76	78 78·5 78·5	4·09	28·40
24	..	S. b. W.	2	b c	30·04	30·25	80·5	79	79 79·5 79	6·09	26·48
25	..	S.W.	2	b c	30·00	30·25	81	79	79 79 78·5	8·07	25·25
26	..	VBLE.	2	b c	30·00	30·20	82	77	78·5 79 79·5	9·57	24·18
27	..	..	2	b c m	29·86	30·14	82	80	79 81 80	10·40	23·42
28	2 A.M.	S.W.	10	o g q r	29·72			76			
..	10 ..	S.	2	o c	29·96	30·16	82	78	78·5 79·5	12·27	23·27
29	..	VBLE.	1	b c m	29·98	30·23	82	78	81 79·5 78·5	13·41	23·22
30	..	N.b.E.	2	b c m	30·00	30·24	82·5	78	79·3 79·2	14·20	23·05
31	9 ..	N.E.	4	b c q		30·23	80·5		77	Porto Praya.	
September.											
1	..	N.N.E.	4	b c	30·01	30·26	81	77	78 78·5 78	..	
2	..	N.E.	4	b c	30·04	30·28	81	78		..	
3	..	..	5	b c q	29·97	30·26	80·5	79		..	
4	..	..	4	b c q	29·94	30·22	81	79		..	
5	10 ..	..	5	b c	30·02	30·23	82	77	78·5	14·24	25·21

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
September, 1836.					Inches.	Inches.	°	°	°	Lat. N.	Long. W.
6	10 A.M.	N.E.	4	b c m q	30·22*	30·26	81	78	78 78 77·5	16·01	27·44
7	..	..	5	b c m	30·26	30·28	80	78	77 76·5 76·5	18·12	29·58
8	..	E.N.E.	5	b c	30·35	30·32	78·5	74	76 76·5 76	20·46	31·54
9	..	VBLE.	5	b c q p	30·39	30·32	77·5	73	75·5 76 75·5	23·07	32·25
10	..	E.N.E.	4	b c	30·39	30·36	77	76	75 75·2 74·5	25·41	34·34
11	..	E. b. N.	2	b c	30·39	30·38	76·5	73	74 74·5 74·5	27·52	35·47
12	..	W.N.W.	2	b c	30·32	30·31	77	73	74·5 75·5 75	28·42	35·17
13	..	N.E.	2	b c	30·34	30·27	77	72·5	73·5 75·5 75	29·59	36·23
14	..	S.E.	2	b c	30·32	30·29	77·5	76	74·5 73·5	30·37	36·23
15	..	S.W.	5	b c m	30·25	30·26	78·5	74	74 74 73·5	32·41	34·30
16	..	S.S.W.	5	b c m	30·26	30·22	78·5	74	72·5 71·5	35·15	32·22
17	6 A.M.	S.	8	o m q g	30·16				71		
..	10 ..	..	6	b c q m	30·24	30·18	78	73	69·5 70 69·5	36·49	29·31
18	9 ..					30·26	77	73	70·5 69·2	38·03	27·39
19	10 ..	N.N.W.	2	b c	30·50	30·36	75	66	68·5		
20	..	S.W.	1	b c f	30·42	30·35	73·5	71		Angra Roads.	
21	..	VBLE.	1	o c n	30·40	30·35	74·5	72		..	
22	..	S.W.	4	o c r	30·42	30·31	75·5	72	68	..	
23	..	VBLE.	1	b c	30·60	30·48	75	70	70 69·5	37·58	
24	..	S.S.E.	4	b c	30·62	30·50	73	69	70·5 70	Off St. Michaels.	
25	..	S.	2	o c g	30·46	30·34	74	70	69 68	39·20	24·30
26	..	N.W.	2	b c	30·37	30·24	72	66	67·5 66 65·5	41·05	22·07
27	..	..	4	b c	30·52	30·32	68·5	63	65 64·5	42·28	19·32
28	..	W.	4	o c g d	30·36	30·16	69	67	64† 64·5	44·33	16·29
29	..	..	10	c g q p	29·88	29·54		59	61		

* 5th Sept., Noon, set Sympr. 0·17 higher.

† 27th Sept., P.M., broke Water Thermometer; used from this time Ivory (No. 25.)

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.	
					Inches.	Inches.	°	°	°	Lat. N.	Long. W.
SEPTEMBER, 1836.											
29	10 A.M.	N.W.	9	b c q m	30·11	29·73	65·5	59	61·5	45·43	13·43
..	4 P.M.	N.	7	b c q	30·37	30·03	67·5	60	62		
30	10 A.M.	N.W.	2	b c q	30·46	30·17	65·5	58	60·5		
..	4 P.M.	VBLE.	2	o c q	30·38	30·06	66	59	61 60·5	46·31	11·41
..	Midt.	S.W.	8	g q p	30·00			60			
OCTOBER.											
1	10 A.M.	N.W.	9	b c	29·58	29·52	67	61	59·5		
..	2 P.M.	..	10	b c q p	29·46				58·5	48·15	8·58
..	4 ..	..	9	b c q p	29·51	29·46	67·5	56	58·5		
2	10 A.M.	W.	5	b c q p	29·80	29·72	63	51	55 56·5		
..	9 P.M.	S.	5	b c q p	29·30	29·56	60	52		Falmouth.	
..	Midt.		11	o u g q	29·16	29·08		49			
3	10 A.M.	N.N.W.	4	b c q	29·64	29·69†	60·5	50	56·5	..	
..	6 P.M.	S.W.	4	b c q p	29·72	29·67	60·5	50			
4	9 A.M.	—	0	b		29·67	60	52			
..	Noon.	S.W.	2	b	29·76	29·71	59·5	54		..	
..	4 P.M.	N.W.	2	b	29·80	29·74	59·5	53	56·5		
5	9 A.M.	E.				30·02			55		
..	4 P.M.	S.	2	b c	30·18	30·06	59	56		Plymouth.	
6	9 A.M.	N.N.W.	2	b c m	29·97	30·04	59	53			
..	4 P.M.	W.S.W.	1	b c g	29·86	29·86	59	55		..	
7	9 A.M.	S.W.	5	b c q	29·58	29·59	59·5	55			
..	3 P.M.	S.S.E.	6	b c q	29·44	29·46	59·5	58		..	
8	9 A.M.	S.W.	2	b c	29·59	29·55	60	54		..	
..	3 P.M.	S.S.W.			29·59	29·55	59·5	57			
9	9 A.M.	W.	5	b c q	29·56	29·53	58	54		..	
10	9 ..	..	6	b c q p	29·47	29·44	59	55		..	
..	3 P.M.	W.S.W.	6	b c q p	29·50	29·50	59	56	56·5		
11	4 A.M.	S.W.	11	b c q	29·34			51			
..	9 A.M.	W.	2	b c g q	29·50	29·48	58·5	53		..	
..	3 P.M.	S.W.	4	b c p	29·54	29·52	58·5	55			
12	9 A.M.	W.S.W.	4	b c g q	29·76	29·73	58·5	54		..	
..	4 P.M.	S.S.E.	9	c g q r	29·42	29·42	59	53			
..	8 ..	W.S.W.	11	b c q p	29·08	29·13	59	55			
..	10 ..	..	10	b c q p	29·11	29·12	58·5	55			
13	10 A.M.	W.	5	b c q p	29·49	29·39	58	53		..	
..	3 P.M.	S.W.	4	b c q	29·51	29·49	57·5	56			
..	Midt.		9	b c q p							
14	9 A.M.	S.W.	4	b c	30·03	29·96	57	54		..	
..	3 P.M.	..	4	b c	30·08	30·03	58	57		..	
15	9 A.M.	S.S.W.	2	b c	30·00	29·96	57	55		..	
16	9 ..	S.E.	2	b c m	30·35	30·25	59	54		..	
..	3 P.M.	..	5	b c q	30·26	30·24	59	58			
17	9 A.M.	E.S.E.	4	b c q	30·27	30·23	60	60		..	
..	3 P.M.	S.E.	5	b c q	30·19	30·23	61	61			
18	9 A.M.	..	2	b c m	30·30	30·25	61	60	56·5		
..	Noon.	S.S.E.	2	b c m	30·29	30·24		61	57		
		VBLE.									
..	4 P.M.	W.S.W.	1	b c m	30·28	30·26	61·5	60	57·2		
19	10 A.M.	N.N.W.	4	b c m	30·56	30·47	61	56	57·2		
..	4 P.M.	N.	2	b m	30·54	30·50	62	56	58·3 57·5	50·17	
20	10 A.M.	S.E.	2	b c m	30·70	30·60	61·5	57			
21	10 ..	..	4	b c m	30·63	30·46	60·5	53	57		

* 1st Oct., A.M., set Sympr. 0·27 lower.

† 3d Oct., 12·30 A.M., Barometer lowest 29·66.

Day.	Hour.	Winds.	Force	Weather.	Sympr.	Barom.	Attd. Ther.	Temp. Air.	Temp. Water.	Locality.
October, 1836.							°	°	°	
21	3 P.M.	S.E.	5	b c m	30·56	30·44	59·5	53	57·5	
22	10 A.M.	..	2	b c m q	30·68	30·53	59·5		57·5	
..	3 P.M.	E	4	b c	30·68	30·54	59·5	53	56·5	
23	9 A.M.	N.	2	b m		30·55	59			
..	4 P.M.	VBLE.	2	b c m	30·66	30·52	58	51	57·5	
24	10 A.M.	—	0	b c m	30·62	30·53	58	54		Downs.
..	4 P.M.	N.W.	2	b f	30·63	30·50	59	55	56·5 57	
25	10 A.M.	..	4	b f	30·56	30·44	59·5	52	57	
..	4 P.M.	..	2	f m	30·50	30·37	59	52	55·5 54·5	
26	10 A.M.	N.W.b.N.	2	b m	30·	30·35	60			
..	4 P.M.	N.W.	1	o g m	30·36	30·28	60	51	54·5 54·5	
27	10 A.M.	W.	8	o c q	30·00	29·88	59	49	53·5	Thames.
..	6 P.M.	N.W.	6	b c q	30·25	30·04	57	41	53·5 52·5	
28	10 A.M.	..	4	b c q	30·26	30·11	56	40	52·5 51·5	
..	8 P.M.					30·02	55			Greenwich.
29	9 A.M.	N.b.E.	2	o g	29·87	29·69	53	35		
..	Noon.	N.N.E.	4	o g s	30·00			35		..
..	3 P.M.	N.b.E.	4	b c g	30·10	29·91	53	35		
30	9 A.M.					30·20	51·5			
..	Noon.	N.	1	b m	30·44			36		..
..	3 P.M.					30·22	51·5			
31	8 A.M.					30·28	52	32		
..	Noon.		1	b m	30·52			37		..
..	3 P.M.	..	1	b m	30·51	30·28	51·5	39		
November.										
1	9 A.M.	W.S.W.	1	b c g m	30·50	30·28	49·5			
..	Noon.	S.W.	2	c g m	30·48			38		..
..	3 P.M.	..	2	c g m	30·49	30·32	50	40		
2	9 A.M.	W.S.W.	1	b c g m	30·30	30·13	52	49		
..	Noon.	W.b.S.	2	c g m	30·23			52		..
3	9 A.M.	W.S.W.	1	b c g m	30·08	30·05	54	47		
..	Noon.	..	2	b c g m	30·01			51		
4	9 A.M.	W.	4	c g q m	29·87	29·78	54	45		
..	Noon.	..	4	c g q m	29·83			46		..
..	3 P.M.	..	4	c m p d	29·78	29·68	53·5	44		
5	9 A.M.	VBLE.	2	b c g q	29·43	29·36	53·5	45		
..	Noon.	W.N.W.	4	b c g q p	29·53			44		..
..	3 P.M.	..	5	b c q	29·63	29·47	53	45		
6	9 A.M.	W.S.W.	2	b c	29·82	29·66	52·5	37		..
..	3 P.M.	W.N.W.	4	b c q	29·87	29·66	51·5			Woolwich.
7	9 A.M.	..	2	b c m	29·99	29·82	52	35		
..	3 P.M.	N.W.	2	b c m	30·08	29·91	50·5	42		..
8	8 P.M.	S.W.	1	b c m	30·46	30·28	48	38		..
9	9 A.M.	..	2	b c g	30·38	30·18	48	45		..

While the Beagle was at Plymouth, in 1831, an excellent marine barometer, made by Jones, (with an iron cistern) was sent by water from the maker's hands. This instrument was suspended in my cabin, with the cistern at the level of the sea (excepting during the first eight months, when it was placed six feet higher), and by it all the barometrical observations recorded in this table were taken or corrected.

In 1836, while conveying the same barometer by land from Woolwich to London, it was seriously injured, and therefore, to give value to its indications while on board the Beagle, I annex some corresponding observations, made at the Royal Observatory, and at Somerset House.

EXTRACT

FROM

THE REGISTERS OF THE STANDARD BAROMETERS OF THE ROYAL SOCIETY, AT SOMERSET HOUSE; AND OF THE ROYAL OBSERVATORY, AT GREENWICH.*

Day.	Hour.	R.S. Bar.	Attd. Ther.	R.O. Bar.	Day.	Hour.	R.S. Bar.	Attd. Ther.	R.O. Bar.
NOVEMBER, 1831					DECEMBER, 1831.				
5	9 A.M.	29·520	47·6	29·40	1	9 A.M.	30·170	46·8	30·06
6	..	29·607	47·3	29·44	2	..	30·027	46·7	29·92
8	..	29·666	49·3	29·58	3	..	30·148	47·7	30·05
10	..	30·421	43.4	30·30	5	..	29·837	48·8	29·73
11	..	30·245	47·4	30·13	6	..	29·432	48·8	29·32
12	..	30·326	51·0	30·22	7	..	28·924	50·7	28·83
13	..	29·994	51·8		8	..	29·139	51·3	29·05
14	..	30·053	45·3	29·93	9	..	29·190	55·3	29·08
15	..	29·478	44·2	29·38	9	3 P.M.	29·206	56·3	29·13
16	..	29·312	41·4	29·21	10	9 A.M.	29·418	53·8	29·31
17	..	29·585	39·7	29·47	12	..	29·307	53·8	29·21
18	..	29·691	38·5	29·58	14	..	29·573	51·5	29·48
19	..	29·436	40·7	29·32	18	..	29·373	49·5	
22	..	29·850	48·8	29·75	19	..	29·567	46·7	29·46
23	..	29·966	52·7	29·87	19	3 P.M.	29·643	47·6	29·54
24	..	30·032	53·4	29·92	27	3 P.M.	30·418	40·0	30·32
25	..	29·960	54·3	29·85	28	9 A.M.	30·428	40·4	30·32
26	..	29·944	54·6	29 83	28	3 P.M.	30·392	42·7	30·27
27	..	30·321	46·7	30·20					
OCTOBER, 1836.					OCTOBER, 1836.				
7	9 A.M.	29·511	54·8	29·40	7	3 P.M.	29·423	56·7	29·31
8	..	29·386	56·0	29·29	8	..	29·390	58·6	29·26
10	..	29·219	54·4	29·11	10	..	29·322	58·9	29·20
11	..	29·247	57·9	29·14	11	..	29·388	60·0	29·28
13	..	29·140	57·5	29·02	13	..	29·333	59·5	29·16
14	..	29·782	56·4	29·68	14	..	29·717	59·2	29·80
16	..	30·229	54·7		16	..	30·212	57·8	
17	..	30·210	55·7	30·10	17	..	30·176	57·7	30·08
18	..	30·174	56.9	30·06	18	..	30·150	60·3	30·02
19	..	30·241	58·5	30·15	19	..	30·322	60·3	
21	..	30·332	52·2	30·22	21	..	30·305	55·5	30·20
22	..	30·398	51·2	30·29	22	..	30·382	53·9	30·28
23	..	30·408	49·3		23	..	30·378	52·2	
24	..	30·394	51·5	30·28	24	..	30·360	53·6	30·25
25	..	30·371	52·6	30·15	25	..	30·225	53·2	30·12
26	..	30·196	52·6	30·07	26	..	30·113	54·4	30·01
29	..	29·473	42·3	29·35	29	..	29·703	41·6	29·55
30	..	30·019	39·0		30	..	30·035	41·0	
31	..	30·089	37·3	29·97	31	..	30·009	40·0	29·97
NOVEMBER.					NOVEMBER.				
1	9 A.M.	30·099	37·6	29·97	1	3 P.M.	30·008	40·4	29·90
4	..	29·570	45·4	29·46	4	..	29·451	47·0	29·34
5	..	29·140	45·6	29·03	5	..	29·287	47·2	29·14
6	..	29·459	42·1		6	..	29·439	44·6	
7	..	29·631	40·0	29·52	7	..	29·722	42·8	29·60

* Royal Society Barometer about 95 feet, and Observatory Barometer about 156 feet above the mean level of the sea. The heights of the mercury are given as read off, without any correction or reduction.

FIGURES USED TO DENOTE THE FORCE OF THE WIND.

0 Calm.

1 Light Air .....Or just sufficient to give steerage way.

2 Light Breeze	Or that in which a man-of-war, with all sail set, and clean full, would go in smooth water from	1 to 2 knots.
3 Gentle Breeze		3 to 4 knots.
4 Moderate Breeze ...		5 to 6 knots.
5 Fresh Breeze	Or that to which a well-conditioned man-of-war could just carry in chase, full and by	Royals, &c.
6 Strong Breeze		Single-reefed topsails and top-gall. sails.
7 Moderate Gale		Double-reefed topsails, jib, &c.
8 Fresh Gale		Treble-reefed topsails, &c.
9 Strong Gale		Close-reefed topsails and courses.

10 Whole Gale .....Or that with which she could scarcely bear close-reefed main-topsail and reefed fore-sail.

11 Storm .....Or that which would reduce her to storm stay-sails.

12 Hurricane .....Or that which no canvass could withstand.

LETTERS DENOTING THE STATE OF THE WEATHER.

b Blue sky; (whether clear, or hazy atmosphere).
c Clouds; (detached passing clouds).
d Drizzling rain.
f Foggy——f Thick fog.
g Gloomy (dark weather).
h Hail.
l Lightning.
m Misty (hazy atmosphere).
o Overcast (or the whole sky covered with thick clouds).
p Passing (temporary showers).
q Squally.
r Rain (continued rain).
s Snow.
t Thunder.
u Ugly (threatening appearances).
v Visible (clear atmosphere).
w Wet dew.
. Under any letter, indicates an extraordinary degree.

By the combination of these letters, all the ordinary phenomena of the weather may be expressed with facility and brevity.

Examples:—Bcm, Blue sky, with passing clouds, and a hazy atmosphere.

Gv, Gloomy dark weather, but distant objects remarkably visible.

Qpdlt, Very hard squalls, with passing showers of drizzle, and accompanied by lightning with very heavy thunder.

TABLE

OF

LATITUDE, LONGITUDE, AND VARIATION OF THE COMPASS,

ALSO

TIME OF SYZYGIAL HIGH WATER, RISE OF TIDE, AND DIRECTION OR SET OF FLOOD TIDE STREAM IN THE OFFING.

	Lat. North.	Long. West.	Var. West.	H. W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
ENGLAND.					
Devonport—Clarence Baths—at high water mark, in the meridian of Government House	50 22 00	4 10 00	25 00	5 17	20 E.
Falmouth—Pendennis Castle	50 08 33	5 02 45	24 10	5 35	17 E.
AZORES ISLANDS.					
Terceira—Mount Brazil—summit	38 38 35	27 13 00	24 19	2 30	6 W.
St. Michael's—St. Braz Castle	37 43 58	25 40 15	24 15	0 15	7 W.
CAPE VERDE ISLANDS.					
St. Jago—Port Praya—Quail Island, the west point (called also Gun Point)... ...	14 54 02	23 30 00	16 30 (15·16 in 1831)	Noon.	5 N.W.
St. Paul—Penèdo, or Peñado de San Pedro—summit	0 55 30	29 22 00	9 30		
BRAZIL.	SOUTH.				
Fernando de Noronha—Fort Concepçáõ ...	3 50 00	32 25 00	7 00	4 00	5 W.
Pernambuco—Fort Picáõ	8 3 35	34 51 30	5 54	4 23	6 N.
Bahia—Fort San Pedro...	12 59 20	38 30 45	4 18	3 30	8 S.
Bahia—in the offing...	13 00 00	38 20 00		4 30	6 S.
Abrolhos—Santa Barbara—E. summit ...	17 57 42	38 41 30	2 00	4 48	6 S.W.
			EAST.		
Rio de Janeiro—Villegagnon Islet—well ...	22 54 40	43 08 45	2 00	2 00	6 W.
Santa Catharina—Anhatomirim Islet—flag-staff	27 25 31	48 34 45	6 30		
PLATA.					
Buenos Ayres—landing-place (mole)	34 35 30	58 21 53	11 40		
Monte Video—Rat Island	34 53 20	56 13 15	12 40	about noon when at all regular.	Varble.
Gorriti—well at N.E. end	34 57 02	54 57 35	12 28		
Point Piedras—extremity of grassy part ...	35 26 50	57 05 11	12 30		..
River Sanborombon—entrance of...	35 41 40	57 18 45	12 30		
River Salado—entrance of	35 43 15	57 19 15	12 30		..
San Antonio, Cape—north extremity, above high water	36 18 30	56 45 51	13 00	Noon.	Varble.
PAMPA.					
Medano Chato—summit of	36 28 00	56 40 15			
Medano Silla—summit of	36 37 10	56 40 55			
Medanos Point—south-east summit	36 59 05	56 40 43	13 30	11 00	6 N.
Mar Chiquito—bar of	37 47 30	57 21 45			7 N.
Corrientes Cape—eastern summit	38 05 30	57 29 15	13 50	10 40	7 N.
Mogotes Point—south-east summit	38 10 36	57 30 35			
Ventana Mount—highest summit	38 11 45	61 56 18			
San Andres Point—south-east high cliff ...	38 17 20	57 39 05	14 00	10 00	8 N.E.
Hermeneg Point	38 22 40	57 51 45		9 55	
Gneguen River...	38 36 00	58 40 00			8 N.E.
Black Point—cliff summit	38 39 00	58 47 30	14 00	8 20	
Argentino Fort	38 43 50	62 14 41	15 20		
Nakedness Point—southern summit	38 49 40	59 36 55			
Wells—Anchorstock Hill—(Point Johnson)	38 56 55	61 58 30	15 00	5 51	12 W.

	Lat. South.	Long. West.	Var. East.	H. W.	R. & S.
PAMPA—*continued.*	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Asuncion Point	38 57 30	60 38 00		8 57	
Hermoso Mount—summit	38 58 50	61 39 45	14 50	5 8	12 W.S.W.
Zuraita Island—south extreme of	39 11 00	61 54 20	15 10	5 58	12 W.N.W
Ariadne Island—south extreme of	39 15 50	62 00 20	15 20	5 20	12
Labyrinth Head—summit	39 26 30	62 02 36	15 30	5 10	12
Colorado Head—one mile north of the entrance	39 50 30	62 05 30	15 40	3 40	11 N.
Colorado River—mouth	39 51 40	62 04 20	15 40	3 40	11 N.
Indian Head (Union Bay)	39 57 30	62 07 00	15 50	3 10	12
Snake Bank—south-east extreme of	40 27 00	61 54 30	16 30	2 30	12 N.
Rubia Point—summit of	40 36 10	62 08 40	16 30	2 15	12
Del Carmen Fort	40 48 15	62 58 06	17 00	1 15	11 N.W.
Raza Point—summit over extreme	40 52 10	62 18 15	17 00	Noon.	12
Leading Hill—summit	40 56 36	62 49 20			
Negro River—Main Point	41 2 00	62 45 10	17 40	11 0	14 N.E.
EASTERN PATAGONIA.					
Nipple Hill—summit of...	40 40 00	64 50 15			
Direction Hill—summit of	40 48 00	65 10 10			
San Antonio Port—Point Villarino	40 49 00	64 53 55	17 40	10 40	28 N.
Fort Hill—centre of	41 06 30	65 10 30			
False Sisters—eastern summit	41 09 00	63 03 30			
Belen Bluff—s.w. cliff	41 09 00	63 55 30	17 40	10 50	18 E.
Bermeja Head—eastern summit	41 11 00	63 07 30			
Sierra Point—summit of	41 35 45	64 54 50			
Pozos Point—summit of cliffy extremity ...	41 40 30	64 54 00	17 50	9 30	24 N.
San Antonio Sierra—summit of	41 41 10	65 12 10			
Norte Point—cliffy extreme	42 03 00	63 47 40	17 50	10 0	20 N.W.
Entrance Point—east	42 14 05	64 21 45	17 45	10 0	25
San José, Port—Point San Quiroga—extreme	42 14 15	64 27 10			
Bajos Point	42 18 00	63 34 10			
Castro Point—rise over extremity	42 25 20	65 04 00			
Valdes Port—entrance	42 30 25	63 35 20	17 50	8 15	1 N.
Cantor Point	42 30 50	63 36 00			
Pyramid—near Pyramid Road	42 34 50	64 18 30	17 50	8 0	14
Ercules Point—eastern cliff...	42 38 30	63 34 10			
Delgado Point—south-east cliff	42 46 15	63 36 30	17 50	7 50	12
Western Port—rocky point in	42 47 00	64 59 45	17 50	8 0	14
Lobos Peak	42 49 00	63 43 50			
Nuevo Head	42 53 00	64 07 30	17 50	7 20	
Nuevo Gulf—Point Ninfas—East Cliff ...	42 58 00	64 19 30	17 50	7 10	13 N.
Chupat River—middle of entrance	43 20 45	65 02 50	18 06	5 0	12 N.
Delfin Head—summit	43 31 00	65 12 06			
Lobos Head—summit	43 46 40	65 17 30	18 30	4 40	13 N.
Tombo Point—extreme...	44 07 00	65 14 30			
Atlas Point—summit	44 11 40	65 15 30	18 50	4 10	14
Raza Cape—eastern summit	44 23 40	65 15 30			
Rock of Salaberria	44 25 00	65 07 20			
Santa Elena—Spanish Observatory	44 30 40	65 21 40	19 10	4 0	17 N.
San José Point—eastern summit	44 30 45	65 17 00			
Santa Elena, Port—south-west cove, Beagle's observatory (not the Spanish)...	44 32 15	65 22 30	19 06	4 0	18 N.
San Fulgensio Point	44 32 30	65 22 00			
Blanca Islet	44 54 50	65 32 10	19 00	3 20	12
Dos Bahias Cape—summit over extreme ..	44 56 30	65 32 00	19 00	3 20	12 N.
Monte Mayor Mount	44 57 35	66 24 00			
Arce Island—summit near centre of	45 00 40	65 29 15			
South Cape—near Oven	45 03 50	65 41 15	19 00	3 0	14 N.E.
Leones Island—south-eastern summit	45 04 00	65 35 15		2 10	12

	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
EASTERN PATAGONIA—*continued.*	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Melo Port—Sugar-loaf Islet, near	45 04 10	65 47 40	19 20	3 40	15 N.E.
Raza Islet	45 06 10	65 24 30			
Medrano Rocks	45 10 00	65 53 30			
Malaspina Cove—South Point	45 10 10	66 31 50	19 30	2 50	16 N.
Aristazabal Cape—south-east pitch	45 12 45	66 31 10			
Matalinares Head	45 24 00	67 02 30			
Salamanca Peak	45 34 00	67 19 30			
Novales Ledge...	45 43 10	67 17 20			
Cordova Head...	45 46 00	67 21 40	19 40	1 20	20 N.
Tilly Road—Point Marques—eastern cliff	45 57 00	67 34 20	19 42	1 15	20 N.
Murphy Head...	46 31 10	67 23 10	19 40	1 00	
Bauza Head—summit	46 41 20	67 10 30	20 00	1 00	18 N W.
Casamayor Cliff	46 52 00	66 56 40			
Nava Head	47 04 40	66 32 15			
Three Points Cape—north-east pitch	47 06 20	65 51 00	19 20	12 50	
Sugar-loaf, near Cape Three Points	47 17 20	65 56 20			
Blanco Cape—north-east summit...	47 12 20	65 43 30	19 30	0 47	18 N.W.
Rivers Peak	47 29 45	65 58 50			
Desire Port—eastern islet	47 44 40	65 49 20	19 42	12 10	18½ N.
Desire Port—Spanish ruins	47 45 00	65 54 15	20 12	0 18	18 N.
Fresh-water islet, at the head of Port Desire (where the fresh water reaches) ...	47 49 30	66 22 50	20 20	Noon.	20
Penguin Island—mount at south end	47 55 35	65 42 00			
Sea Bear Bay, observatory on sandy beach at south side	47 57 15	65 45 40	20 50	12 45	20 N.
Shag Rock—centre	48 08 30	65 53 30			
Mount Video	48 13 40	66 25 50			
Watchman Cape—summit of Round Mount Islet	48 21 30	66 21 25	20 00	0 4	24 N.N.E.
Bellaco Rock—summit	48 29 20	66 12 15	21 00	Noon.	24
Look-out Point	48 35 30	66 53 20	21 00	11 30	25
Flat Islet—centre	48 43 00	67 01 00		0 13	N.N.E.
San Julian Port—Cape Curioso—south east point	49 10 45	67 37 00	21 00		N.N.E.
Wood Mount—summit	49 13 45	67 44 50	21 10		
Sholl Mount	49 14 00	67 48 00			
Desengaño—South Head—north-east extreme	49 14 30	67 36 10	21 00	10 45	30 N.N.E.
Sholl Point—monument...	49 15 20	67 42 00	21 00	10 30	30
Franco de Paulo Cape—extreme cliff	49 41 10	67 36 00			N.
Beagle Bluff—summit	49 55 10	68 33 00			
Weddell Bluff—summit...	49 59 20	68 31 40			
FALKLAND ISLANDS.					
Adventure Sound—O.S. (Observ^n Spot) ...	52 12 20	59 04 30	19 30		
Albemarle Rock—Middle	52 14 30	60 24 42			
Barren Island—south-east extreme	52 24 36	59 42 22			
Beauchesne Island—north extreme	52 40 00	59 04 00			
Beauchesne Island—south extreme	52 41 00	59 05 00			
Berkeley Sound—entrance	51 35 00	57 50 00	19 00	5	6 N.W.
Bird Island—summit	52 10 45	60 55 12			
Bougainville Cape—North-east cliff	51 18 00	58 28 20			
Brisbane Mount—summit	51 29 50	57 55 20			
Bull Road—height near Point Porpoise ...	52 20 50	59 19 57			
Bull Road—O.S.	52 20 45	59 20 28	19 50		
Calm Head—summit	52 07 20	60 56 22			
Carcass Island—summit...	51 16 50	60 35 30			
Carlos San Port—summit northward of ...	51 28 50	59 02 00			
Choiseul Sound—Pyramid Point...	52 01 20	58 36 00		5 58	5 N.
Carysfort Cape—north-east cliff	51 25 40	57 51 00			

FALKLAND ISLANDS—*continued.*	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Castle Rock—summit	52 12 25	60 48 22			
Cow Bay	51 27 00	57 49 00		5 25	8 N.N.W.
Dangerous Point—east extreme	52 01 35	58 20 47			
Dolphin Cape—north-west extreme	51 14 35	58 58 30			
Driftwood Point—Islet off	52 16 40	59 01 34			
Eagle Point, Nelson Head, near eastern extremity	51 32 50	57 47 00			
Eddystone Rock—centre	51 11 30	59 03 15			
Edgar Port, summit at south end of Entrance Ridge	52 06 15	60 16 12			
Edgar Port, summit over South Head	52 02 10	60 15 10			
Edgar Port—O.S.	52 03 15	60 16 16	20 00	7 15	5
Egmont Port—O.S.	51 21 26	60 04 04	19 35	8 20	8 w.
Egmont Port—Cay—western centre	51 13 05	60 03 10			
Elephant Cays—west extreme of western Cay	52 09 00	59 52 52			
Elephant Jason—summit	51 10 20	60 52 02			
Fanning Head—south-west summit	51 28 06	59 08 35			
Flat Jason—north-west extreme	51 06 30	60 55 20			
Fox Bay—eastern entrance—summit	52 00 50	60 00 52			
Frehel Cape—north cliff	51 23 16	58 14 00			
George Island—south-west cliff	52 24 00	59 48 12			
Gibraltar Rock—summit	51 19 45	60 47 02			
Grand Jason—summit	51 04 30	61 03 57			
Grantham Sound—summit of Islet north-west of	51 35 30	59 13 10			4
Harbours—Bay of—O.S.	52 12 00	59 22 00		5 44	8
Hope Point—near West Point Island—O.S.	51 20 51	60 40 14		9 18	
Horse Block Island	51 56 00	61 08 00			
Jason Cay (or East Cay)—north-west extreme	51 00 38	61 18 02			
Kelp Point—small height on	51 52 20	58 13 52			
Keppel Island—north-west cliff	51 18 45	60 03 00			
Keppel Island—west summit	51 19 15	60 02 20			
Lively Island—south-east extreme	52 06 15	58 25 02			
Long Island—small height near west end ...	52 14 40	58 59 42		6 0	5 w.
Louis Port—settlement, flagstaff at Government House...	51 32 00	58 07 16	19 00		
Louis Port Creek—west side of the narrowest part	51 32 20	58 06 58			
Low Kelp Patch—middle	52 32 00	59 39 00			
Low Mount	51 38 20	57 49 30			
Macbride Head—north cliff	51 23 00	57 59 25			
Many-branch Harbour—summit over north point	51 31 05	59 20 30			
Mare Harbour—height over north-east side	51 54 35	58 27 37			
Mare Harbour—O.S.	51 54 11	58 30 08		7 15	8 w.
Meredith Cape—southern cliff	52 16 15	60 39 07			
Midway Rock	51 25 36	59 10 00			
New Island—highest summit...	51 42 07	61 17 52			
New Island—Ship Islet, O.S.	51 43 10	61 16 59			
North Islet—summit of north cliff	51 39 15	61 14 36			
North Look-out Hill—summit	51 29 10	58 02 15			
North Fur Island—east extreme	51 08 15	60 44 10			
North Keppel Island—north extreme	51 13 30	59 55 55			
Orford Cape—west summit	51 59 45	61 06 22			
Passages Island—summit	51 34 55	60 46 58			
Pebble Island—cliff summit near north-west end	51 15 48	59 47 20			
Pembroke Cape—eastern extreme	51 41 30	57 41 45			
Pleasant Port—O.S.	51 48 55	58 11 26		7 19	5

	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
FALKLAND ISLANDS—*continued.*	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Poke Point—east extreme	51 36 25	59 23 25			
Porpoise Point—extreme	52 21 47	59 19 22	19 42	6 20	4 W.
Race Point Cliff—extreme	51 25 00	59 06 20			
Rodney Bluff—western summit	52 03 36	61 04 37			
Salvador San Port—O.S.	51 27 05	58 20 04		6 45	6 W.
Saunders Island—north-west summit	51 17 20	60 19 50			
Saunders Island—north-east point—extreme	51 18 55	60 05 07			
Sea Lion Island—west extreme	52 26 50	59 09 37			
Sea Lion Point—summit	51 21 47	58 21 00			
Sedge Island—north-west extreme	51 10 30	60 27 20			
Shag Rock	52 14 30	58 39 42			
Ship, or Coffin, Harbour — Ship Islet—south-west extreme	51 43 10	61 17 07	20 18	8 30	7 N.W.
Simon Mount — summit	51 38 05	58 28 50			
South Fur Islet—summit	51 15 50	60 51 52			
South Jason—summit	51 12 40	60 53 42			
Speedwell Island Harbour—O.S.	52 13 00	59 41 16			
Split Cape—extreme cliff	51 49 20	61 20 37			
Split Island—west summit	51 28 05	60 42 10			
Steeple Jason—steeple summit	51 04 00	61 09 37			
Steeple Jason—north-west summit	51 02 15	61 13 22			
Stephens Port—east entrance point—summit	52 11 50	60 42 27	20 24	7 45	7
Stephens Port—O.S.	52 11 15	60 40 53			
Swan Island—French Harbour—entrance ...	51 52 00	61 08 00		8 35	8 S.
Tamar Cape—north cliff summit	51 16 50	59 29 50			
Tamar Harbour—eastern head—extreme ...	51 20 32	59 25 42			
Uranie Rock, off Volunteer Point	51 31 45	57 41 00			
Usborne Mount	51 42 30	58 49 48			
Volunteer Point—eastern solid extreme ...	51 31 15	57 43 40			
West Point Island—summit over West Bluff	51 23 00	60 43 12			
West Cay—north-west extreme	50 59 47	61 27 30			
White Rock	51 17 15	60 53 52			
White Rock Point—north-east extreme cliff	51 24 23	59 12 22		7 17	7 W.
White Rock Harbour—south head	51 26 25	59 13 00			
White Rock Harbour—sharp peak	51 27 56	59 15 30			
White Rock Harbour—O.S.	51 26 00	59 16 38			
Wickham Heights—middle summit of ...	51 43 50	58 31 52		5 49	5 N.
William Port—O.S.	51 39 14	57 48 28			
William Mount	51 42 15	57 55 58			
Wreck Island—east extreme...	51 11 00	60 13 20			
SOUTH OF 50° (EXCLUSIVE OF FALKLANDS.)					
Admiralty Sound—bottom—Mount Hope ...	54 26 30	69 02 55	22 50		
Agnes Islands—summit of Western Isle ...	54 18 00	72 48 40			
Aguirre Bay—Kinnaird Point	54 57 05	65 47 00	22 50	4 20	8 N.E.
Ainsworth Harbour—projecting point west side	54 23 05	69 37 45			
Alikhoolip Cape—south extreme	55 11 50	70 49 00			
Anchor Bay—summit over anchorage	50 55 00	74 21 20	22 30	1 00	5
Ancon Sin Salida—Central Island, summit of	52 12 45	73 19 30	23 10	0 50	4 E.
Andres San—Sound—summit of Middle Kentish Isle	50 23 15	74 23 00	22 20		
Andres San—Sound—south-east extreme ...	50 33 00	73 42	22 25	1 30	6
Anna, Point Santa—extremity	53 37 50	70 55 00	23 00	0 07	6 N.
Anne St. Island—central summit...	53 06 30	73 16 30	23 30	4 00	5 E.
Anne St. Peak...	52 43 00	73 56 45			
Anthony, Cape St.—northern extreme cliff...	54 43 30	64 34 00			

SOUTH OF 50°—*continued.*	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Antonio, San—summit over	53 54 40	71 50 30	23 40	Noon.	7 N.
Apostle Rocks—western large rock	52 46 15	74 47 50	23 50		
April Peak—summit	50 10 50	75 21 00			
Arenas Point—south extreme	53 09 10	68 12 10			
Astrea Island—summit	54 36 30	72 05 30	24 40	2 20	4 N.E.
Austin Point—north-east pitch	55 49 30	67 03 00			
Avalanche Point—extreme	54 56 00	69 13 20			
Aymond Mount—summit	52 07 10	69 32 10			
Bachelor River—entrance	53 33 00	72 19 15	24 06	1 40	5
Bachelor Peak	53 29 30	72 19 30			
Back Harbour—outer point	54 47 25	63 50 15			
Balthazar Point—extreme	51 38 05	74 00 30			
Barnevelt—north-east extreme	55 48 25	66 44 40	23 00	4 40	8 N.E.
Bartholomew San, Cape—south-west cliff ...	54 53 45	64 45 30	22 40	4 45	9 N.E.
Basalt Glen	50 11 00	70 11 00			
Bald Point, west extreme of cliff	53 34 40	67 39 30			
Bathurst Cape—summit	55 14 15	68 00 00			
Beagle Island—north-west summit	51 58 30	75 12 45			
Beaufoy Mount—summit	55 36 15	68 58 00	24 00	3 30	6
Bell Mount—summit	54 09 54	72 07 10			
Bell Mount Summit—Valentyn Bay	54 53 15	65 33 30			
Bessel Point—extremity...	52 00 40	73 46 40	23 00		
Benito Point—extreme	51 48 52	73 55 00			
Bennett Point—extremity	52 38 45	71 30 00	23 34	1 30	1 or 2
Between Point—west low rise	53 13 50	70 28 30			
Bivouac—Last Hill...	50 12 30	71 41 00			
Black Head—south-east point	55 33 45	69 20 30			
Boat Island—summit of (Diego Ramirez) ...	56 28 50	68 42 30			
Boqueron Mount—highest pinnacle	54 10 40	70 59 44			
Bougainville Cape—south-west summit ...	53 25 40	70 13 15			
Bougainville Cape—extremity	53 27 00	70 13 00	23 20	0 50	6
Bolton Island—northern summit...	54 59 00	70 10 00			
Bougainville Sugar Loaf—summit	53 57 32	71 27 57			
Bowles Island—north summit	54 02 00	72 15 00	24 00	2 00	5
Brazo Ancho Point—eastern summit	50 08 55	74 41 45			
Brent Cove—point south-east of	54 50 20	64 22 50			
Brinkley Island—summit	51 58 45	73 43 00			
Brisbane Head—extreme summit...	55 39 00	68 57 00			
Broken Mount...	55 24 20	69 45 19	23 50		
Broken Cliff Peak	50 14 40	68 31 30	21 00	12 15	
Brother, Middle—north-east summit	54 42 35	65 29 50			
Buckland Mount (Staten Land)	54 46 18	64 20 45			
Buckland Mount—summit	54 26 00	70 22 30			
Bueno Puerto—west point	50 58 35	74 10 55	21 00	1 40	5 S.
Burney Mount—southern summit	52 20 00	73 26 00			
Button Island—south-east summit	55 05 00	68 07 30	23 45	2 40	6 S.
Bynoe Island—summit	54 19 00	72 12 44			
Camden Head—summit...	53 12 30	71 41 00			
Capstan Rocks—summit of largest	55 24 10	70 17 30			
Card Point—extremity	54 20 45	70 15 30			
Castle Hill	50 09 15	72 34 00			
Castlereagh Cape—summit	54 56 00	71 28 00	24 15	2 50	4 E.
Catherine Point, north-east extremity	52 32 00	68 44 10			
Catherine Isle, western point...	54 47 30	71 19 00	24 10	2 55	5 E.
Cayetano Peak...	53 53 04	72 09 40			
Ceres Island—summit	51 51 35	74 05 55			
Chalia Stream—junction with Santa Cruz ...	50 11 15	70 10 30	21 00		
Chancery Point, south-west pitch...	52 52 00	74 40 30	24 00	1 40	5 S.E.
Charles Island—Wallis Mark	53 43 57	72 05 46			

SOUTH OF 50°—*continued.*	Lat. South.	Long. West.	Var. East.	H. W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Charles Cape—pitch	53 15 00	72 20 00			
Cheer Cape—north-west pitch	51 41 00	74 18 45			
Childs Island—summit	53 21 30	73 51 00			
Clanricarde Point—south summit...	50 11 30	74 35 30			
Clay Cliff Narrow—cliff summit	54 54 00	67 28 30	23 00	3 00	6 E.
Cliff Head—northern cliff	52 43 30	70 19 15			
College Rocks—south-west rock	53 37 20	73 58 00			
Colnett Cape—northern cliff	54 42 15	64 18 30	22 30	5 00	9 W.
Cone Point—summit	54 06 35	70 51 45			
Convent Hill—south	51 53 00	69 17 35			
Cook Port—Observatory Mark summit ...	54 45 16	64 02 45			
Cook Port—Observatory at south-west corner of	54 46 27	64 02 45	22 30	5 30	8 N.W.
Corona Island—summit	53 15 15	72 23 30			
Cortado Cape—extremity	52 49 37	74 26 40	23 40		
Cotesworth Island—Port William	53 10 00	74 34 00			
Coy Inlet—northern head	50 54 10	69 04 20	21 30	9 30	40 N.
Coy Inlet—height south side extreme	50 58 30	69 07 20	21 30	9 30	40 N.
Coy Inlet—south-east height...	50 59 00	69 06 00			
Creole Point—extreme	54 06 00	72 12 30			
Crosstide Cape—extreme	53 33 00	72 26 30	23 35	1 40	5 E.
Cruz Mount—summit	53 40 45	72 04 00			
Cruz Santa Port—north point—south-east extreme	50 05 30	68 03 00	20 54	9 48	40 N.
Curious Peak—summit	54 19 35	70 12 15			
Cutter Cove—Jerome Channel	53 22 00	72 26 45		4 30	6 N.
Dampier Islands—southern summit	54 53 00	64 11 20			
Darwin Mount—summit	54 45 00	69 20 00			
Davies Gilbert Head—north summit	53 56 30	72 15 00			
Deceit Island—Cape Deceit—east extreme	55 54 40	67 02 25			
Deceit Islets—middle islet	55 56 10	66 59 00	23 30	4 30	8 E.
Deepwater Head—summit	53 38 00	73 44 00			
Deepwater Sound—O. S.	53 35 00	74 34 55	24 20	1 10	5 N.E.
Delgada Point—extreme	52 26 30	69 34 10			
Deseado Cape—peaked summit near	52 55 30	74 37 30			
Desolation Cape—southern summit	54 45 40	71 37 10	24 30	1 40	4 N.E.
Detached Islet—summit	54 53 20	64 30 00			
Devil Island—summit	54 58 30	69 04 50			
Diana Peak	52 08 00	74 48 00			
Diego San—Cape—east extreme	54 41 00	65 07 00	22 50	4 30	10 N.W.
Dinero Mount—summit...	52 19 40	68 33 20			
Direction Hill—north	52 20 50	69 32 50			
Dislocation Harbour—O. S.	52 54 15	74 37 10	23 53	1 40	4 S.E.
Divide Cape—east extreme	54 59 10	69 07 00			
Dog-jaw Mountains—western summit ...	55 00 30	67 41 00			
Dog-jaw Mountains—eastern summit	55 02 20	67 32 00			
Donaldson Cape—extremity	51 06 10	74 20 15			
Doris Cove—O. S.	54 58 50	71 09 48	24 16	3 0	4 E.
Doris Peak—summit	54 59 20	71 11 40			
Dos-Hermanas—summit	53 57 45	71 25 15			
Duncan Rock—middle	51 22 40	75 28 20			
Dungeness Point—extremity...	52 23 50	68 25 10	22 36	8 50	40 W.
Dutch Point—north extreme...	55 29 00	67 39 30			
Dynevor Sound—north-eastern headland ...	53 22 00	73 35 00			
Dynevor Castle—summit	52 35 00	72 26 00			
Earnest Cape	52 10 52	73 18 30			
Eastern Peak—summit	50 00 15	75 13 20			
Elizabeth Island—north-east Bluff	52 49 10	70 37 15	23 50	0 05	7 N.E.
Elizabeth Head—Adventure Passage	54 56 30	70 54 00			

SOUTH OF 50°—*continued.*	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Elvira Point—extremity...	53 49 12	72 03 55			
Emily Island—summit	55 29 30	69 35 00			
Enderby Island—centre	54 13 00	71 57 35			
Entrance Mount—summit of Santa Cruz Cliff	50 08 50	68 20 00	22 54		
Esperanza Island—south-west extreme ...	51 11 45	73 15 00			
Espinoza Cape—north-east extreme of cliff...	52 37 20	68 36 20			
Evangelists—Sugar Loaf Islet	52 24 18	75 06 40	24 00	1 00	5 E.
Evans Island—western summit	53 26 30	73·53 30			
Evouts—north-east head	55 33 00	66 45 00			
Expectation Bay—north islet	50 25 00	74 17 00			
Fairweather Cape	51 32 05	68 55 20	22 00	9 0	30 N.W.
Famine Port—Observatory	53 38 15	70 57 45	23 40	0 7	6 to 7
Felix Point—extremity	52 56 00	74 12 45			
Felipe, San—Bay of	52 35 00	69 49 00		9 40	30 S.
Felipe, San—Bay of	52 40 00	69 42 00		9 00	24 W.
Fifty Point—south-west summit	55 17 10	66 35 40	23 30	4 45	8 N.E.
Fincham Islands—summit of westernmost islet	53 44 15	73 45 30			
Fitton Mount—summit	54 47 45	64 23 00			
Fitz-Roy Passage—N.W. end O.S.	52 39 00	71 31 00	23 00	1 30	1 or 2
Flamsteed Cape—extremity rock	51 46 25	73 51 45			
Focus Island—summit	51 53 23	72 48 00			
Fortune Bay—rivulet mouth...	52 15 48	73 45 00	23 40	0 50	8 E.
Fortyfive Cape—extreme pitch	53 23 00	72 31 45	23 50	3 00	7 N.
Foster Mount—summit	55 50 30	67 32 50			
Friar Hill—southernmost summit	51 50 08	69 08 20			
Froward, Cape—summit of the Bluff	53 53 43	71 18 15	23 20	1 0	6 N.E.
Furies, East—largest rock	54 38 00	72 12 00	25 00	2 30	4 N.E.
Furies, West—largest rock	54 34 45	72 21 50	25 00	2 30	4 N.E.
Fury Peak—highest	54 25 40	72 19 20			
Gallant, Port—Wigwam Point	53 41 45	72 00 41	24 04	9 3	5 or 6 E.
Gallegos River—observatory mound	51 33 20	68 59 10	21 47	8 50	48 N.
Gallegos River—west head	51 38 45	69 42 40			
Gap Peak	53 55 00	69 39 50			
Gente grande, Point—north-west extremity	53 00 45	70 26 45	23 00		
George Point—extreme pitch	55 12 20	66 36 20			
George, Cape—Bluff summit	51 37 40	75 21 00			
Gidley Islet—summit	53 10 45	72 13 00	23 45	5 0	6 N.E.
Gloucester Cape—summit	54 05 18	73 29 15	24 30	1 30	5 S.E.
Good Success Bay—O.S.	54 48 02	65 14 00	22 48	4 3	9 N.
Good Success Bay—north head	54 47 00	65 11 30			
Good Success Bay—south head	54 48 45	65 12 20		4 15	9 N.
Good Success Cape—southern extreme ...	54 54 40	65 21 30			
Goodwin Mount—summit	54 19 30	70 51 00			
Goree Road—Station Islet	55 17 35	67 03 00	23 40	4 40	8 N.E.
Goree Road—Guanaco Point, extreme ...	55 19 00	67 10 00	23 30	4 00	8 N.E.
Gracia, N.S. de—south extremity of cliff ...	52 43 10	70 30 25			
Graham, Cape—south-east pitch	55 16 40	66 30 30			
Grant Bay—head south-west of	54 51 45	64 14 00			
Graves Mount—summit	53 45 00	70 37 30			
Gregory Bay	52 39 00	70 13 00	23 30	9 22	25 S.S.W.
Gregory Bay	52 39 00	70 13 00	23 30	10 22	15
Gregory Cape—extremity	52 39 00	70 13 40	23 30	9 38	12 S.S.W.
Gregory Range—south-west summit	53 34 30	70 22 50			
Guanaco Hill	50 02 00	69 03 00			
Guia Narrow—north extremity—nearly mid. channel	50 43 30	74 26 40	22 00	2 8	5 S
Hall Cape—south extreme	54 57 00	65 36 00			8 N.E.
Hall Point—extremity	52 49 45	71 25 54		4 00	4 N.

SOUTH OF 50°—*continued.*	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Halfport Bay—point	53 11 40	73 18 45	23 40	2 00	6 E.
Hamond Island—south-west summit	55 18 45	70 06 30			
Hart Mount—summit	54 11 45	70 50 30			
Harvey Point—south-west extreme	55 18 25	67 26 20			
Hat Isle—summit	55 04 20	71 08 30	24 16	3 00	6 E.
Hately Point—south-east extreme	52 58 30	71 46 00			
Henry Port—observatory	50 00 18	75 18 55	20 50	Noon.	5 E.
Herschel Mount—summit	55 49 45	67 19 15			
Hewett Harbour—south point of	52 25 00	72 50 30			
Hobbler Hill	50 11 40	72 21 00			
Hole in Wall Point—south extreme	54 49 20	63 55 25			
Holland Cape—south-east extreme	53 48 33	71 39 25	23 50	10 40	6 E.
Hope Island—central extreme summit ...	55 32 30	69 39 50			
Hope Harbour—Hope Point extreme	54 07 30	73 07 00			
Horace Peaks—southern summit	54 43 00	71 57 25			
Horn Cape—summit	55 58 40	67 16 00	24 00	4 40	9 E.
Horn False Cape—south extreme	55 43 15	68 05 40	23 56	3 28	6 N.E.
Hyde Mount—summit	55 43 40	67 29 40			
Ignocentes Island—summit	50 31 55	74 46 30			
Ildefonso Isles—northern rock	55 49 00	69 28 00	24 10	3 20	6 E.
Ildefonso Isles—highest summit	55 52 30	69 18 30			
Ildefonso Isles—southern rock	55 53 30	69 17 00	24 10	3 20	6 E.
Indian Cove—south-east corner	55 30 20	69 05 00			
Indian Pass—first (Santa Cruz river)	50 08 00	69 11 00			
Indian Pass—second (Santa Cruz river) ...	50 12 20	71 36 20			
Inez Sta.—north cliff	54 07 00	67 07 50			
Inglefield Island—north extremity	53 04 20	71 53 14	23 56	4 00	6 N.E.
Inglefield Island—south extreme	53 06 10	71 53 00	23 56	4 00	6 N.E.
Inman Cape—cliff summit	53 18 30	74 19 15	24 00	2 00	4 S.E.
Ipswich Isles—southern summit	54 10 30	73 20 40			
Isabel Cape—summit	51 52 00	75 10 00			
Isabel Cape—west extreme	51 51 50	75 13 00			
Isidro, San, Cape	53 47 00	70 57 50	23 40	1 00	8
Isabella Island—O.S.	54 13 05	72 58 50	24 20	2 00	
Isabella Isle—Murray Peak, northern summit	54 12 35	72 59 00			
Jane Mount—summit	55 31 10	69 05 00			
Jerdan Island—summit	55 49 05	67 29 00			
Jerome Channel—Jerome Point—summit ...	53 31 30	72 25 30	24 00	1 30	6 N.
Jerome, St., Point—south-east extreme ...	53 31 40	72 25 45			
Jesse Point	55 02 45	66 22 30			
John, St., Cape—north cliff	54 42 20	63 43 45	22 30	5 30	9 N.
John, St., Cape—east cliff	54 42 50	63 43 15	22 30	5 30	9 N.
Jonathan Mount—summit	55 21 50	70 00 00			
Joy Mount	52 39 20	73 47 00			
Juan, San, Point—south-west extremity ...	50 39 52	74 32 45			
Judge Rocks—westernmost	52 51 00	74 48 30	24 00	1 00	
Jupiter Rock	54 24 15	72 43 40			
Kater Peak	55 51 55	67 33 50			
Keel Point—Observatory true west of Shingle Point	50 06 45	68 23 30	20 54	9 48	40 N.
Kekhlao Cape—northern pitch	55 10 00	70 02 00			
Kempe Peaks—southern summit	54 23 30	72 30 10			
Kendall Cape—extremity	51 27 15	74 10 04			
Kennel Rocks—largest	54 17 30	73 02 00			
King Island—summit	54 22 38	71 17 00	23 50		7 F.
King Head—summit	53 13 30	72 01 00			
Latitude Bay—O S.	53 18 40	74 15 44	23 56	2 05	4 S.E.
Labyrinth Islands—Jane Island, summit ...	54 19 10	71 00 20	28 50	0 30	6
Laura Harbour (basin)—O.S.	54 07 00	73 18 45	24 40	1 00	6

SOUTH OF 50°—*continued.*	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
	° ′ ″	° ′ ″	° ′	° ′	Feet.
Law Peaks—northernmost	52 53 00	74 33 00			
Leading Hill—summit	55 33 20	69 16 40			
Lennox Harbour—O.S.	55 17 00	66 49 00	23 40	4 40	8 N.E.
Lennox Road—Luff Islet—summit	55 18 40	66 44 45	23 40	4 40	8 N.
Lindell Rock	56 24 30	68 43 10			
Lion Mount—summit	50 20 00	68 49 30			
Longchase Cape—western pitch	54 45 40	71 04 00			
Lort Point—eastern pitch	55 40 30	67 59 00	23 30	4 30	7
Lucia, Santa—Cape—summit	51 30 00	75 29 00	22 00		
Magdalena Isle, Sta.—north-west cliff ...	52 54 15	70 35 25			
March Harbour—O.S.	55 22 35	69 59 34	24 04	3 10	6 E.
Martha, Santa—Island—summit	52 50 00	70 34 45	23 58		
Magalhaens Strait—eastern entrance—Observation for tide	52 26 00	68 57 00	22 30	8 56	45 W.S.W.
Magalhaens Strait—eastern entrance	52 26 00	69 00 00		8 47	S.W.
Magalhaens Strait—eastern entrance	52 32 00	68 59 00		7 40	S.S.W.
Magalhaens Strait—eastern entrance	52 31 00	68 42 00	22 00	8 37	42 W.
Magalhaens Strait—eastern entrance	52 22 00	68 39 00		8 13	39 S.S.W.
Magalhaens Strait—eastern entrance	52 14 00	69 06 00		8 24	W.S.W.
Magalhaens Strait—eastern entrance	52 15 00	69 24 00	22 40	8 46	35
Martens Peaks—highest	55 43 00	67 19 00			
Martin, St., Cove—O.S.	55 51 20	67 34 00	24 23	4 41	9 E.
Mary, St., Point—extremity	53 21 15	70 57 45	23 26		
Mateo, San, Point—extreme	51 23 50	74 04 00			
Maxwell Island—summit	55 47 30	67 30 45			
Maxwell Mount	53 47 10	72 15 00			
May Point—western extreme	55 22 20	70 09 30	24 10	3 00	6 E.
Medio Cape—north-east cliff...	54 12 15	66 51 20			
Mercy (Misericordia, or Separation) Harbour—Bottle Island summit	52 44 58	74 39 14	23 48	1 10	6 E.
Meta Islet—central summit	52 29 15	72 55 40	23 00		
Michael Point—extremity	50 17 00	74 48 00			
Mid Bay Rocks—largest	53 50 10	73 35 10			
Middle Islet—summit	55 36 15	67 17 45			
Middle Cape—north-west cliff	54 48 20	64 45 20	22 00		7
Middle Cove, Wollaston Island — Observation Spot on beach	55 35 30	68 19 00	23 50	3 30	
Middle Hill	51 49 56	69 22 40			
Mitchell Cape—north-west pitch...	55 57 30	68 14 00			
Monday Cape—extreme of	53 09 12	73 22 00			
Monmouth Cape—west head...	53 20 30	70 27 45	23 00		
Monmouth Island—summit	53 41 45	72 11 45			
Moore Monument	51 39 30	72 52 40			7 E.
Morrion, El—summit	53 33 20	72 32 15	23 20		6 S.
Murray Narrow—Eddy Point	55 01 00	68 14 20	23 40	3 00	
Nassau Island—south-east point	53 50 23	71 04 30			6 E.
Nativity Cape—western pitch	55 27 30	69 48 30	24 00	3 00	
Negro Cape—south-west extreme cliff... ...	52 56 40	70 49 00			
Newton Point—extreme of Windhond Bay...	55 15 45	67 52 40			9 W.
Newyear Islands—north-eastern point ...	54 39 00	64 06 20	22 30	5 30	6 S.E.
Nicholson Rocks—south-western rock ...	55 03 00	71 23 20	24 20	3 0	
Nodales Peak	53 50 40	71 09 45			5 S.E.
Noir Island—O.S.	54 28 15	72 59 45	24 40	2 30	5 S.E.
Noir Island—Cape Noir—extreme	54 30 00	73 05 30	25 00	2 25	
Nombre Head—north-east cliff	52 39 00	68 34 50			5
North Cove—O.S.	54 24 25	72 18 10	24 30	2 30	
North Hill—summit	51 47 30	69 25 40			
Northern Rock (above water) off Diego Ramirez	56 24 40	68 43 00	24 30		

SOUTH OF 50°—*continued.*	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Nose Peak—summit	53 52 30	70 05 20			
Notch Mountain—summit	55 04 30	70 30 30			
Notch Cape—extremity	53 25 00	72 48 55	23 40		
Observation Mount—summit	50 32 35	69 00 20			
Observation Mount—summit—on west coast	52 28 58	74 36 02	25 09	1 00	5 s.
Oeste Point—extremity	51 31 45	74 08 41			
Oracion and Isthmus Bays—Isthmus middle	52 10 00	73 40 00			
Orange Cape—north extremity	52 27 10	69 28 00	22 30	9 00	46 w.
Orange Peak	52 28 15	69 25 10			
Orange Bay—Burnt Island—summit	55 31 00	68 02 20	23 56		
Orange Bay—O.S.	55 30 50	68 05 17	23 56	3 30	5 N.
Orozco Table—south-east summit	54 40 40	65 59 45			
Oazy Harbour—head at west entrance	52 42 00	70 36 35	23 50	0 30	
Packsaddle Island—summit	55 23 50	68 04 20	23 50	3 30	6 N.
Parker Cape—western summit over	52 42 00	74 14 30			
Parry Harbour—north-west point	54 25 15	69 20 09			
Paulo, San, Cape—north-east cliff	54 16 20	66 40 05			
Paulo, San, Mount—northern summit ...	54 39 30	72 01 00			
Pecket Harbour—south summit	52 47 10	70 46 15	23 29	12 00	9
Peel Inlet—north-east extreme	50 38 00	73 36 30			
Peñas Cape—south-east cliff	53 51 30	67 33 20	22 00	6 42	12 N.W.
Peñas Cape—offing near	54 08 00	66 53 00		6 27	12 W.N.W.
Peter Mount	52 22 00	72 40 30			
Philip, St., Bay	52 35 00	69 49 00	22 40	9 40	30 S.W.
Philip, St., Bay	52 40 00	69 42 00	22 40	9 00	24
Philip, San, Mount—summit	53 36 25	71 00 00			
Phillip Cape—summit	52 44 20	73 56 44			
Phillips Rocks—largest, summit	55 14 10	70 57 00			
Picton Island—Cape Maria—south-east extreme	55 07 00	66 46 45			
Pillar Cape (or Pilar)—northern cliff	52 42 50	74 43 20	23 50	1 00	6 E.
Pillar Rock, at extremity	50 02 00	75 23 15	23 00		
Pinto Hills—eastern summit	52 23 00	72 20 00			
Pio, San, Cape—south pitch	55 03 15	66 30 30			
Playa Parda—Shelter Isle summit	53 18 45	73 01 30	23 45	1 08	6 E.S.E.
Policarpo Point—extreme	54 39 00	65 39 30			
Pond Mount	53 51 45	71 56 30			
Porpoise Point—north-east extremity	52 55 30	70 48 00	23 30	Noon.	8
Portland Bay—west point of islet	50 14 45	74 40 30			
Possession Cape—middle of cliff	52 17 00	68 56 20	22 40	8 40	40 W.
Possession Bay—western bank	52 19 00	69 20 00		8 19	42 S.S.W.
Providence Cape—south extreme	52 59 00	73 34 45	23 22		
Pyramid Hill—summit	54 27 00	71 07 40			
Preserve Islands—summit of west island ...	54 23 00	71 35 00			
Quarter Master Island—north point	52 56 00	70 22 35	23 20	Noon.	9 N.
Quoin Head—south extreme, summit	53 44 15	70 43 15	23 20	Noon.	9 E.
Quod Cape—extremity	53 32 10	72 33 25			
Ramirez Diego Islands—highest summit ...	56 28 50	68 42 30	24 30	4 00	6 E.
Red Hill	55 34 00	68 09 00			
Redbill Island—summit	50 05 30	74 48 00			
Rejoice Harbour—north point extreme ...	51 02 15	74 19 45			
Rees Cape—east pitch	55 05 00	67 01 00	23 20	4 00	8 E.
Renouard Island—summit	52 34 50	73 43 00			
Richardson Mount—summit	54 45 50	63 51 05			
Roca Partida—summit	50 45 00	75 02 00			
Rocky Point—extreme	54 57 45	65 46 00			
Roldans Bell—summit	53 57 40	71 47 15			
Roos de Cape—north-east pitch	55 34 20	67 20 00	23 45	3 30	7 E.
Rose Mount—Whittlebury Island	55 13 20	70 10 00			

SOUTH OF 50°—*continued.*	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Round Cape (or Redondo Cape)—summit ...	50 51 00	69 04 50	21 30	9 30	40 N.
Rowlett Cape—extreme	54 14 45	70 08 15			
Rowley Cape—south-west pitch	54 55 00	67 00 00			
Ragged Point—extreme south	55 39 10	69 05 40			
Rugged Point—western extreme	53 47 10	73 35 00			
Sanchez Cape	51 06 56	69 03 40			
Sanderson Island—south extreme...	55 38 40	68 49 00			
Sandy Point—extremity...	53 09 15	70 52 00			
Santiago Cape—summit	50 42 00	75 28 00			
Sarmiento Mount—north-east peak	54 27 15	70 51 15			
Saturday Harbour—O.S.	53 10 15	74 18 00	24 20	2 00	5 S.E.
Schetky Cape—southern pitch	53 21 40	74 12 45	24 00	2 00	5 S.E.
Schomberg Cape—western pitch	54 39 00	72 07 00	24 40	2 30	5
Scott Island—summit	55 16 50	67 46 00			
Scourfield Cape—north-east pitch...	55 45 15	67 08 00			
Sea Rock—summit	55 15 00	70 28 30			
Sebastian, San, Cape—northern height ...	53 19 00	68 09 50	22 40	7 00	13 N.W. to NNW.
Selina Island—summit	54 55 20	71 30 20			
Sesambre—summit	55 27 15	66 59 30			
Seymour Mount—summit	54 19 05	69 50 20			
Sharp Peak—Wickham Island—summit ...	54 06 50	70 26 45			
Singular Peak	50 24 00	74 33 45			
Skyring Mount—summit	54 24 48	72 11 20	24 30	2 30	5
Sloggett Bay—Island, south extreme of ...	55 02 15	66 20 00			
Snowy Sound—extreme of Islet at entrance	53 31 00	72 40 00			
South Cape—south extreme cliff	54 51 00	64 45 40			
Southern Rock (Diego Ramirez)...	56 29 52	68 42 20	25 00	4 00	6 E.
Spaniard Harbour—N.W. extreme	54 53 00	65 53 00			
Spencer Cape—south-east summit	55 55 00	67 37 40	24 30	4 40	8 E.
Staines Peninsula—Isthmus centre	51 40 35	73 41 40			
Stepout Mount	50 11 45	70 16 45			
Stewart Harbour—O.S....	54 54 24	71 29 02	24 14	2 50	5 S.E.
Stokes Monument	51 02 00	75 00 00			
Stokes Mount	50 29 00	73 05 00			
Sulivan Head—south-west summit	55 20 50	69 45 45			
Sunday Cape—north-east cliff	53 39 50	67 56 20	22 50	6 00	12 N.W.
Sunday Cape—summit	53 10 30	74 22 00			
Swim Bluff	50 04 20	69 33 00			
Tapering Point—extremity	50 28 55	74 41 45			
Tamar Cape—south extreme	53 55 30	73 48 10	23 24	2 30	6 E.
Tame-seal Islet—middle	53 23 30	74 05 30			
Tarn Mount—peak at north end	53 45 06	71 02 10			
Turn Cape—extremity	54 24 08	71 07 30	24 00	1 20	6 N.E.
Tate Cape—summit	53 37 15	73 51 30			
Tekeenica Sound—north-west extremity ...	55 15 00	68 54 00			
Terhalten Island—summit	55 26 15	67 01 30	23 40	4 30	8 E.
Terhalten, Island—Cape Caroline—south-extreme	55 21 10	66 52 15	23 45	4 37	8 E.
Thomas Point—extreme	52 26 00	72 48 00			
Three Peaks Mount—summit	53 42 40	72 44 15			
Tiger Mount	51 21 36	69 01 46			
Tower Point—tower	54 59 30	66 01 30			
Tower Rocks—eastern rock	54 36 40	73 02 50	25 00		
Townshend Harbour—O.S.	54 42 15	71 55 30	24 34	2 30	5 E.
Trafalgar Mount—summit	51 38 00	74 24 45			
Treble Island—southern summit	55 07 50	71 02 20	24 15	3 00	5 S.E.
Tres Puntas—Cape	50 02 00	75 21 00			
Trigo Mount—summit	51 15 04	74 15 45			
Tussuck Rock	54 34 00	72 12 10	25 00	2 30	5 N.E.

	Lat. South.	Long. West.	Var. East.	H. W.	R. & S.
SOUTH OF 50°—*continued.*	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Twoboats Point—north extreme	54 52 30	69 37 00			
Upright Cape—north extreme	53 04 03	73 36 00	23 30	1 30	
Union Peak—summit	54 50 45	70 08 00			
Valentyn Harbour—Observation Mount ...	52 55 00	74 18 45	24 00	2 00	6
Valentyn Cape—summit at extreme	53 33 30	70 33 45			
Vancouver Port—head south-west of	54 49 50	64 05 45			
Vauverlandt Islet—summit	55 19 30	67 57 00	23 50	4 40	7 E.
Vernal Mount—summit	54 06 28	71 01 24			
Vicente, San, Cape—extreme	54 38 40	65 14 15	22 50	4 30	10 N.W.
Vicente, San, Cape—south-west summit (west coast)...	51 30 00	74 00 15			
Vicente, San, Cape—west extreme	52 46 20	70 26 25			
Victory Cape—extremity	52 16 10	74 54 39			
Virgins Cape—south-east extreme	52 20 10	68 21 34	22 30	8 50	38 N. to N.W.
Walker Bay—height south of	50 22 00	74 53 15			
Waller Point—extreme	55 10 10	66 28 00			
Warping Cove—O.S.	54 24 08	71 08 20	24 57		
Walter Point—eastern pitch of	54 55 15	70 58 00			
Webley Cape—Islet off extreme point	55 16 15	68 06 00	23 40	3 30	6
Webster Mount—summit	54 47 12	64 04 52			
Weddell Cape—south-west pitch	55 33 00	68 45 00			
West Point—extremity	55 50 15	67 54 30	24 20	4 30	9 E.
West Hill—Hermite Island—summit	55 50 30	67 46 45			
West Mountain—summit	54 50 00	64 35 35			
West Channel—north head, summit	50 22 15	75 22 00			
West Channel—south head, summit	50 33 30	75 28 15			
West Cliff Cape—cliff extreme	50 36 30	75 31 45			
Western Station—Santa Cruz river	50 12 40	71 50 00			
Westminster Hall—eastern summit	52 37 18	74 24 10			
Whitshed Mount—summit	54 08 00	71 14 00			
White Horse Islet—north summit	51 07 50	75 14 40			
Wilson Cape—south-west summit	55 04 45	71 01 00			
Windhond Bay	55 15 00	67 50 00		4 11	10 E.
Windward Bay—beach	50 03 12	74 41 45			
Wollaston Island—largest—summit of	56 27 44	68 43 01			
Woollya—settlement	55 03 40	68 03 00			
York Minster—summit	55 24 50	70 02 30			
WEST COAST OF PATAGONIA.					
Placed by Latitude from 50° Northwards.					
Double Peak Mount—western peak	49 58 20	74 41 00			
Neesham Bay—beach	49 53 54	74 59 00			
Cape Primero—extremity	49 50 05	75 35 30	20 58		
Mount Corso—south-west summit	49 48 00	75 34 00			
Cathedral—Mount—summit	49 46 30	74 43 50			
Sandy Bay—east point	49 45 40	74 16 45			
Mount Corso—N.E. summit	49 45 15	75 32 00			
Cape Brenton—summit	49 39 00	75 31 00	20 20		
Falcon Inlet—south-east extremity	49 38 00	73 36 30			
Saumarez Island—Bold Head	49 32 48	74 06 15			
Fury Cove—height east of	49 31 50	74 03 00		1 15	W.S.W.
Falcon Inlet—Cape Wellesley—extremity ...	49 28 30	73 54 25			
Offshore Islet—centre	49 25 10	75 36 00			
Picton Opening—middle of	49 15 00	75 23 00			
Mount Jervis—summit	49 08 30	74 11 15			
Level Bay—west point—extremity	49 07 45	74 14 00			
Cape Montague—western cliff	49 07 30	75 37 00			
Western Rock—centre	49 01 00	75 48 40			

WEST COAST OF PATAGONIA—*continued.*	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Wildcoast Head Cliff—summit	48 57 30	75 32 00			
Eyre Sound—north-east extremity	48 57 00	73 41 45			
Halt Bay—middle of islet close to	48 54 15	74 14 20		12 30	S.S.E.
Dyneley Point—extreme	48 50 00	75 26 00			
Parallel Point—extreme	48 47 45	75 34 40			
Parallel Peak—summit	48 45 40	75 31 00			
Station Head—summit of	48 39 00	74 10 00			
Conglomerate Point—extreme	48 36 15	75 35 00			
White Kelp Cove—summit over west side ...	48 30 15	74 17 10			
Breaker Peak—summit	48 28 00	75 32 30			
Middle Island—north point—extremity ...	48 27 35	74 21 40		12 00	N.
Point Breakoff—extreme	48 26 00	75 33 40			
Fallos Channel—Duplicate Mount—south summit...	48 19 00	75 14 00			
Black Island—south-east summit	48 12 00	74 32 00			
Dundee Rock—summit	48 06 15	75 42 00			
Cape Dyer—extremity	48 06 00	75 34 20			
Miller Island—south extreme	48 03 20	74 35 30			
Port Santa Barbara—Observation Point, north extreme	48 02 20	75 29 20	19 10	11 45	6 E.
Bynoe Islands—northern centre	47 58 00	75 23 30			
Millar Monument—at north extreme	47 55 50	74 41 30			
Campanilla Island—summit at south end ...	47 45 00	74 37 10			
Good Harbour—Isthmus at the bottom ...	47 45 00	75 20 20			
Bynoe Island—western extremity	47 44 40	75 24 20			
Cape San Roman—north extremity	47 44 30	74 52 30			
Wager Island—eastern point—extremity ...	47 41 00	74 55 00			
Supposed position of Wager's Wreck	47 39 30	75 06 30			
Speedwell Bay—hill at north-east point ...	47 39 30	75 10 00			
Northernmost Islet—summit	47 38 10	75 14 00			
Ayautau Island—summit of largest	47 34 15	74 40 20			
Channel's Mouth—largest rock off entrance	47 29 30	74 29 30			
Channel's Mouth—east side of northernmost Hazard Islet	47 28 55	74 24 20			
CHONOS ARCHIPELAGO.					
Xavier Island—Ignacio Beach	47 10 00	74 25 40	19 50		
Jesuit Sound—central mount	47 09 30	74 08 20			
Xavier Island—Lindsay Point—north-east extremity	47 03 15	74 16 00			
Kelly Harbour—south point extreme	46 59 30	74 08 30			
Kelly Harbour—north point extreme	46 59 00	74 05 50			
Cape Tres Montes—extremity	46 58 57	75 27 50			
Cape Tres Montes—summit over	46 57 50	75 27 55			
Purcell Island—summit...	46 55 20	74 39 45			
Cirujano Islet—north-east point	46 51 10	74 21 45			
Forelius Peninsula—Isthmus (narrowest part)	46 50 00	74 41 40			
Port Otway—Observation Spot	46 49 31	75 19 20	20 32	Noon.	6 E.
Port Otway—summit over southern entrance head	46 49 30	75 18 00			
Cape Raper—rock close to	46 49 10	75 40 55			
Bad Bay—summit west of	46 47 10	74 51 40			
Point Rees—extreme	46 44 40	75 42 20			
Sugar Loaf—summit	46 42 40	75 15 00			
Mitford Head—summit	46 39 00	75 40 30			
St. Paul's Dome—summit	46 36 16	75 13 40			
Small Islet near Cape Gallegos	46 35 40	75 40 00			
Cape Gallegos—summit	46 35 00	75 28 30			

	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
CHONOS ARCHIPELAGO—*continued.*	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Christmas Cove—O. S.—at south-east extremity of cove...	46 35 00	75 34 05	20 40	0 45	5 N.E.
Cone—summit	46 34 10	75 31 00			
Point Pringle—extremity	46 30 50	75 33 00			
Rescue Point—summit—northern	46 18 10	75 13 45		0 14	5 N.E.
Hellyer Rocks—middle	46 04 00	75 14 00			
Cape Taytao—western extreme	45 53 20	75 08 00			
Skyring Monument—summit	45 53 10	75 04 00			
Mount Gallegos—summit	45 52 45	74 56 45			
Patch Cove—O. S.—under Mount Gallegos	45 52 15	74 55 50	20 31	0 45	5 E.
Port Refuge—Puentes Island—summit ...	45 51 36	74 51 25			
Inche Island—south-east summit	45 48 05	75 01 00	20 36	0 45	5 E.
Anna Pink Bay—St. Julian Island—summit	45 47 25	74 55 00			
Mount Haddington—summit	45 43 25	74 39 50			
Mensuan Island—summit	45 36 00	74 56 00			
Mount Riviero—summit	45 34 45	74 35 00			
Midbay Rock—centre	45 27 30	74 45 00			
Cape Garrido—northern extreme	45 26 10	74 32 20			
Darwin Channel—north-east head	45 25 00	74 25 00			
Mount Isquiliac—summit	45 20 00	74 21 40			
Vallenar Road—O.S.—south-east extreme of Three-finger Island	45 18 30	74 36 15	20 48	0 18	5 N.
Lemu Island—summit	45 12 10	74 34 15			
Paz Island—summit	44 57 00	74 40 45			
Huamblin (or Socorro) Island—south extreme	44 55 50	75 12 45			
Huamblin (or Socorro) Island—west head ...	44 49 30	75 14 45			
Ypun (or Narborough) Island—John Point—extremity	44 40 40	74 48 30			
Stokes Island—summit	44 40 30	74 33 10			
Cape Lort—summit over	44 32 35	74 50 20			
Hulk Rocks—northern—above water	44 16 00	74 33 00			
Mount Main—summit	44 09 00	74 11 45			
Mellersh Island—western extremity	44 04 45	74 23 50			
Melimoyu Mountain—summit	44 01 30	73 07 00			
Tuamapu Island—summit	43 58 30	74 15 20			
Huaytecas Island—central summit	43 52 45	74 01 00			
Point Huayhuin—western islet off	43 51 00	74 13 00			
Port Low—O.S. on rocky islet in harbour ...	43 48 30	74 03 05	19 48	0 40	7 N.E.
Point Chaylime—north extremity...	43 46 10	73 55 40			
Huacanec Islets—northernmost—small ...	43 46 05	74 03 30			
Queytao Islet—largest—summit	43 43 00	73 35 30			
ARCHIPELAGO OF CHILOE.					
Huafo Island—south extremity	43 41 50	74 46 00			
Huafo Island—east point (of coves)	43 38 40	74 34 40			
Huafo Island—summit over north west, or weather, point	43 35 30	74 48 40	19 00		
Huafo Island—northern rock	43 32 00	74 44 20			
Canoitad Rock—summit	43 30 00	73 50 30			
Yanteles Mountain—summit—southern ...	43 30 00	72 50 30			
Huapiquilan Islands—southern islet summit	43 29 30	74 15 00			
Larger Island Huapiquilan—southern summit	43 26 30	74 17 50			
San Pedro Mountain—summit	43 21 00	73 49 00		11 45	
San Pedro Passage—O.S. in cove	43 19 35	73 45 20		0 30	9 N.E.
Cape Quilan—south-west extreme	43 17 10	74 26 00			
Laytec Island—south-east extremity	43 15 05	73 36 00		0 37	
Corcovado Mountain—summit	43 11 20	72 48 40			
Huildad Harbour	43 03 00	73 34 00	18 30	0 48	20 N.
Point Sentinela—extremity	42 59 25	73 22 30			

	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
ARCHIPELAGO OF CHILOE—*continued.*	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Cape Ypuntad—north-west extremity	42 59 15	74 16 50			
Quilan Cove—O.S.	42 52 00	73 33 00	18 40	0 29	
Mount Vilcun—summit	42 48 50	72 52 50			
Minchinmadom Mountain—south summit ...	42 48 00	72 34 30			
Talcan Harbour—O.S.	42 47 00	72 58 00		1 03	16 N
Pirulil Head—north-west extremity	42 44 40	74 11 00			
Lemuy Island—Apabon peaked hill	42 40 00	73 35 30		0 55	
Yal Point—summit	42 39 00	73 43 00		0 55	
Nihuel Islet—summit	42 36 10	72 58 10			
Alao Island—summit	42 35 00	73 22 00		0 31	18 N.
Huentemo Head—summit	42 34 20	74 12 40			
Cahuache Island—summit	42 28 05	73 18 45			
Castro Town—easternmost part	42 27 45	73 49 20	18 35	0 11	18 N.
Dalcahue—Chapel	42 23 00	73 40 00		0 26	
Cape Matalqui—west extreme	42 10 40	74 14 00			
Chaugues Islands—north summit...	42 15 00	73 18 00		0 28	
Matalqui Height—summit	42 10 30	74 11 10			
Quicavi Bluff	42 15 00	73 24 00		0 51	20 N.
Quintergen Point—summit	42 09 25	73 24 00			
Oscuro Port—O.S.	42 04 00	73 29 00		1 00	20 N.
Huapilinao Head—summit	41 57 36	73 32 20		1 25	15 N.
Lobos Head—summit	42 04 00	73 27 00		0 29	
Cocotue Height—summit	41 56 40	74 05 35			
San Carlos—town—landing-place at Mole ...	41 52 00	73 52 40	18 33	11 15	6 E.
Poloque Island—south point...	41 51 00	73 06 00		1 05	
San Carlos Harbour—Point Arenas—O.S.	41 51 20	73 56 00	18 00	0 14	6 E.
San Carlos Harbour—English Bank	41 49 00	73 54 00		0 04	
Point Tres Cruces—extreme pitch	41 49 30	73 31 40		1 15	16
Abtao Island—s. Point	41 48 00	73 26 00		0 50	18
Cape Guabun—north-west extreme	41 47 50	74 05 55			
Point Sanoullan—north-eastern cliff	41 47 30	73 35 20		0 48	17
Calbuco Fort—east end of island...	41 46 10	73 10 45		1 18	22
Calbuco—another observation	41 46 00	73 11 00		0 47	18
Corona Head—northern pitch	41 46 00	73 57 30			
COAST OF CHILE.					
Mount Yate (or Llebcan)—summit	41 45 30	72 31 50			
Carelmapu Cove—O.S.	41 45 00	73 45 00		0 50	10 E.
Maullin—Amortajado—north extreme ...	41 37 15	73 44 30			
River Coyhuin—mouth	41 40 00	72 45 00		0 52	21 N.
Point Godoy—south-west extreme	41 34 15	73 50 20			
Quellaype Mountain—summit	41 22 00	72 43 30			
Osorno Mountain—summit	41 09 30	73 36 45			
Point Coronel—south extremity	41 07 40	73 31 45			
Cape Quedal—summit	41 03 00	73 59 50			
Manzano Cove—rivulet—mouth	40 33 20	73 45 50			
Milagro Cove—depth of...	40 16 00	73 45 00			
River Bueno—entrance (bar)	40 11 00	73 44 00			
Point Galera—west extremity	40 02 00	73 46 40			
Falsa Point—summit over (highest)	40 00 50	73 40 50			
Valdivia—O.S. near Fort Corral	39 52 53	73 29 00	18 15	10 35	5 E.
Gonzales Head—northern pitch	39 51 15	73 30 00			
Valdivia Town — landing-place opposite church (Hospital Mole)	39 49 02	73 18 30	18 20	10 45	Varble.
Chanchan Cove—Islet off	39 26 40	73 18 30			
River Tolten—mouth	39 07 45	73 19 00			
Cauten (or Imperial) River—mouth	38 47 40	73 26 00			
Cauten Head Cliff—summit	38 40 40	73 30 20			
Mocha Island—south summit	38 24 10	73 56 50			

COAST OF CHILE—*continued.*	Lat. South.	Long. West.	Var. West.	H. W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Cape Tirua—summit of islet off	38 23 00	73 34 30			
Mocha Island—north summit	38 21 15	74 01 09			
Mocha Island—O. S.—east side, near north point	38 19 35	74 00 20	17 20		
Molguilla Point—south-west extreme	37 48 00	73 36 00			
Point Tucapel—extreme	37 42 00	73 43 00			
River Leübu—entrance	37 35 45	73 42 00	17 10	10 30	5 N.
Tucapel Head—summit	37 35 20	73 43 10			
Carnero Head—western summit	37 21 20	73 44 00			
Arauco Fort—middle	37 15 00	73 23 00			
Tubul River—south head—entrance	37 14 25	73 27 30			
Cape Rumena—north-west cliff—summit ...	37 12 45	73 42 00			
Laraquete River—mouth	37 10 30	73 14 00			
Point Lavapie—extremity	37 08 50	73 38 20			
Colcura Village—western pitch of hill	37 02 50	73 14 00			
Santa Maria Island—O. S. near rivulet (landing place)	37 02 48	73 34 00	17 00	10 20	6 N.
Santa Maria Island—summit of west head ...	37 01 45	73 36 30			
Point Coronel—west extremity	36 57 00	73 15 00			
Concepcion City—middle—nearest to river...	36 49 30	73 05 20			
River Bio Bio—south entrance point	36 48 45	73 13 00			
Talcahuano—Fort Galvez	36 42 00	73 10 00	16 48	10 14	5 N.
Point Tumbes—north-west cliff	36 37 15	73 10 20			
Mount Neuke—summit	36 34 55	72 58 00			
Coliumo Head—north extreme	36 31 30	73 01 15			
Boquitata Point—western extreme	36 16 30	72 54 45			
Bio Bio Paps—south-west summit	36 06 20	73 14 40			
Carranza Point—south-west extreme	35 37 20	72 42 20			
Cape Humos—summit	35 22 50	72 33 00			
Maule Church—rock near entrance	35 19 40	72 29 20	16 24		
Maule River—south head entrance	35 19 15	72 28 00			
Point Huachupure—extreme...	34 57 30	72 16 30			
Topocalmo Point—summit on extremity ...	34 00 50	72 05 00			
Navidad Bay—River Rapel mouth	33 54 00	71 52 20			
Rapel Shoal (wrongly called Topocalma) ...	33 51 00	71 56 30			
Maypo River—south entrance head	33 39 20	71 43 15			
White Rock Point—White Rock...	33 29 00	71 46 50			
Curaumilla Point—rock off	33 06 00	71 48 00			
Valparaiso—Fort San Antonio	33 01 53	71 41 15	15 18	9 32	5 N.
Quillota—Bell—summit	32 57 10	71 10 20			
Quintero Rocks—body	32 52 20	70 37 00			
Quintero Point—summit	32 46 00	70 35 30			
Horcon Rock—largest	32 41 50	70 35 30			
Aconcagua—mountain—summit	32 38 30	70 00 30			
Papudo—Gobernador Mount over Bay ...	32 31 00	71 31 30			
Papudo Bay—O. S. landing-place...	32 30 09	71 30 45	15 12		
Pichidanque—south-east point of island—O. S.	32 07 55	71 36 00	15 24	9 20	5 N.
Conchali Bay—islet in middle	31 53 10	71 36 00			
Point Tablas—south-west extremity	31 51 45	71 37 30			
River Chuapa—south entrance point	31 39 30	71 38 00			
Maytencillo Cove—north head	31 17 05	71 42 05			
Talinay Mount—summit	30 50 45	71 41 45			
Limari River—south head	30 44 53	71 46 25			
Lengua de Vaca—extremity	30 13 40	71 41 30			
Huanaquero Hill—summit	30 12 50	71 30 45			
Sugar Loaf Hill—north-west summit	30 00 10	71 26 10			
Herradura Port—south-west corner	29 58 40	71 25 45	14 30	9 8	5 N.
Coquimbo Port—northern islet (rock)	29 55 10	71 25 10	14 24	9 8	5 N.

	Lat. North.	Long. West.	Var. West.	H. W.	R. & S.
COAST OF CHILE—*continued.*	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Coquimbo City (La Serena)—Mr. Edwards's house	29 54 10	71 18 45	14 10		
Arrayan Cove—south point	29 42 20	71 23 45			
Juan Soldado, Mountain—summit...	29 41 30	71 25 25			
Pajaro Islet—southern summit	29 35 00	71 36 25			
Yerba Buena, village—chapel	29 34 00	71 21 50			
Pajaro Islet—northern summit	29 32 50	71 37 30			
Trigo Island—south-west point	29 32 35	71 24 20			
Tortoralillo—south entrance point	29 29 15	71 23 45	13 40		
Chungunga Islet—summit	29 24 15	71 25 15			
Toro Rock	29 21 10	71 35 25			
Choros Islands—south-west point of largest	29 15 45	71 37 30			
Polillao Cove—south point extreme	29 10 00	71 34 10			
Chañeral Bay—south-west point	29 02 40	71 33 40			
Chañeral Island—south-west summit	29 01 15	71 39 05			
Sarco Cove—middle of beach...	28 50 00	71 32 10			
Cape Vascuñan—Islet off (rock)	28 50 00	71 34 30			
Alcalde Point—summit upon	28 34 16	71 23 40			
Huasco—Captain of Port's house	28 27 15	71 19 00	13 37	8 30	6
Lobo Point outer pitch	28 17 50	71 17 10			
Herradura de Carrisal—landing-place	28 05 45	71 15 45	13 23		
Carrisal—middle point—south side	28 04 30	71 14 30			
Matamores Cove—outer point on south side	27 54 10	71 12 35			
Pajonal Cove—south-east corner	27 43 30	71 07 00	13 28		
Salado Bay—Cachos Point—summit	27 39 20	71 06 25			
Copiapo—landing-place	27 20 00	71 01 45	13 36	8 30	5
Morro—summit (Morro of Copiapo)	27 09 30	71 01 45			
Morro, Point—northern extremity	27 06 45	71 01 40			
Port Yngles—sandy beach in south-west corner	27 05 20	70 56 00	13 30		
Cabeza de Vaca—point—extreme...	26 51 05	70 55 00			
Flamenco—south-east corner of bay	26 34 30	70 47 30	13 46	9 10	5
Las Animas—summit over point (outer) ...	26 23 35	70 47 00			
Pan de Azucar—islet—summit	26 09 15	70 47 05			
Ballenita—islet—off Ballenita	25 45 45	70 50 40			
Lavata—cove near south-west point	25 39 30	70 47 15	13 30	9 20	5
Point San Pedro—summit	25 31 00	70 44 30			
Point Taltal—northern extreme	25 24 45	70 38 15			
Hueso Parado—south point of cove	25 24 30	70 35 15			
Point Grande—outer summit	25 07 00	70 33 30			
Point Grande—summit, a mile and a-half inshore	25 07 00	70 33 45			
Paposo—white head	25 02 30	70 33 05	13 00	9 40	5
COAST OF PERU.					
Mount Trigo—summit	24 40 00	70 36 15			
Reyes Head—extreme pitch	24 34 30	70 39 45			
Point Jara—summit	23 53 00	70 35 45			
Jaron Mountain—summit	23 52 30	70 32 15			
Moreno Mountain—summit...	23 28 30	70 38 15			
Constitucion Cove—shingle point on island...	23 26 42	70 40 30	12 48	10 00	4
George Mount—Morro Jorge—summit ...	23 15 10	70 39 45			
Mexillones Hill—summit	23 06 30	70 35 00		10 32	3
Cobija—flagstaff—landing-place	22 34 00	70 21 05	12 30	9 54	4
Algodon Bay—extremity of point	22 06 00	70 17 05	12 06		
Chipana Bay—O. S.	21 23 00	70 10 50	12.00		
San Francisco Head—west pitch	21 55 50	70 14 45			
River Loa—mouth of	21 28 00	70 06 15			
Point Lobo, or Blanca—outer pitch	21 05 30	70 15 45			

COAST OF PERU—*continued.*	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Mount Carrasco—highest summit...	20 58 30	70 09 45			
Pica Pabellon—summit	20 57 40	70 14 00			
Point Patache—extreme...	20 51 05	70 18 15			
Iquique—centre of island	20 12 30	70 14 30	12 18	8 45	5
Pisagua—Point Pichalo—extreme	19 36 30	70 19 00	11 30		
Point Gorda—western low extreme	19 19 00	70 21 30			
Point Lobo—summit	18 45 40	70 25 30			
Arica—summit of Monte Gordo	18 28 55	70 23 30	11 10		
Arica—Mole	18 28 05	70 23 45	11 00	8 00	5
Sama—Mountain—highest summit	17 58 35	70 56 15			
Mollendo...	17 00 00	71 00 00	11 05	8 00	5
Point Coles—extremity	17 42 00	71 26 15			
Ylo Town—rivulet mouth	17 37 00	71 23 45	11 00	8 20	6
Tambo Valley—Point Mexico—south-west extreme	17 10 50	71 52 00			
Islay—Custom House	17 00 00	72 10 15	11 00	8 53	7
Islay—Mountain—summit	16 56 05	72 08 30			
Quilca—Cove—west head	16 42 20	72 31 00	10 45	8 00	6
Pescadores Point—south-west extreme ...	16 23 50	73 20 25			
Atico—east cove	16 13 30	73 45 15	11 12	8 53	5
Point Chala—extreme	15 48 00	74 31 00			
Lomas—flagstaff on Point	15 33 15	74 54 45	10 48	8 19	5
San Juan—Needle Hummock	15 20 56	75 13 20	10 30	5 10	3
Point Beware—south-west extreme	15 08 35	75 25 45			
Point Nasca—summit	14 57 00	75 34 30			
Doña Maria—Table—central summit	14 41 00	75 53 40			
Yndependencia Bay—south point of Santa Rosa Island	14 18 15	76 13 30	9 30	4 50	4
Mount Carreta—summit	14 09 50	76 20 20			
Mount Wilson—summit	14 04 50	76 20 15			
San Gallan—Island—northern summit ...	13 50 00	76 31 15			
Paraca Bay—west point—north extreme ...	13 48 00	76 22 15			
Pisco—Town—middle	13 43 00	76 16 30	11 00	4 50	4
Point Frayles—extreme	13 01 00	76 34 50			
Asia Rock—summit	12 48 00	76 41 55			
Chilca Point—south-west pitch	12 31 00	76 52 40			
Chilca Cove—Rock—summit	12 29 20	76 52 30			
Chorillos Bay				3 37	6
Morro Solar—summit	12 11 30	77 06 15			
Callao Bay—Arsenal Flagstaff	12 04 00	77 13 30	10 00	5 47	4
San Lorenzo Island—north point...	12 04 00	77 19 00	10 36		
Hormigas Islet—largest (southern)	11 58 00	77 50 00			
Pescador Islands—summit of largest	11 47 10	77 19 50			
Chancay Head—summit	11 35 55	77 20 35	10 12		
Pelado Islet—summit	11 27 10	77 53 00			
Salinas Hill—summit	11 15 30	77 39 55		4 56	
Huacho Point—extreme pitch	11 08 45	77 40 15	9 48	4 44	3
Supé—west end of village	10 49 45	77 47 00	9 42	4 50	3
Juguay, or Gramadel, Head—west extremity	10 25 15	78 03 30			
Huarmey—west end of sandy beach	10 06 15	78 13 00	9 36	6 10	2
Colina Redonda—summit	9 38 35	78 24 20			
Mount Mongon—western summit	9 38 15	78 21 15			
Casma Bay—inner south point	9 28 00	78 25 35	9 30		
Samanco Bay—Cross Point	9 15 30	78 32 45	9 20	6 30	2
Ferrol Bay—Blanco Island—summit	9 06 30	78 39 25			
Santa—centre of projecting point...	9 00 00	78 41 30	9 32		
Chao Islet—centre	8 46 30	78 49 00			
Guañape Islands—summit of highest	8 34 50	78 59 15			
Mount Wickham—summit	8 20 00	78 49 00			

	Lat. South.	Long. West.	Var. East.	H. W.	R. & S.
COAST OF PERU—*continued.*	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Truxillo—church	8 07 30	79 04 00			
Huanchaco Point—south-west extremity ...	8 05 40	79 09 00	9 30		
Macabi Islet—summit	7 49 15	79 30 55			
San Nicholas Bay				5 04	3
Malabrigo Bay—rocks	7 42 40	79 28 00	9 28	5 00	2
Pacasmayo Point—north-west extreme ...	7 25 15	79 37 25	9 30		
Sana Point—extreme	7 10 35	79 43 30			
Lobos de Afuera Island—Fishing Cove on east side	6 56 45	80 43 55	9 20		
Eten Head—summit over	6 56 40	79 53 50			
Lambayeque—beach opposite	6 46 00	79 59 30	9 10	4 00	3
Lobos de Tierra—central summit	6 26 45	80 52 50			
Point Ahuja—western cliff summit	5 55 30	81 10 00			
Sechura Town—church	5 35 00	80 49 45			
Lobos Island—near Payta—south extreme...	5 13 35	81 13 10			
Payta—Silla (or Saddle)—south summit ...	5 12 00	81 09 20			
Payta—new end of town	5 05 30	81 08 15	9 00	3 20	3
Pariña Point—extreme	4 40 50	81 20 45			
Cape Blanco—under middle high cliff	4 16 40	81 15 45			
Picos Point—extreme cliff	3 45 10	80 47 30			
Point Malpelo—mouth of Tumbes River ...	3 30 40	80 30 30	8 50	4 00	10
Puná Island—Consulate on Point Española	2 47 30	79 57 45	9 00	6 00	11
Guayaquil—south end of city	2 13 00	79 53 30	8 30	7 00	11
GALAPAGOS ISLANDS.					
Hood Island—eastern summit	1 25 00	89 43 55			
Charles Island—summit	1 19 00	90 32 00			
Charles Island—Post Office Bay—south-east corner	1 15 25	90 31 30	9 40	2 10	6 N.W.
MacGower Rocks—middle	1 08 30	89 59 30			
Albemarle Island — Iguana Cove — south-west extreme	0 59 00	91 32 15	9 30	2 00	6 N.
Chatham Island—Watering Cove beach ...	0 56 25	89 33 25			
Barrington Island—summit at west end ...	0 50 30	90 10 00			
Chatham Island—south-west point of Stephens Bay	0 50 00	89 36 45	9 35	2 23	6½ N.W.
Chatham Island—eastern summit	0 44 15	89 20 45			
Indefatigable Island—summit of Islet in N.W. Bay—Eden Islet	0 33 25	90 37 45	9 30	1 56	6 N.W.
Narborough Island—north-west extremity...	0 20 00	91 44 45			
Albemarle Island—Tagus Cove	0 15 55	91 26 45			
James Island—Sugar Loaf near west end ...	0 15 20	90 56 40	9 36	3 10	5 N.
James Island—cove on N.E. side	0 10 00	90 50 00	9 30	2 34	5
James Island—Adam Cove	0 10 00	90 50 00	9 40	2 14	5
	NORTH.				
Bindloes Island—southernmost summit ...	0 18 50	90 33 55			
Towers Island—westernmost cliff	0 20 00	90 02 30			
Abingdon Island—summit	0 34 25	90 48 10	9 35	2 10	N.W.
Culpepper Islet—summit	1 22 55	91 53 30			
Wenman Islet—north-western summit ...	1 39 30	92 04 30			

From Callao to Guayaquil the longitudes depend upon Mr. Usborne's survey, in the Constitucion. He had three chronometers fixed on board the vessel, and one which was used for observations; all four were good watches. If his whole meridian distance between Guayaquil and Callao is incorrect, the error, whatever it may be, must be distributed equally along that portion of coast, but I do not think there is an error of two miles; probably, indeed, there is not near so great a deviation from truth, as Mr. Usborne landed for observations continually, and carried a connected triangulation from Callao to Puná.

OTHER POSITIONS

ASCERTAINED AND USED TO CONTINUE THE CHAIN OF MERIDIAN DISTANCES.

Not included in the Survey.	Lat. South.	Long. West.	Var. East.	H.W.	R. & S.
	° ′ ″	° ′ ″	° ′	h. m.	Feet.
Otaheite—Point Venus*—extremity	17 29 15	149 30 00	7 54	Noon every day.	1
* By continuing the chain of meridian distances westward from Bahia (in Brazil), Otaheite (Point Venus extremity) would be in...		149 34 30			
And by taking the measures eastward from Bahia		149 26 14			
The mean of the two is		149 30 22			
The longitudes in the following list, from New Zealand to Ascension, are obtained by adding the meridian distances eastward from Bahia.					
		EAST.			
New Zealand—Bay of Islands—Paihia Islet	36 16 30	174 09 45	14 00	9 16	6 N.W.
Sydney—Fort Macquarrie—flag-staff	33 51 30	151 17 00	10 24	7 36	6
Paramatta—Observatory		151 04 00			
Hobart Town—Fort Mulgrave	42 53 30	147 24 15	11 06	8 00	5 W.
			WEST.		
King George Sound—Princess Royal Harbour—New Government Buildings ...	35 02 10	117 56 30	5 36	8 00	4 E.
Keeling Islands—Direction Island—west point	12 05 22	96 54 45	1 12	5 27	5 N.W.
Mauritius—Port Louis—Observatory	20 09 25	57 31 30	11 18	1 02	2 N.W.
Cape of Good Hope—Simons Bay—east end of Dock Yard	34 11 24	18 25 45	28 30	2 30	5
Royal Observatory		18 28 30			
		WEST.			
St. Helena—*high water mark, in the meridian of Observatory*	15 55 15	5 42 45	18 00	4 50	3 W.N.W
Ascension—Barrack Square	7 55 33	14 24 15	13 30	5 30	2 W.
By the Beagle's Chronometers, the meridian distances between Falmouth, Plymouth, Portsmouth, and Greenwich, are as follows:—					
Portsmouth Observatory—R.N. College—from Greenwich Observatory		1 06 07·5	N.B.—These are identical with the measures of Dr. Tiarcks.		
Devonport (Government House) — from Portsmouth Observatory		3 03 49·5			
Pendennis Castle—Falmouth—from Devonport (Government House)		0 52 46·5			
And Falmouth—Pendennis Castle—west of Greenwich		5 02 43·5			

In the foregoing Table, every position, variation, and notice of tide, is the result of observations made by officers of the Adventure or the Beagle, therefore they are, strictly speaking, original, and have no reference whatever to observations made by other persons.

An explanation of the methods and instruments used, and of the basis on which the longitudes, especially, are founded, is given, in an abridged form, at the end of the Appendix.

The positions of those points only are given which are considered to be, generally speaking, satisfactorily ascertained by actual observation on shore, or well connected by triangulation to those stations at which the artificial horizon was used.

Where tidal notices are given opposite to summits of mountains, or other places at some distance from the sea, it is to be understood that they refer to a point at which the sea approaches nearest to that specified.

TABLE OF THE VARIATION OF THE COMPASS;

OBSERVED ON BOARD (AFLOAT).

Date.	Lat. North.	Long. West.	Var. West.	Date.	Lat. South.	Long. West.	Var. West.
1831.				1832.			
Dec. 30	43 20	12 00	23 50	March 30	18 07	38 38	2 37
.. ..	42 37	12 30	23 34				EAST.
.. ..	42 31	12 40	24 18	April 3	23 22	42 07	2 19
.. 31	41 00	13 30	24 49		At Rio de Janeiro.		1 55
.. ..	40 15	13 50	24 25				WEST.
1832.				May 13	18 14	38 52	1 04
Jan. 1	38 41	15 00	23 35	.. 14	17 12	38 47	1 00
.. 2	37 20	15 30	23 54	.. ..	17 14	38 48	1 15
.. 4	33 00	16 10	23 00	.. ..	16 35	38 48	1 52
.. 5	29 32	16 20	20 41	.. 15	15 01	38 41	1 30
.. ..	29 30	16 22	20 48	.. 23	13 25	38 37	2 08
.. 7	28 20	16 15	20 24	.. 25	14 42	38 22	2 20
.. ..	28 12	16 20	20 20	.. ..	15 29	38 24	2 54
.. 8	26 59	16 48	20 04	.. ..	15 25	38 24	2 42
.. 9	25 26	18 02	19 59	.. 26	16 20	38 24	1 59
.. ..	24 40	18 42	19 53	.. ..	17 31	38 23	2 12
.. 10	23 09	19 47	18 47	.. ..	17 35	38 23	2 20
.. ..	22 39	20 14	18 45	.. 27	18 59	38 44	1 14
.. 11	22 02	20 26	18 10	June 1	22 42	40 21	0 03
.. ..	21 44	20 39	18 22				EAST.
.. ..	21 38	20 42	18 37	.. 2	22 58	41 15	0 33
.. 12	20 42	21 21	18 24	.. ..	22 58	41 14	0 15
.. ..	20 18	21 28	18 20	July 5	23 03	43 06	1 39
.. 13	19 31	21 57	18 06	.. 8	24 06	42 53	1 57
.. ..	19 06	22 17	17 39	.. 12	26 33	43 48	3 39
.. 14	17 50	23 10	17 06	.. 13	27 13	45 48	4 35
.. 15	15 29	23 52	15 52	.. ..	27 14	45 50	4 34
.. 16	15 17	23 35	15 22	.. 14	27 16	46 16	5 10
Feb. 7	14 54	23 30	15 55	.. 17	29 53	48 13	6 52
.. 9	13 20	25 20	14 49	.. ..	29 52	48 12	6 02
.. 10	12 17	26 25	13 43	.. 18	31 09	48 57	7 50
.. 11	8 50	27 02	12 44	.. 21	34 09	52 03	10 27
.. 14	2 10	27 50	11 08	Aug. 20	35 20	56 47	12 30
.. 15	1 20	29 05	10 39	.. 21	35 49	56 49	11 21
.. 16	1 00	29 23	09 23	.. ..	35 54	56 47	11 36
.. ..	0 51	29 25	07 20	.. 22	36 53	56 34	12 17
	SOUTH.			.. ..	36 55	56 35	12 23
.. 17	0 01	29 59	8 58	.. 23	37 02	56 36	13 07
.. ..	0 28	30 18	8 18	Oct. 27	At Monte Video.		12 42
.. ..	0 28	30 18	8 03	.. 31	34 50	57 13	12 09
.. 19	3 29	31 57	8 00	Nov. 1	34 42	57 28	12 24
.. 20	Fernando de Noronha.		7 53	.. 2	34 35	57 55	11 06
.. 21	3 09	32 02	7 54	.. 14	34 55	56 19	12 00
.. 23	5 04	32 01	7 45	.. 26	34 58	56 10	12 56
March 18	13 12	38 34	2 07	.. 27	34 48	56 42	12 26
.. 19	13 29	38 30	1 47	.. 29	35 07	56 05	12 29
.. 20	13 11	38 29	2 11	Dec. 3	40 46	62 06	15 26
.. ..	13 38	38 20	1 21	.. 5	42 16	61 32	16 12
.. 22	15 03	37 25	3 22	.. 6	43 14	61 17	16 20
.. ..	15 38	37 20	2 44	.. 7	43 56	61 25	16 40
.. 23	16 29	36 57	3 44	.. 8	45 12	62 23	17 25
.. 25	18 10	35 55	3 13	.. 11	51 18	65 14	20 26
.. ..	18 09	35 58	2 50	.. 13	50 42	65 45	20 41
.. 27	17 54	37 31	2 20	.. 14	52 06	66 58	21 35
.. 28	18 04	38 30	1 55	.. 15	52 39	67 14	21 31
.. 30	17 59	38 46	2 24				

Date.	Lat. South.	Long. West.	Var. East.
1833.			
March 12	51 30	57 54	18 42
.. 14	51 30	57 54	18 45
April 16	41 58	64 35	17 00
.. 17	42 18	64 19	16 47
Aug. 2	41 17	61 13	14 23
.. 3	40 50	61 30	16 55
.. 4	40 53	61 50	16 27
.. 5	40 53	61 30	16 44
.. 6	40 27	62 00	16 16
.. 22	39 10	60 41	15 07
.. 26	38 57	61 58	15 11
.. 30	38 57	61 58	14 56
Sept. 1	38 57	61 58	15 25
Nov. 25	34 53	56 13	11 45
.. 29	34 53	56 13	11 21
Dec. 7	34 45	56 48	12 11
.. 15	42 34	58 54	16 01
.. 19	43 27	59 59	15 46
.. 20	44 30	61 18	18 14
.. 23	47 11	65 04	19 50
1834.			
Jan. 1	47 45	66 00	20 30
.. 7	48 10	67 30	20 50
.. ..	48 46	64 24	19 18
.. 8	48 47	67 15	21 28
.. ..	48 45	66 00	18 22
.. 9	49 10	67 15	19 47
.. 23	48 20	66 12	19 56
.. ..	48 26	66 09	19 31
.. 26	52 07	68 05	21 40
.. 30	52 45	70 08	23 38
Feb. 11	53 18	67 15	22 00
.. 13	52 45	70 08	23 45
.. 14	53 23	69 08	24 40
.. 17	53 15	67 51	24 12
.. 19	54 00	67 15	23 05
.. 24	55 48	66 23	23 31
April 11	50 15	64 15	19 52
.. 12	49 47	65 16	22 50
.. 13	49 39	67 55	20 18
.. 14	50 08	68 27	20 21
.. 20	50 08	68 27	21 28
May 22	52 16	67 30	22 22
June 13	52 51	77 28	25 47
Nov. 10	33 04	72 09	17 16
.. 18	38 08	77 12	17 27
.. 19	40 12	77 15	18 30
.. ..	40 12	76 56	17 30
.. ..	39 06	77 09	17 36
.. 20	40 30	76 45	18 58
.. ..	40 30	76 46	18 56
.. 27	41 42	74 00	19 09
.. 30	43 46	77 05	19 42
.. ..	43 46	77 05	20 11
Dec. 1	44 22	76 42	18 54
.. ..	44 26	75 39	19 13
.. ..	44 26	75 15	19 43
.. ..	44 22	76 42	19 01
.. ..	44 27	76 33	19 57

Date.	Lat. South.	Long. West.	Var. East.
1834.			
Dec. 2	44 26	75 15	20 05
.. ..	44 29	75 44	20 15
.. 3	44 48	75 02	20 30
.. 18	44 52	76 18	21 24
.. 19	45 09	77 48	21 09
.. ..	45 10	77 51	21 53
.. 20	46 31	75 43	22 35
.. 29	45 48	75 06	21 33
.. 30	45 48	75 06	21 39
1835.			
Jan. 6	44 30	74 20	20 18
.. 7	43 58	74 20	20 36
Feb. 28	38 18	72 30	17 22
March 1	38 18	72 30	17 54
.. 25	35 11	71 45	16 34

NOTE.—Hence to the Galapagos Islands the variations were all observed on shore.

Date.	Lat. South.	Long. West.	Var. East.
Sept. 12	4 42	84 48	9 27
.. 13	2 58	85 16	9 23
	NORTH.	WEST.	
Oct. 22	0 10	97 27	8 43
	SOUTH.		
.. 24	1 12	99 59	8 37
.. 25	4 32	103 56	6 10
.. ..	3 39	102 54	8 20
.. 26	5 31	105 02	7 47
.. 27	6 09	106 26	7 20
.. 28	7 07	109 09	6 33
.. ..	7 47	100 24	6 03
.. 29	7 40	112 40	6 00
.. 30	8 21	113 51	6 00
.. ..	8 47	115 18	6 19
.. 31	9 38	118 20	6 08
Nov. 1	10 04	119 48	5 04
.. ..	10 27	121 16	4 35
.. 2	11 14	123 59	4 54
.. 3	11 33	125 10	6 06
.. ..	11 42	126 06	4 43
.. 4	11 52	127 21	5 38
.. 4	12 07	128 43	5 31
.. 6	13 11	132 11	6 20
.. 27	17 16	150 02	7 57
.. 28	17 22	151 52	7 59
.. ..	17 22	152 02	7 56
.. ..	17 19	152 24	6 45
.. 29	17 26	152 50	8 52
.. ..	17 26	152 51	7 46
.. ..	17 32	152 30	7 03
.. 30	18 20	156 31	8 11
Dec. 1	18 21	157 15	7 14
.. 2	18 32	158 01	8 23
.. ..	18 33	158 13	8 33
.. 3	18 42	159 24	10 14
.. ..	18 44	159 27	9 25
.. 4	19 47	161 47	9 20
.. ..	20 17	163 05	8 38
.. 5	21 17	165 24	9 28

Date.	Lat. South.	Long. West.	Var. East.
1835.			
Dec. 6	21 51	166 37	10 27
.. 7	22 41	169 01	10 56
.. ..	22 41	169 1	11 00
.. 10	25 42	177 6	11 15
.. ..	26 30	178 26	11 15
.. 11	27 26	179 20	11 22
.. ..	28 45	179 27	11 54
		EAST.	
.. 12	29 41	179 08	13 24
.. ..	29 41	179 08	13 16
.. 14	31 25	175 59	14 15
.. 15	32 36	175 05	14 14
.. 21	35 00	174 00	14 05
1836.			
Jan. 1	34 04	172 56	13 05
.. 4	34 40	165 37	13 26
.. 7	34 29	163 26	13 28
Feb. 21	42 53	141 45	8 21
.. 22	42 48	140 40	7 37
			WEST.
March 2	39 46	123 42	3 35
.. 3	38 20	123 36	2 50
.. ..	37 52	123 13	3 48
.. ..	37 54	123 11	3 02
.. 5	36 27	119 50	5 24
.. 15	35 33	117 30	6 06
.. 16	35 38	117 09	8 15
.. ..	35 34	116 16	6 31
.. 17	34 48	114 00	7 20
.. 21	27 28	108 50	4 59
.. ..	27 27	108 47	5 19
.. 23	23 44	106 17	3 58
.. 25	20 24	104 09	3 22
April 13	12 21	94 04	0 04
.. 15	13 17	88 13	0 18
.. ..	12 59	90 33	0 57
.. 21	16 56	73 02	3 55
.. ..	16 56	73 01	3 38
.. 22	16 58	72 59	3 28
.. ..	17 13	71 48	4 04
.. ..	17 24	71 51	4 10
.. 23	17 36	70 27	5 07
.. 24	17 52	68 30	5 39
.. 26	18 35	63 34	7 36
.. 27	18 43	62 20	8 06
.. ..	18 43	62 14	8 11
.. 28	19 20	60 12	8 59
May 13	25 42	46 42	16 16
.. 15	27 30	41 08	20 37

Date.	Lat. South.	Long. East.	Var. West.
1836.			
May 15	27 33	40 52	21 10
.. 16	27 21	40 13	21 36
.. 17	27 45	33 18	21 43
.. 18	28 12	36 08	20 48
.. 23	34 45	23 11	26 22
.. ..	34 53	22 33	28 59
June 29	22 56	5 06	24 09
.. 30	22 17	4 36	24 12
		WEST.	
July 8	15 57	5 34	19 43
.. 16	13 02	9 07	19 56
.. 18	9 52	12 34	17 43
.. 21	7 57	14 24	17 36
.. 24	9 30	17 32	15 56
.. 25	10 07	18 58	15 57
.. 26	11 25	23 23	13 06
.. 28	12 04	28 31	8 26
.. ..	12 12	29 39	9 00
.. 31	12 48	35 55	4 29
.. ..	12 49	36 52	4 07
Aug. 6	13 09	38 30	2 44
.. 7	12 44	37 54	3 18
.. 8	12 32	37 39	3 11
.. 9	12 44	37 29	2 46
.. ..	12 40	37 00	4 16
.. 13	8 03	34 49	5 11
.. 15	8 03	34 50	5 09
	NORTH.		
.. 22	2 32	29 07	10 23
.. 23	3 39	29 11	10 27
.. 24	5 45	27 11	14 26
Sept. 4	14 43	23 39	17 02
.. 9	23 43	33 50	15 26
.. ..	23 39	83 47	15 13
.. 10	25 00	34 19	16 05
.. 11	28 07	36 00	17 06
.. 12	28 29	36 18	16 25
.. 13	29 59	36 23	17 54
.. 14	31 04	35 57	18 28
.. 15	32 03	35 05	18 22
.. 16	35 38	31 32	21 34
.. 17	37 15	28 54	22 09
.. 18	37 49	28 00	24 00
.. 19	38 35	27 08	25 21
.. 25	38 54	25 03	23 21
.. 26	40 35	22 45	25 00
.. ..	41 28	21 31	25 38
.. 27	42 06	20 06	26 00
.. 27	42 20	19 50	26, 03

All the observations for variation, afloat, were taken with a very good Gilbert's compass, placed on a stanchion above the poop, where it was found, by trials in various latitudes, to be nearly free from any effect of local attraction.

ERRATUM in page 65, line 4, of figures, *for* 0 15 *read* 2 15.

APPENDIX.

No. 1.

SIR: March 19, 1831.

Accompanying this letter, I have the honour to transmit to you, for their Lordships' information, six charts and sixteen plans of harbours and portions of the coast of Tierra del Fuego, the results of Commander Fitz-Roy's surveys in H.M.'s sloop Beagle, between April 1829 and June 1830.

Their Lordships will, I trust, permit me, as the senior officer of that expedition, to state the peculiar nature and extent of this service, as well as the complete manner in which it has been effected.

On the melancholy occasion of Commander Stokes's death, I was fortunate, through the Commander-in-chief Sir Robert Otway's just discrimination of Commander Fitz-Roy's qualifications, on account of which alone he was selected, to receive him as my colleague, in the command of the Beagle.

In April I detached the Beagle, and Adventure's tender, to complete portions of the Strait of Magalhaens that were then imperfect; and by him, and under his superintendence and able direction, the Magdalen and Barbara Channels through the Tierra del Fuego were surveyed; a considerable portion of the interior sounds on the western coast was examined; and the discovery of the Otway and Skyring Waters was made, by Commander Fitz-Roy himself, in the depth of the severe winter of that climate, and on which he was absent from the ship thirty-three days in an open whale-boat.

In August the Beagle joined me at Chiloe, and sailed again early in November following, with a view to examine the outward or sea-

coast of Tierra del Fuego, from its westernmost extremity to the Strait Le Maire, including Cape Horn and the islands in the vicinity.

The difficulties under which this service was performed, from the tempestuous and exposed nature of the coast, the fatigues and privations endured by the officers and crew, as well as the meritorious and cheerful conduct of every individual, which is mainly attributable to the excellent example and unflinching activity of the commander, can only be mentioned by me in terms of the highest approbation.

For the results of the voyage, and the services of Commander Fitz-Roy, I beg to refer their Lordships to their Hydrographer and the charts herewith transmitted, which I hope will be satisfactory.

I trust their Lordships will permit me once again to express how much I feel that Commander Fitz-Roy, not only from the important service he has rendered, but from the zealous and perfect manner in which he has effected it, merits their distinction and patronage; and I beg leave, as his late senior officer, to recommend him in the strongest manner to their favourable consideration.

I have, &c.

PHILLIP P. KING, Captain.

To the Hon. GEORGE ELLIOT,
Secretary of the Admiralty, &c. &c. &c.

No. 2.

SIR, London, May 23, 1831.

Enclosed is a copy of the letter sent to Captain P. P. King (then commanding H. M.'s sloop Adventure), by the Secretary of the Admiralty, relative to the natives of Tierra del Fuego, who were brought to England in the Beagle; and I have to request that you will honour me by submitting the enclosed copy, and the purport of this letter, to my Lords Commissioners of the Admiralty.

The proper season for the return of these Fuegians is now drawing near. They have been with me fourteen months, and at least five months more must elapse before they can reach their own shores.

They have always expected to return during the ensuing winter (summer of their country), and should they be disappointed, I fear that discontent and disease may be the consequence.

Having been led to suppose that a vessel would be sent to South America to continue the survey of its shores, and to explore parts yet unknown, I hoped to have seen these people become useful as interpreters, and be the means of establishing a friendly disposition towards Englishmen on the part of their countrymen, if not a regular intercourse with them.

By supplying these natives with some animals, seeds, tools, &c., and placing them, with some of their own tribe, on the fertile country lying at the east side of Tierra del Fuego, I thought that, in a few years, ships might have been enabled to obtain fresh provisions, as well as wood and water, during their passage from the Atlantic to the Pacific Ocean, on a part of the coast which can always be approached with ease and safety.

If their Lordships should so far approve of these ideas as to grant me any assistance in carrying them into execution, I shall feel deeply gratified, and shall exert every means in my power; but should they not be thought worthy of attention and support, I humbly request that their Lordships will grant me twelve months' leave of absenee from England, in order to enable me to keep my faith with the natives of Tierra del Fuego, by restoring their countrymen, and by doing them as much good as can be effected by my own very limited means.

I have, &c.,

ROBERT FITZ-ROY, Commander.

To the Hon. GEORGE ELLIOT,
Secretary to the Admiralty, &c. &c. &c.

In June I received twelve months' leave of absence from England, and made the following agreement with Mr. Mawman, a shipowner, of London.

No. 3.

MEMORANDUM of Agreement made the eighth day of June, in the year of our Lord one thousand eight hundred and thirty-one, between John Mawman, of Stepney Causeway, London, merchant,

owner of the brig or vessel called The John, of two hundred tons register burthen, now lying in the London Dock, whereof John Davey is Master, on the one part, and Robert Fitz-Roy, a Commander in His Majesty's Royal Navy, of the other part.

The said John Mawman agrees with the said Robert Fitz-Roy, in manner following :—

That the said master, or such other master as the said John Mawman shall appoint, shall receive the said Robert Fitz-Roy and his friends and servants, not exceeding in the whole six persons, on board the said brig or vessel, and proceed with them forthwith to South America, to such one or two port or ports, or place or places, as the said Robert Fitz-Roy shall order and direct, such port or ports, or place or places, not to be north of Valparaiso; and at the first port or place, or so near thereto as the said vessel may safely get, to be named by the said Robert Fitz-Roy, to land the said Robert Fitz-Roy and his said friends and servants, or such of them as the said Robert Fitz-Roy shall require, and receive them, or such of them as the said Robert Fitz-Roy shall require, on board again; and thence forthwith to proceed to the second port or place, or so near thereto as the said vessel may safely get, to be named by the said Robert Fitz-Roy, there to land such of them, the said Robert Fitz-Roy and his friends and servants, as shall not have been already landed at the said first-named port or place, and receive the said Robert Fitz-Roy, and such other or others of the last-mentioned persons, as he shall require again on board the said vessel, and forthwith proceed to and land him or them at Valparaiso.

That the said Robert Fitz-Roy shall be at liberty to put on board stock and provender, at such places as may be agreed upon, port charges and pilotage being paid by the said Robert Fitz-Roy.

That John Mawman will find and provide the said Robert Fitz-Roy, and the said other persons, with all suitable and proper customary provisions, stores, wines, beer, and spirits.

And the said Robert Fitz-Roy agrees with the said John Mawman, his executors and administrators, as follows :—

That he will not detain the said brig or vessel at either of the ports or places to be named by him, as hereinbefore mentioned, any longer than shall be reasonably necessary to enable him and the said other persons safely to land, re-embark, and finally land at the said ports respectively.

That he will pay to the said John Mawman, his executors or administrators, as the compensation for the agreement hereinbefore contained on the part of the said John Mawman, the sum of one thousand pounds sterling, to be paid down prior to embarkation.

As witness the hands of the said parties.

Witness,
W. H. WOOLLETT.
W. WACKERBARTH.

ROBERT FITZ-ROY.
JOHN MAWMAN.

No. 4.

Salisbury Square,
November 10, 1831.

MY DEAR SIR,

Matthews left town this morning to join the Beagle at Plymouth, being detained till to-day for the steamer.

We have provided Matthews with all such articles as appeared to be necessary for him, and which could be most advantageously supplied in this country. These had all been completed before I learned from Mr. Wilson that you are short of stowage. I hope, however, they will not be found to amount to a quantity to occasion you inconvenience; and I think you will be of opinion that no part of his outfit could, with propriety, be dispensed with, in case Matthews becomes a permanent resident in Tierra del Fuego.

Mr. Wilson and myself concurred in opinion that a letter should be addressed by us to Matthews, in reference to the undertaking on which he is about to enter. This I have drawn up at Mr. W.'s request, and hoped to have procured the addition of his signature to it; but a pressure of other engagements has compelled me to drive it off till it is too late to send it to him for that purpose. I have no doubt, however, that it expresses his general views on the subject. If you should think I have dwelt too much on the religious bearing of Matthews's future labours, you must kindly call to your recollection that I am a Missionary Secretary, and could not altogether divest myself of that character on the present occasion. The letter is enclosed, and we shall feel obliged by your giving it to Matthews, when he comes on board. You will, of course, take a copy of it, if you wish to do so.

I much regret that we could not meet with a suitable companion for Matthews. I trust, however, you will find him to possess many valuable qualifications for the undertaking.

With very cordial wishes for your safety and welfare,

I remain, &c.
D. COATES.

To Capt. FITZ-ROY, R.N.
&c. &c. &c.

No. 5.

Salisbury Square, London,
Nov. 10, 1831.

DEAR MR. MATTHEWS,

The friends by whose means you are enabled to proceed to Tierra del Fuego cannot suffer you to depart without offering to you some suggestions and counsel with regard to your future course.

The undertaking in which you are about to be engaged springs from the benevolent interest taken by Captain Fitz-Roy in the natives of the island of Tierra del Fuego, with whom he became acquainted during his survey of that part of the coast of South America, in which he was employed by His Majesty's Government. Some of them were brought hither by Capt. F. on his return home, about twelve months ago. These individuals, through Capt. F.'s kind exertions, were, during their stay in England, placed under circumstances to receive instruction in the English language, in the principles of Christianity, and in some of the most simple arts of civilized life.

These natives will be your companions on board the "Beagle," a passage to Tierra del Fuego having, at the instance of Capt. F., been granted to them and to you on board that ship, by the liberality of the Lords of the Admiralty.

Some Christian friends having become acquainted with these foreigners, and with Capt. Fitz-Roy's solicitude to promote their welfare and that of the tribes with which they are connected, have supplied the means of providing the outfit, which was requisite to

enable you, advantageously, to enter on the work before you. Among these friends you are especially indebted to the kindness and liberality of the Rev. W. Wilson. His solicitude to forward Capt. Fitz-Roy's views has been manifested toward these Fuegians, as well as yourself, by his having had them under his immediate care at Walthamstow for many months, in order to impart to them such knowledge and information as seemed calculated to promote their present and eternal welfare, and by contributing largely to the fund raised for your use.

From what has been just stated, you will perceive the peculiar obligations under which you lie to Capt. Fitz-Roy and to Mr. Wilson, and the interest which they both take in your undertaking. You will especially consider yourself as bound to act under the superintendence and direction of Capt. Fitz-Roy. We earnestly recommend you to consult Capt. F. on all your plans and proceedings, and ever to act toward him with entire openness and unreserve. He is cordially desirous to promote the welfare of the Fuegians, and is possessed of information and experience, authority and influence, calculated, under the Divine blessing, powerfully to advance the object you have in view. To him, therefore, you will do well to refer on all occasions, and cheerfully conform to his wishes.

We trust that, in entering on this undertaking, you have been influenced by a sincere desire to promote the glory of God and the good of your fellow-creatures. These are the ends which those friends have in view who have assisted you, and these they trust that you, by the grace of God, will ever steadily keep in view yourself. The means to be employed for the attainment of these ends may be summed up in very few words: it is to make it your study and endeavour to do these poor creatures all the good in your power in every practicable way. By evidencing this to them in the whole of your spirit and conduct, you will gain their confidence and obtain influence over them, without which you cannot expect to succeed. But it is not easy, steadily and consistently, to maintain a line of conduct like this. To enable you to do it, you must be "strong in the grace which is in Christ Jesus," and this grace must be sought by diligent prayer and a constant reading and meditating on the word of God. Here lies your strength, and hence, under God, must your success be derived. "Draw nigh to

God, and He will draw nigh to you." Walk closely with Him, and his name will be glorified in you. Pursuing this course, you will be sure of enjoying His blessing, and may cheerfully leave all events in His hands.

Your first object must be to acquire the language of the Fuegians. To this you must apply with the utmost diligence, fully availing yourself for this purpose of your intercourse with the natives on the voyage; as, till this point is gained, you can hold no free communication with the tribes on the island. In prosecution of this object, we recommend you carefully to note down in writing every new word which you hear. These vocabularies you will, at your leisure, classify and reduce to order, to form the basis of a grammar and dictionary, and ultimately of translations into the language. In prosecution of this design, it will be requisite that you should ascertain, if practicable, which dialect is most extensively used in the island, if it should be found that there are more than one; as it is obviously desirable that you should fix that which is most extensively used.

In imparting religious instruction to the natives, you will make the Bible the basis of all your teaching. You must never lose sight of that great theological principle laid down in the sixth article of the Church of England:—"That Holy Scripture containeth all things necessary to salvation; so that whatsoever is not read therein, nor may be proved thereby, is not to be required of any man that it should be believed as an article of the faith, or be thought requisite or necessary to salvation." By this sound and salutary principle, let the whole of the religious instruction which you impart to the natives be governed. And we earnestly pray that God may give you a mouth to speak, and them ears to hear, that they may so "know the Holy Scriptures that they may be made wise unto salvation through faith in Christ Jesus."

In your intercourse with the Fuegians, you will bear in mind that it is the temporal advantages which you may be capable of communicating to them that they will be most easily and immediately sensible of. Among these may be reckoned the acquisition of better dwellings, and better and more plentiful food and clothing. Consequently, you will consider it a primary duty to instruct them in cultivating the potato, cabbage, and other vegetables; to rear pigs, poultry, &c., and to construct a commodious habitation, &c. You

will probably find in this, as well as in more important things, that example is the most influential instructor. You must therefore take care to have a comfortable habitation yourself, furnished with all necessary articles for use, and kept clean and orderly. You will also fence in a piece of ground for a garden, and get it well stocked with the most useful vegetables; and also surround yourself as quickly as possible with a plentiful supply of pigs, poultry, goats, &c. This, indeed, you will find absolutely necessary for your own future subsistence, as well as with a view to the civilization and comfort of the natives.

Captain Fitz-Roy will, we doubt not, afford you assistance in selecting a proper spot for your residence, and raising a dwelling upon it; and also in procuring the requisite seeds and animals for your subsistence, and for the successful prosecution of your work. A very liberal supply of European clothing, implements and tools, ironmongery, earthenware, &c., is included in your outfit.

We trust that these general hints, with the information and assistance which you may acquire from Captain Fitz-Roy and the books with which you are supplied, will suffice to enable you to carry on your work with comfort and efficiency.

You will have the kindness to write to Mr. Wilson, with full particulars of your proceedings and prospects, by every practicable opportunity, sending your letters to Buenos Ayres, or any other point where they may be likely to get into a channel to reach England.

In conclusion, I have only to add that Captain Fitz-Roy has very kindly and considerately offered to bring you back with him to this country, should circumstances, contrary to our anticipations, turn out to be such that you should deem it unadvisable to remain at Tierra del Fuego.

Earnestly praying that the blessing of God may rest on you and your important and interesting labours,

I remain, truly yours,

D. Coates.

No. 6.

Memorandum of Agreement made this eleventh day of September, one thousand eight hundred and thirty-two, between Mr. James

Harris, resident at the River Negro, and Robert Fitz-Roy, Commander of His Britannic Majesty's surveying sloop Beagle.

Mr. James Harris will provide and furnish two decked schooner-rigged vessels, with their rigging, sails, masts, and all other things necessary for their use and safety, both at sea and in harbour; also, sufficient crews and two pilots, together with provisions for the said pilots, their crews, and eight other persons.

The said Mr. James Harris hereby agrees that the said schooner-rigged vessels, and all on board of them, shall be under, and obey the directions of, the said Robert Fitz-Roy, or those whom the said Robert Fitz-Roy may appoint; and that the said vessels shall continue to perform this expressed service during eight lunar months from the date of this agreement, unless the said Robert Fitz-Roy shall end this agreement at an earlier period; and the said Robert Fitz-Roy shall be at liberty to put an end to this agreement at th end of any month after December of this year.

In consideration of the above useful service to be thus rendered to His Britannic Majesty and the public, the said Robert Fitz-Roy hereby agrees and promises to pay to the said Mr. James Harris, his executors or administrators, the sum of one hundred and forty pounds sterling per lunar month, during the whole time that the said schooners are employed as herein agreed.

As witness the hands of the said parties,

JAMES HARRIS, Resident at the Rio Negro.
ROBERT FITZ-ROY, Commander.

Witnesses to the signatures and agreement.

J. C. WICKHAM, Senior Lieutenant.
B. J. SULIVAN, Second Lieutenant.

No. 7.

ROBERT FITZ-ROY, Esq., Commander of H.M.S. Beagle, Dr. to Mr. James Harris, for the hire of two schooner-rigged vessels, &c., as per annexed agreement, £1,680 sterling.—11th August, 1833.

Received from Robert Fitz-Roy, Commander of H.M.S. Beagle, the sum of £1,680 sterling, in full payment for the hire of two

schooner-rigged vessels, &c., as per annexed agreement, dated 11th July, 1832.

JOHN HARRIS.

H.M.S. Beagle, at Sea,
15th Sept., 1833.

No. 8.

By Robert Fitz-Roy, Commander of His Britannic Majesty's surveying ship Beagle.

You are hereby required and directed to take command and charge of the two vessels, "La Paz" and "La Liebre," and of all on board of them.

They are engaged by me upon the terms specified in the accompanying agreement.

With these vessels you will execute as much of the survey, herein pointed out, as your means and other circumstances will allow.

Between Blanco Bay and New Bay the sea-coast should be accurately examined and charted.

Particular plans should be made of the entrances to False Bay, Brightman Inlet, Union Bay, the Bay of San Blas, and the River Negro.

The plans already made of Port San Josef and Port San Antonio should be verified.

The sea-coast ought to be completed before you undertake any examination of the interior waters; and I have to request that you will be cautious of information which may be coloured or exaggerated by individual interest.

As you are well acquainted with the excellent Mémoir, drawn up by the Hydrographer for our guidance, I need only recall your attention to the accompanying extracts.

I wish you to be at the Bay of San Blas on the 10th of November, and there to await my arrival.

ROBERT FITZ-ROY, Commander.
Blanco Bay, 19th Sept., 1832.

To Lieut. J. C. WICKHAM,
Senior Lieutenant of H. M. S. Beagle.

No. 9.

(MEMORANDUM.)

H. M. S. Beagle, Blanco Bay,
19th September, 1832.

It is my direction that you take command and charge of the hired vessel "La Paz," and of all on board of her.

You will be extremely careful to keep company with Lieutenant Wickham, unless otherwise directed; and you will obey his orders, and assist him in carrying my orders into execution.

ROBERT FITZ-ROY, Commander.

To Mr. J. L. STOKES,
Assistant-Surveyor, H.M.S. Beagle.

No. 10.

H.M.S. Beagle, off San Blas Bay, Coast of Patagonia,
4th December, 1832.

SIR,

As you have already executed a considerable part of the service pointed out to you in my order, dated September 1832, and are ready for a more arduous task than I had supposed your limited means could undertake, you are hereby required and directed to examine and survey as much of the sea-coast between Port Desire and Blanco Bay as time and your means will allow.

In the first instance, you will hasten to Blanco Bay, and deliver the accompanying despatches to the Commandant of the Buenos Ayrean settlement.

Afterwards, your route will be that which appears to you the most proper for the verification of the charts with which you are furnished, and for the execution of the above-mentioned service.

You will endeavour to pass the month of March in the River Negro, and, if we do not meet sooner, you will look for the Beagle in Blanco Bay at the beginning of July.

Should she not arrive there in July, you will go with both vessels to Monte Video.

I have, &c.,

ROBERT FITZ-ROY.

Lieut. J. C. WICKHAM,
Commanding the hired Schooners
"La Paz" and "La Liebre."

No. 11.

EXTRACT from Falkner, pp. 61, 62, 63.

I shall here give an account of a strange amphibious animal, which is an inhabitant of the river Parana, a description of which has never reached Europe; nor is there even any mention made of it by those who have described this country. What I here relate is from the concurrent asseverations of the Indians, and of many Spaniards, who have been in various employments on this river: besides, I myself, during my residence on the banks of it, which was near four years, had once a transient view of one; so that there can be no doubt about the existence of such an animal.

In my first voyage to cut timber, in the year 1752, up the Parana, being near the bank, the Indians shouted, "yaquaru!" and looking, I saw a great animal, at the time it plunged into the water from the bank; but the time was too short to examine it with any degree of precision.

It is called yaquaru, or yaquaruigh, which (in the language of that country) signifies the water tiger. It is described by the Indians to be as big as an ass, of the figure of a large overgrown river-wolf or otter, with sharp talons and strong tusks, thick and short legs, long shaggy hair, with a long tapering tail.

The Spaniards describe it somewhat differently:—as having a long head, a sharp nose like that of a wolf, and stiff erect ears. This difference of description may arise from its being so seldom seen, and, when seen, so suddenly disappearing; or perhaps there may be two species of this animal. I look upon this last account as the most authentic, having received it from persons of credit, who assured me that they had seen this water-tiger several times. It is always found near the river, lying on a bank, from whence, on hearing the least noise, it immediately plunges into the water.

It is very destructive to the cattle which pass the Parana, for great herds of them pass every year; and it generally happens that this beast seizes some of them. When it has once laid hold of its prey, it is seen no more, and the lungs and entrails soon appear floating upon the water.

It lives in the greatest depths, especially in the whirlpools made by the concurrence of two streams, and sleeps in the deep caverns that are in the banks.

No. 12.

EXTRACT of a Letter from Thomas Pennant, Esq. to the Hon. Daines Barrington. (Written in 1771.)

DEAR SIR:

I now execute the promise I made in town some time ago, of communicating to you the result of my visit to Mr. Falkner, an antient Jesuit, who had passed thirty-eight years of his life in the southern part of South America, between the river la Plata and the Straits of Magellan. Let me endeavour to prejudice you in favour of my new friend, by assuring you, that by his long intercourse with the inhabitants of Patagonia, he seems to have lost all European guile, and to have acquired all the simplicity and honest impetuosity, of the people he has been so long conversant with. I venture to give you only as much of his narrative as he could vouch for the authenticity of; which consists of such facts as he was eye-witness to, and such as will (I believe) establish past contradiction the veracity of our late circumnavigators, and give new lights into the manners of this singular race of men. It will not, I flatter myself, be deemed impertinent to lay before you a chronological mention of the several evidences that will tend to prove the existence of a people of a supernatural height, inhabiting the southern tract. You will find that the majority of voyagers who have touched on that coast have seen them, and made reports of their size, that will very well keep in countenance the verbal account given by Mr. Byron, and the printed, by Mr. Clarke; you will observe, that if the old voyagers did exaggerate, it was through the novelty and amazement at so singular a sight; but the latter, forewarned by the preceding accounts, seem to have made their remarks with coolness, and confirmed them by the experiment of measurement.

A.D. 1519. The first who saw these people was the great Magellan;—one of them just made his appearance on the banks of the river La Plata, and then made his retreat; but, during Magellan's long stay at Port St. Julian, he was visited by numbers of this tall race. The first approached him singing, and flinging the dust over his head, and shewed all signs of a mild and peaceable disposition: his visage was painted; his garment, the skin of some animal, neatly

sewed; his arms, a stout and thick bow, a quiver of long arrows feathered at one end, and armed at the other with flint. The height of these people was about seven feet (French); but they were not so tall as the person who approached them first, who is represented to have been of so gigantic a size that Magellan's men did not, with their heads, reach as high as the waist of this Patagonian. They had with them beasts of burden, on which they placed their wives. By Magellan's description of them, they appear to have been the animals now known by the name of Llama. These interviews ended with the captivating two of the people, who were carried away in two different ships; but, as soon as they arrived in a hot climate, each of them died. I dwell the longer on this account, as it appears extremely deserving of credit; as the courage of Magellan made him incapable of giving an exaggerated account through the influence of fear; nor could there be any mistake about the height, as he had not only a long intercourse with them, but the actual possession of two for a very considerable space of time.* It was Magellan who first gave them the name of Patagons, because they wore a sort of slipper made of the skin of animals. "Tellement," says M. de Brosse,† qu'ils paroissoient avoir des pattes de bêtes." In 1525 Garcia de Loaisa saw, within the Straits of Magellan, savages of a very great stature, but he does not particularize their height. After Loaisa, the same Straits were passed in 1535 by Simon de Alcazova, and attempted in 1540 by Alphonso de Camargo, but without being visited by our tall people. The same happened to our countryman, Sir Francis Drake; but, because it was not the fortune of that able and popular seaman to meet with these gigantic people, his contemporaries considered the report as the invention of the Spaniards.

In 1579, Pedro Sarmiento asserts that those he saw were three ells high. This is a writer I would never venture to quote singly, for he destroys his own credibility by saying the savage he made prisoner was an errant Cyclops. I only cite him to prove that he fell in with a tall race, though he mixes fable with truth. In 1586 our countryman, Sir Thomas Cavendish, in his voyage, had only

* Vide Ramusio's Coll. Voyages, Venice, 1550; also the Letter of Maximilian Transylvanus, Sec. to Charles V.; and in the first volume, p. 376, A. and B.

† This account, as well as the others where I do not quote my authority, are taken from that judicious writer, M. de Brosse.

opportunity of measuring one of their footsteps, which was eighteen inches long: he also found their graves, and mentions their customs of burying near the shore.* In 1591, Anthony Knevet, who sailed with Sir Thomas Cavendish in his second voyage, relates that he saw, at Port Desire, men fifteen or sixteen spans high, and that he measured the bodies of two that had been recently buried, which were fourteen spans long.† In 1599, Sebald de Veert, who sailed with Admiral de Cordes, was attacked in the Strait of Magellan by savages whom he thought to be ten or eleven feet high. He adds, that they were of reddish colour, and had long hair.‡

In the same year, Oliver Van Noort, a Dutch admiral, had a rencontre with this gigantic race, whom he represents to be of a high stature, and of a terrible aspect.

1614.—George Spilbergen, another Dutchman, in his passage through the same Strait, saw a man, of a gigantic stature, climbing a hill as if to take a view of the ship.§ 1615.—Le Maire and Schouten discovered some of the burying-places of the Patagonians beneath heaps of great stones, and found in them skeletons ten or eleven feet long.‖

Mr. Falkner supposes that formerly there existed a race of Patagonians superior to these in size; for skeletons are often found of far greater dimensions, particularly about the river Texeira. Perhaps he may have heard of the old tradition of the natives mentioned by Cieza,¶ and repeated from him by Garcilasso de la Vega,** of certain giants having come by sea, and landed near the cape of St. Helena, many ages before the arrival of the Europeans.

1618.—Gracias de Nodal, a Spanish commander, in the course of his voyage, was informed by John Moore, one of his crew, who landed between Cape St. Esprit and Cape St. Arenas, on the south side of the Straits, that he trafficked with a race of men taller, by the head, than the Europeans. This and the next are the only instances I ever met with of the tall race being found on that side of the Strait.

* Purchas, i. 58. † Purchas, i. 1232.

‡ Col. Voy. by the Dutch East-India Company, &c. London, 1793, p. 319.

§ Purchas, i, 80. ‖ Purchas, i. 91.

¶ Seventeen years travels of Peter de Cieza, 138.

** Translated by Ricaut, p. 263.

1642.—Henry Brewer, a Dutch admiral, observed, in the Strait Le Maire, the footsteps of men which measured eighteen inches. This is the last evidence, in the seventeenth century, of the existence of these tall people. But let it be observed, that out of the fifteen first voyagers who passed through the Magellanic Straits, not fewer than nine are undeniable witnesses of the fact we would establish.

In the present century, I can produce but two evidences of the existence of the tall Patagonians; the one in 1704, when the crew of a ship belonging to St. Maloes, commanded by Captain Harrington, saw seven of these giants in Gregory Bay. Mention is also made of six more being seen by Captain Carman, a native of the same town, but whether in the same voyage, my authority is silent.*

But as it was not the fortune of the four other voyagers† who sailed through the Straits in the seventeenth century, to fall in with any of this tall race, it became a fashion to treat as fabulous the account of the preceding nine, and to hold this lofty race as the mere creation of a warm imagination. In such a temper was the public, on the return of Mr. Byron from his circumnavigation, in the year 1766. I had not the honour of having personal conference with that gentleman, therefore will not repeat the accounts I have been informed he had given to several of his friends; I rather chuse to recapitulate that given by Mr. Clarke,‡ in the Philosophical Transactions for 1767, p. 75. Mr. Clarke was officer in Mr. Byron's ship, landed with him in the Straits of Magellan, and had for two hours an opportunity of standing within a few yards of this race, and seeing them examined and measured by Mr. Byron.

He represents them in general as stout and well-proportioned, and assures us that none of the men were lower than eight feet, and that some even exceeded nine, and that the women were from seven feet and a half to eight feet. He saw Mr. Byron measure one of the men, and, notwithstanding the Commodore was near six feet high, he could, when on tip-toe, but just reach with his hand the top of

* Frezier's Voy. p. 84.

† Sir John Narborough, in 1670; Bartholomew Sharp, in 1680; De Gennes, in 1696; and Beauchesne Goüin, in 1699,

‡ This able officer commanded the Discovery, in Capt. Cook's last voyage, and died off Kamtschatka, August 22d, 1779.

the Patagonian's head; and Mr. Clarke is certain that there were several taller than him on whom the experiment was made, for there were about five hundred men, women, and children. They seemed very happy at the landing of our people, and expressed their joy by a rude sort of singing. They were of a copper colour, and had long lank hair, and faces hideously painted. Both sexes were covered with skins, and some appeared on horseback and others on foot.

A few had on their legs a sort of boot, with a sharp-pointed stick at the heel, instead of a spur. Their bridles were made of thong, the bit wood; the saddle as artless as possible, and without stirrups. The introduction of horses into these parts by the Europeans introduced, likewise, the only species of manufacture they appear to be acquainted with. All their skill seems to extend no farther than these rude essays at harness, and to equip themselves for cavaliers. In other respects they would be in the same state as our first parents, just turned out of paradise, clothed in coats of skins; or, at best, in the same condition in which Cæsar found the ancient Britons; for their dress was similar, their hair long, and their bodies like those of our ancestors, made terrific by wild painting. These people, by some means or other, had acquired a few beads and bracelets; otherwise, not a single article of European fabric appeared among them. These they must have gotten by the intercourse with the other Indian tribes; for had they any intercourse with the Spaniards, they never would have neglected procuring knives, the stirrups, and other conveniences, which the people seen by Mr. Wallis had.

I should have been glad to have closed, in this place, the relations of this stupendous race of mankind, because the two following accounts, given by gentlemen of character and abilities, seem to contradict great part of what had been before advanced, or at least serve to give scoffers room to say, that the preceding navigators had seen these people through the medium of magnifying glasses, instead of the sober eye of observation. But before I make my remarks on what has been before related, I shall proceed with the other navigators, and then attempt to reconcile the different accounts.

In 1767 Captain Wallis, of the Dolphin, and Captain Philip Carteret, of the Swallow sloop, saw and measured with a pole several of the Patagonians who happened to be in the Straits of

Magellan during his passage.* He represents them as a fine and friendly people, clothed in skins, and on their legs a sort of boots; and many of them tied their hair, which was long and black, with a sort of woven stuff of the breadth of a garter, made of some kind of wool; that their arms were slings, formed of two round balls fastened one to each end of a cord, which they fling with great force and dexterity. He adds: "They hold one ball in their hand, and swing the other, at the full length of the cord, round their head, by which it acquires a prodigious velocity; they will fling it to a great distance, and with such exactness, as to strike a very small object." These people were also mounted on horses; their saddles, bridles, &c., were of their own making; some had iron, and others metal bits to their bridles, and one had a Spanish broad-sword; but whether the last articles were taken by war, or procured by commerce, is uncertain; but the last is most probable. It seems evident that they had intercourse with Europeans, and had even adopted some of their fashions, for many had cut their dress into the form of Spanish ponchos, or a square piece of cloth with a hole cut for the head, the rest hanging loose as low as their knees; they also wore drawers.—So these people had attained a few steps farther towards civilization than their gigantic neighbours; others, again, will appear to have made a far greater advance, for these still devoured their meat raw, and drank nothing but water.

M. Bougainville, in the same year, saw another party of the natives of Patagonia. He measured several of them, and declares that none were lower than five feet five inches French, or taller than five feet ten; i. e. five feet ten, or six feet three, English measure. He concludes his account with saying, that he afterwards met with a taller people in the South Sea, but I do not recollect that he mentions the place.

I am sorry to be obliged to remark, in these voyages, a very illiberal propensity to cavil at and invalidate the account given by Mr. Byron, but at the same time exult in having had an opportunity given me by that gentleman of vindicating his and the national honour. M. Bougainville, in order to prove that he fell in with the identical people that Mr. Byron conversed with, asserts that he saw numbers of them possessed of knives of an English manufactory, certainly given them by Mr. Byron. But he should have considered

* Phil. Trans. 1770, p. 21. Hawkesworth's Voy. vol. i. 374.

that there are more ways than one of coming at a thing—that the commerce between Sheffield and South America, through the port of Cadiz, is most uncommonly large—and that his Indians might have got their knives from the Spaniards, at the same time that they got their gilt nails and Spanish harness. But for farther satisfaction on this subject, I have liberty to say, from Mr. Byron's authority, that he never gave a single knife to the people he saw—that he had not one at that time about him—that, excepting the presents given with his own hands, and the tobacco brought by Lieutenant Cummins, not the least trifle was bestowed. I am furnished with one other proof that these lesser Indians, whom Mr. Wallis saw, were not the same as those described by Mr. Byron, as has been insinuated; for the first had with him some officers who had been with him on the preceding voyage, and who bear witness not only to the difference of size, but declare that these people had not a single article among them given by Mr. Byron.* It is extremely probable that these were the Indians that Mr. Bougainville fell in with; for they were furnished with bits, a Spanish scymeter, and brass stirrups, as before-mentioned.

My last evidence of these gigantic Americans is that which I received from Mr. Falkner: he acquainted me that, about the year 1742, he was sent on a mission to the vast plains of Pampas, which, if I recollect right, lie to the south-west of Buenos Ayres, and extend near a thousand miles towards the Andes. In these plains he first met with some tribes of these people, and was taken under the protection of one of the caciques. The remarks he made on their size were as follows:—that the tallest, which he measured in the same manner that Mr. Byron did, was seven feet eight inches high—that the common height, or middle size, was six feet—that there were numbers that were even shorter—and that the tallest woman did not exceed six feet; that they were scattered from the foot of the Andes over that vast tract which extends to the Atlantic Ocean, and are found as far as the Red River, at Bay Anegada, lat. 40°. 1′; below that the land is too barren to be habitable, and none are found, except accidental migrants, till you arrive at the river Gallego, near the Straits of Magellan.

"M. Frezier was assured by Don Pedro Molino, Governor of

* See Mr. Byron's letter at the end.

Chiloe, that he once was visited by some of these people, who were four varas, or about nine or ten feet high; they came in company with some Chiloe Indians,* with whom they were friends, and who probably found them in some of their excursions."

"Those whose height is so extraordinary as to occasion a great disbelief of the accounts of voyagers, are indisputably an existent people; they have been seen by Magellan, and six others, in the sixteenth century, and by two, if not three, in the present."

THOMAS PENNANT.

Copy of a Paper transmitted from Admiral Byron to Mr. Pennant, through the hands of the Right Reverend John Egerton, late Bishop of Durham, after he had perused the manuscript of the foregoing account.

"The people I saw upon the coast of Patagonia were not the same that were seen the second voyage. One or two of the officers that sailed with me, and afterwards with Captain Wallis, declared to me that they had not a single thing I had distributed amongst those I saw.

"M. Bougainville remarks, that his officers landed amongst the Indians I had seen, as they had many English knives among them, which were, as he pretends, undoubtedly given by me. Now it happened that I never gave a single knife to any of those Indians, nor did I even carry one ashore with me.

"I had often heard from the Spaniards that there were two or three different nations of very tall people, the largest of which inhabit those immense plains at the back of the Andes: the others, somewhere near the river Gallegos. I take it to be the former that I saw, and for this reason:—returning from Port Famine, where I had been to wood and water, I saw those people's fires a long way to the westward of where I had left them, and a great way inland, so, as the winter was approaching, they were certainly returning to a better climate. I remarked that they had not one single thing amongst them that shewed they ever had any commerce with Europeans. They were certainly of a most amazing size: so much were

Frezier's Voyage. p. 86.

their horses disproportioned, that all the people that were with me in the boats, when very near the shore, swore that they were all mounted upon deer; and, to this instant, I believe there is not a man that landed with me, though they were at some distance from them, but would swear they took them to be nine feet high. I do suppose many of them were between seven and eight feet, and strong in proportion.

"Mr. Byron is obliged to Mr. Pennant for the perusal of his manuscript, and thinks his remarks very judicious."*

No. 13.

EXTRACTS from "Diario de Antonio de Viedma, 1783."

Communicated by Don Pedro de Angelis to Sir Woodbine Parish, F.R.S., and by him to Capt. Fitz-Roy, in 1837.

Los Indios todos son de una misma nacion en esta vecindad: su estatura es alta, de dos varas á nueve palmos por lo comun en los hombres, siendo muy raro el que pasa de esta talla. Las mugeres no son tan altas, pero lo bastante con proporcion á su sexo. Todos son de buenos semblantes, y entre las mugeres las hay muy bien parecidas y blancas, aunque curtidas del viento y del sol como ellos. No se encuentra hombre ni muger flaco, antes todos son gruesos con proporcion á su estatura: lo que y usar las ropas del cuello á los pies, habrá contribuido á que algunos viageros los tengan por gigantes.

Su idioma es gutural, y repiten en sus conversaciones una misma voz muchas veces. No interrumpen al que está hablando, aunque su oracion dure todo el dia: comunmente habla uno de mas autoridad ó el mas elocuente. Las mugeres no hablan entre los hombres sin ser preguntadas, y entonces solo contestando á la pregunta: los que hablan mucho sin ocasion ni asunto, no tienen partido entre ellos, ni se les oye.

El vestido de los hombres es un cuero de guanaco, zorillo ó liebre,

* Extract from Pennant's Literary Life, p. 47 to 69.

de dos varas en cuadro, el pelo para adentro, y la tez pintada de colorado, verde ó amarillo: este los cubre desde el cuello á los pies con tal arte y manejo, que raramente se les vé parte alguna de su cuerpo, excepto los brazos, y estos, cuando usan de ellos para algo. Llevan ademas otro cuero muy sobado, atado á la cintura con una correa por debajo de aquel, con que tapan el vientre y hasta la mitad de los muslos, descendiendo desde aquí en punta hasta los tobillos. En los pies se atan con unas correillas unos cueros de buey, si le tienen ó de caballo ó del cuero de los guanacos grandes, formando á manera de sandalias. Para andar á caballo usan de botas que hacen de los garrones ó piernas de los mismos caballos ó guanacos grandes; y las espuelas son se madera, que labran ellos con bastante primor. Se ciñen la cabeza con una cinta de lana como de dos dedos de ancho, tegida por ellos de varios colores, con que se sugetan el pelo doblado por arriba, con las puntas al aire como plumage por el lado izquierdo, dándose con la cinta seis ó ocho vueltas, y colgando las puntas de ella con unos cabetes de metal amarillo ó laton. Para montar á caballo sujetan el cuero grande con una correa, que se rodean por encima de todo á la cintura, de la cual cuelgan las bolas y daga, que son las armas que generalmente traen: y cuando necesitan de los brazos para usarlas, dejan caer por las espaldas el cuero sobre las ancas del caballo, quedándose desnudos de medio cuerpo arriba, y hacen de este modo buena vista cuando van de huida ó en seguimiento de la caza, porque el cuero cubre las ancas del caballo, y ofrece á los ojos el pelo que tiene por dentro de varios colores. El aparejo de montar es á manera de un albardon, sin pretal ni grupa, hecho tambien de cuero de guanaco grande, reenchidos los bastos de paja fuerte. Los estribos labrados por ellos de madera, y tan pequeños, que tasadamente cabe el dedo pulgar del pié. Se ponen mal á caballo, pero son muy firmes en él, y lo mismo corren cuesta abajo que cuesta arriba. El freno del caballo se compone de un palito, ó hueso de canilla de avestruz, labrado con dos perillas á los estremos, tan largo como ancha la boca del caballo, y en dichas perillas están sujetas las riendas y dos correitas que atan en la barbada, con lo que queda seguro para que no se le salga de la boca. Las riendas son cordones de ocho ramales, de correitas de cuero muy sobadas.

Las mugeres tienen el vestido de la misma especie de cueros, puesto del mismo modo, con sola la diferencia de que sobre el pecho

lo sugetan, pasándole dos agujetas de á tercia de largo, hechas de madera ó de fierro, quedando las puntas del cuero colgando como las faldillas de los capingotes, hasta lo bajo de la cintura. Las otras dos puntas les cuelgan, y arrastran atras como media vara, estando suelto, pero para andar se lo recogen y afianzan con la mano izquierda, de la que no hacen mas uso que este, y el de cubrirse con ella en alguna urgencia sus partes. Encima de estas llevan debajo de aquel cuero una especie de mandil cuadrado, que cuelga hasta mas de las rodillas; de bayeta, paño ú otro género si le pueden haber, y sino, de cuero sobado muy bien, el cual atan con un cinto de lo mismo que las rodea el cuerpo, el que guarnece las de alguna autoridad entre ellas, con abalorios. No llevan sandalias en los pies como los hombres, pero cuando montan á caballo, calzan botas como ellos. Llevan descubierta la cabeza, dividido el pelo en dos partes, y de cada una hecha una coleta, que baja por las orejas y hombros hasta el pecho y cintura; cuya cinta es de lana parda de dos dedos de ancho, guarnecida, si es muger rica, en dias de gala con abalorios, y lo mismo las mugeres de alguna autoridad.

Tambien se ponen los abalorios en las agujetas con que sujetan el cuero en el pecho, y en las cañas de las piernas como pulseras, y en el cuello por gargantillas de cualesquiera colores. En las orejas llevan zarcillos de laton, y lo mismo los hombres. Los arreos de las caballerías en que las mugeres montan, que por lo comun son yeguas, se componen de unos sillones de vaqueta ó de zuela, (si la pueden conseguir) muy bien hechos, claveteados con clavitos de laton amarillo, guarnecidos sus extremos con abalorios de diferentes colores, (cuando los tienen) formando dibujos ó labores á su modo y fantasía. La cincha tiene tres argollas, la una en un extremo, y las otras dos en cada tercio una; la evilla con que la abrochan ó ciñen es muy grande. El freno se compone de cabezada, bocado y riendas: la cabezada es rica, guarnecida de abalorios, ó de cuantas cosas tienen ó pueden adquirir al propósito: las riendas y el bocado son del mismo modo que los que usan los hombres. Ponen á la yegua un collar al cuello que cae hasta las rodillas, con cuantos cascabeles y colgajos pueden conseguir. Estos arreos son para gala y fiestas, pero en sus marchas ordinarias no usan estos adornos, y en lugar de dicho collar ponen un cordon de lana azul ó colorado, de un dedo de grueso, con el cual dan tres vueltas al cuello de la caballería, y les sirve tambien de estribo para montar en el sillon, donde

se asientan con la cara á la cabeza del caballo, recogiendo las piernas arriba sobre las faldillas del mismo sillon, en una postura muy violenta y trabajosa, que solo la costumbre puede hacerles sufrir; por lo que están espuestas á muchas caidas. Parar andar á caballo y para montar guardan suma honestidad, no permitiendo que se les vea parte alguna de su cuerpo. Las mugeres de alguna autoridad llevan en las marchas sombreros de paja, que vienen á ser un redondel con cabo, sin copa, que se lo atan por debajo de la barba con cualesquiera cosa; y con esto se cubren del sol y agua cuando van á caballo.

El egercicio ó ocupacion ordinaria de los hombres es cazar, para mantener con las carnes sus familias, y hacer del cuero los toldos ó chozas en que viven, y todos sus vestidos: cuidan tambien de los caballos que tienen, y trabajan todos sus arreos. Sus divertimientos se reducen á jugar á los dados y la perinola, y egercitarse en su modo de batallar y correr parejas á caballo.

Las mugeres tienen obligacion de guisar la comida, traer el agua y la leña, armar y desarmar el toldo en las marchas, y cargarlo y descargarlo: sin que para nada de esto le ayude el hombre, aunque esté elle enferma, porque ha de sacar fuerzas de flaqueza. Ademas de esto ha de coser el toldo, que es siempre de cuero de guanaco grande, y tambien ha de coser todos los demas cueros de cama y vestidos, que regularmente se componen de cueros de liebre, zorrillo y guanacos nonatos, ó recien nacidos, de los que hacen prevencion y cosecha en la primavera, para con los sobrantes comerciar con los indios del Rio Negro, por caballos, ropas, frenos abalorios y dagas, que aquellos adquiren del comercio, é invasiones que hacen en las fronteras de Buenos Aires: porque los indios, de que aquí se vá hablando, jamas han tratado españoles hasta ahora, ni han visto ninguna de sus poblaciones, ni estas costas tienen fierro, metal, laton, herramientas ni armas; todas estas piezas y géneros las adquieren mediante dicho comercio. Para coser estas mugeres los expresados cueros, usan de alesnas, que forman del fierro que les dan los referidos indios del Rio Negro, y en lugar de hilo emplean nervios, que adelgazan, segun necesitan, de las piernas de los avestruces.

El cacicazgo es hereditario, su jurisdiccion absoluta en cuanto á mudarse de un campo á otro en seguimiento de la caza, que es su subsistencia. Cuando al cacique le parece tiempo de mudar el campo, el dia antes al ponerse el sol hace su platica á grandes voces desde su toldo: todas le escuchan con suma atencion desde los suyos. Les

dice se ha de marchar al otro dia: les señala hora para recoger los caballos, batir los toldos, y empezar á marchar: nadie le replica, y á la hora señalada todos están prontos como se les ha mandado. Las mugeres van por veredas que hay hechas para todas las aguadas donde deben parar: son las conductoras de todo el equipage. Los hombres, luego que las mugeres empiezan la marcha, se van apostando en el campo para cercar los guanacos y bolearlos á la travesia: porque son tan violentos en la carrera, que ningun caballo ni perro les puede alcanzar: cuando están con las bolas enredados, les sirven los perros para acabarlos de rendir. El mismo cacique señala los puestos de la batida, por lo que, y en testimonio de señorio, el tributan parte de la caza: asi nunca corre, ni hace otra cosa mas que andar de apostadero en apostadero: sus jornadas mas largas son de 4 leguas. En llegando al destino que está asignado, arman las mugeres los toldos, recogen leña, y lo tienen todo pronto para cuando los hombres vengan: estos al ponerse el sol marchan á sus toldos, sin que jamas se verifique llegue á ellos ninguno, obscurecida la noche. Si se ha de continuar la marcha al otro dia, hace el cacique la misma arenga y prevenciones; y si no dice nada, ya saben que por entonces han de permanecer allí, y esta mansion por lo comun es adonde saben que se ha retirado la caza. Aquí, cuando el cacique vé que están escasos de carne, al ponerse el sol, y en la misma forma que para las marchas, les dice recojan los caballos á la hora que señala para el dia siguiente, lo que egecutan sin falta: luego que tienen los caballos en los toldos, les hace otra plática, paseándose á caballo, y señalándoles los apostaderos con lo que cada cuadrilla debe egecutar. Van con ellos algunas mugeres para cargar la caza, porque ni aun este trabajo quieren los hombres hacer: los toldos quedan armados, y en ellos las restantes mugeres, muchachos é impedidos. Al ponerse el sol se retiran otra vez á sus toldos, reduciéndose á solas estas funciones todo el mando de este cacique, el cual por ningun delito castiga á sus indios, aunque en los puntos de obediencia que van expresados jamas se verifica le falten á ella. Cuando quiere hacer guerra á sus vecinos, ó á algunos otros de que hayan recibido agravio, ha de ser con aprobacion de su indios principales, para lo cual se juntan en el toldo del cacique: este pondera y explica los agravios y modo de vengarlos; fuerzas, facilidad ó inconvenientes que hay en hacer la guerra. Los de la junta confieren sobre el asunto, y aprueban ó reprueban lo

propuesto por el cacique: este no se agravia. La guerra, por lo regular, se aprueba, y solo ventilan el modo de hacerla, y cuando; y suele tardar esta resolucion algunos dias. Luego que están convenidos en salir á campaña, el cacique tres noches seguidas desde su toldo á grandes voces les hace saber á todos los indios la declaracion de la guerra, el tiempo para cuando está resuelta, la forma en que ha de hacerse enemigos contra quien, y su motivo; avisan que esten prevenidos.

Una de las principales causas que tienen para declarar guerra es, que como cada cacique tiene señalado el terreno de su jurisdiccion, no puede ninguno de sus indios entrar en el terreno de otro sin pedirle licencia para ello. El indio que vá á pedirla ha de hacer tres humaradas, y hasta que le correspondan con otras tres no puede llegar á los toldos: en ellos dá razon á aquel cacique del motivo que le trae, ya sea de paso, ó ya porque pretenda permanecer allí. Si al cacique le parece, consiente en su pretension, y si no, le manda salir inmediatamente de sus terrenos y dominios. Si el indio vá como embajador de su cacique ó de otros indios, bien pidiendo paso por aquel terreno, ó bien para comerciar con ellos ó para visitarlos, se le señala por el cacique el tiempo, y por donde deben entrar, camino que han de tomar para seguir su viage, ó terreno que han de ocupar donde hagan su comercio. Luego hacen sus tres humaradas, y en habiéndoles correspondido los indios del terreno, entran todos en este, y á cosa de una legua de la tolderia, se detienen todos los hombres, y pasando adelante las mugeres y criaturas, arman sus toldos á donde se les señala, y en estándolo, todos llegan á ellos los hombres. Nadie sale á recibirlos, quedándose así á la vista unos de otros, hasta que despues de mucho rato vá el cacique, ó cualquiera otro que haga cabeza entre los forasteros, á visitar y cumplimentar al del pais, que le recibe en su toldo acompañado de sus principales indios, que acuden allí luego para cortejar al forastero. Esta visita suele durar todo un dia, porque como cada uno habla sin que nadie le interrumpa, si el forastero trae muchas noticias y quiere enterarse de las del país, suele durar la oracion de cada uno, dos ó tres horas, y aun mas, porque tambien repiten muchas veces ciertas voces. El que oye, y los demas estan con grande atencion, diciendo con frecuencia, á, á, que quiere decir sí, sí; y con ninguna otra voz interrumpen al que habla. En estas juntas se hacen las alianzas, se otorgan amistades amplias, y otros contratos, acuerdos ó convenios, para todo lo cual tienen los caciques facultades absolutas. Cuando

para entrar en terreno ó tolderia agena, no se observan las expresadas formalidades, es señal de mala fé, y en consecuencia se toca luego al arma.

Tambien se declaran á menudo guerra por robarse algunos caballos, de cuyas resultas quedan los vencidos á pié, y cautivas del vencedor las mugeres mozas, y muchachos; que á las viejas y los hombres no se les dá cuartel, como no lo consigan en la fuga.

El cacique tiene obligacion de amparar y socorrer á los indios de su dominio y territorio en sus necesidades, y por lo tal es mas estimado, tiene mas partido entre ellos, y mas preferencia para cacique el que es mas dispuesto á socorrerlos, mas galan, y mas inteligente en la caza; porque si le faltan estas calidades, se van á buscar á otro que las tenga, dejándolo solo con sus parientes, y expuestos á continuas invasiones de sus vecinos: bien que no pierde aquella familia el derecho del terreno, y con el tiempo suele haber otro que restablece la tolderia que su padre, abuelo ó hermano ha destruido por su desgracia, ó mala conducta. Cuando está viejo el cacique, y en estado que por falta de fuerzas no puede cumplir con las obligaciones de su ministerio, deja el mando en el sucesor.

Los casamientos se hacen por compra que el hombre hace de la muger al padre, ó cualquiera otro á cuyo cargo está ella, que segun su calidad, buen parecer, conducta, &c., es mas cara ó mas barata, sin que pueda oponerse á la venta que celebre su padre ó su tutor, quienes no cuentan con su voluntad para otorgarla. Puede cada hombre tener una, dos ó mas mugeres propias, segun tengan haberes para comprarlas, pero raramente tienen mas de una, á menos de ser cacique ó indio de grande autoridad. El que mas llega à tener son tres mugeres, y todo marido tiene facultad de vender las suyas á otros, cuya segunda venta hace poco apreciable á la muger, y se dá por lo mismo en muy poco precio, comprándolas solamente los pobres que se surten de este modo, porque carecen de medios con que adquirirlas de primera mano. No hay tampoco inconveniente en venderlas á cualquiera pariente, como no sea hijo ó hermano de la vendida, porque todos los demas grados los tienen dispensados. Son muchos los casamientos que hacen de esta especie, por lo caro que cuestan las mugeres solteras, las cuales, interin son mozas, y tienen esperanza de casarse guardan la virginidad; pero en perdiendo aquella esperanza, se entregan á todos. Las casadas, cuyo marido que les trató su padre ó tutor ha sido de su gusto, le guardan suma fide-

lidad, pero en las que no, hay muchos trabajos ; bien que el adulterio no es delito, como no sea á vista del marido, y en este caso culpan al adultero y no á ella : y tampoco así se castiga, pues por medio de algun corto interes perdona este agravio el marido. El cacique siempre tiene por muger una hija ó hermana de otro cacique ; la cual es la principal entre las demas mugeres suyas, y estas la sirven en todo. Aunque se halle cansado de ella no la puede vender, porque seria agravio y motivo de romper una guerra con sus parientes. Todas estas cacicas manifiestan gravedad, hablan poco, se están recogidas en su toldo, ocupadas en algun trabajo correspondiente á ellas, y no intervienen en las vulgares conversaciones de las demas indias. Los hombres por ningun motivo castigan de obra á las mugeres, excepto cuando están borrachos ; y aun entonces el cacique á la cacica preferente jamas le pega, aunque las otras lleven todas golpes. Las ceremonias del casamiento solo se reducen, una vez ajustada la muger, llevàrsela su padre al novio á su toldo, á menos que ella no se adelante á irse con él sin que la lleve nadie, que en esto no hay inconveniente. Entonces el novio hace matar uno ó dos yeguas, segun tenga de ellas, y convida á los parientes y parientas, amigos y amigas de la novia y suyos, y comiendo todos de aquella carne, queda concluido el casamiento. Así hombres como mugeres son muy celosos y amantes de sus hijos, à quienes luego que nacen atan con muchas fajas de cuero que tienen preparadas, muy sobadas y suaves, contra una à manera de tabla, que forman, porque no las tienen, de palitos cruzados y atados, forrados con fajas de cuero, en donde los tienen sugetos mas de un mes, dándoles el pecho sin desatarlos de allí. Así dicen que se crian derechos, y efectivamente tanto ellos como ellas son todos muy derechos, tienen buenos cuerpos, y no se vè uno que sea cargado de espaldas. En quitándolos de estas ataduras, los traen regularmente siempre consigo las madres, metidos en las espaldas entre su carne y el cuero con que van vestidas, con la cabeza sacada por el cogote de la madre. Cuando van de marcha, hacen de cuero y unos palitos una especie de cuna, atumbada y cerrada por todas partes, menos por los pies y la cabeza, las cuales forran y adornan con bayeta, paño ò lo que tienen, guarneciéndolas con abaloríos, cascabeles, &c., segun pueden, y las aseguran encima de las ancas del caballo, donde va la madre. Entre estas gentes se vé que los muchachos nunca lloran, sino llevan golpes ó alguna caida.

Su religion viene à ser solamente una especie de creencia en dos potencias; la una benigna que solo gobierna el cielo, independiente y sin poderio en la tierra y sus habitantes, de la cual hacen muy poco caso; y la otra á un tiempo benigna y rigorosa, la cual gobierna la tierra, dirige, castiga y premia á sus habitadores, y à esta adoran bajo cualquiera figura que fabrican, ó que se hayan hallado en las playas, procedidas de algunos navios nàufragos; como son mascarones de proa, ó figuras de las aletas de popa, y estas son las que estiman y prefieren para sus cultos por suponerlas aparecidas. A esta deidad dan por nombre el Camalasque, que equivale á "poderoso y valiente." De estas figuras, cada uno que la tiene defiende y cree ser aquella la verdadera deidad, y que las de los otros son falsas, aunque no llega el caso de empeñar estas disputas, ni armar quimeras sobre ello, porque se persuaden que la misma deidad vengará sus agravios con las supersticiones que se figuran: creyendo que las enfermedades y las muertes son venganzas de estas deidades, á menos de suceder en los ya muy viejos, que solo entonces las tienen por naturales. Estas figuras las guardan en sus toldos, muy cubiertas y liadas con cuero, paño, bayeta ò lienzo, segun cada uno puede, y no se descubre à nadie sin dictàmen del santon ò hechicero, que puede ser muger ú hombre. Tiene de continuo dias en que debe egercer su oficio, cantando à la deidad al son de dos calabazas con chinas dentro,—mùsica tan desagradable como su misma voz. Tambien hace en esta forma rogaciones, por que la deidad enferme ó mate à los que tienen por enemigos: pero esto suele salirles muy mal à los tales hechiceros, porque si acaso tienen sus enemigos algun contagio, ó muere algun indio principal ó cacique, procuran por todos los medios posibles haber á las manos á los referidos hechiceros, y los hacen màrtires del diablo. Tambien deben cantar á la deidad estos hechiceros por los enfermos de sus tolderias, para contradecir á los otros hechiceros sus enemigos, y sino consigue el alivio el enfermo, suelen tambien los amigos de este darle su merecido á aquellos, á lo menos quitándoles el empleo, y tratándole en adelante como á infame: y si la muerte ha sido de muger ò hijo del cacique, suele pagar con la vida el hechicero su mala cura, que solo se reduce al canto, porque no usan de otras medicinas en sus enfermedades. Y por tanto tienen muchos contratiempos estos médicos cantores, siendo pocos de ellos los que mueren de muerte natural: pero siempre sobran pretendientes para este empleo, porque tienen facultad de usar de las mugeres de los indios,

si ellas consienten, ó de ellos, si el hechicero es muger. De estos hechiceros casi hay tantos como familias, ó como ídolos, porque regularmente cada cabeza de familia tiene su ídolo en su toldo, y si la tolderia se compone de cuatro, cinco ò mas familias, hay otros tantos ídolos y otros tantos hechiceros ó santones: en la inteligencia de que una familia entre ellos se compone no solo del marido, muger è hijos, sino tambien de todos los parientes del dicho marido, que es cabeza y gefe de esta familia, en la cual viene á ser como un cacique subalterno, del que tiene el general gobierno de todos, y derecho en propiedad de aquel terreno.

Cuando enferma alguno en la familia, acude el santon de ella à cantarle al oido, con voces tan fuertes y desentonadas, y tan desagradables, que ellas por sì solas bastarian à matarle. Si se agrava, convida à los demas de su oficio, y à todas las viejas, para que le ayuden á cantar, á fin de que de noche y de dia no cese el canto: pero nadie queda responsable si el enfermo muere, porque este cargo es solo del hechicero. Cuando el enfermo està ya enteramente postrado, si es doncella y jóven, le forman un toldo de ponchos, separado de la tolderia, la ponen en él, y allí es el canto mas fuerte; porque todas cuantas viejas hay, van á cantarle, y una de ellas arma en un palo todos los cascabeles que puede juntar, y haciendo con ellos gran ruido, da una vuelta al rededor del toldo de cuando en cuando, à cuyo tiempo esfuerzan las de adentro su griteria. Durante la enfermedad se matan yeguas y caballos, en ofrenda ó sacrificio al ídolo para que mejore el enfermo; pero esta ofrenda se la comen entre el mismo enfermo y los cantores. Si el enfermo muere, bien sea en el nuevo toldo de ponchos, siendo doncella, ò en el suyo mismo, siendo hombre ò muger casada, se trae al toldo el caballo mas estimado, lo aparejan, y poniéndole encima todas las alhajas del difunto, montan en él un muchacho, y le hacen dar una vuelta al rededor del toldo, donde está el cadáver: bajan al muchacho y ponen al cuello del caballo un lazo, de cuyos dos cabos tiran dos indios hasta que lo ahogan. Tienen ya prevenida una hoguera, donde van arrojando à quemar el aparejo y alhajas que lleva el caballo; y la persona que hace cabeza de duelo se va quitando el vestido y cuanto tiene puesto, y lo va arrojando tambien al fuego; como tambien todos los parientes y amigos echan una prenda cada uno, que al efecto traen de sus toldos ó se quitan de su vestidura, compitiéndose en entregar al fuego las mejores, en que denotan mas

obligaciones al muerto, ò mas amistad, amor, &a. Luego desuellan el caballo ahogado, y se reparte su carne entre todos los que echaron sus prendas al fuego. La doliente se està en su toldo muy tapada y sin hablar una palabra. Todas las mugeres parientas y amigas las van á hacer compañia, y para ello se cortan del pelo unos mechones, de modo que les caiga por la frente hasta las cejas, se arañan la cara, se sajan los carrillos, y lloran aunque no tengan gana, con unos gemidos y estilo tan lamentable y lastimoso, que parece se les arranca el alma. A la noche se entregan las viejas del cadáver, y ellas lo entierran donde les parece, sin que lo sepan dolientes ni otro alguno, porque ni se les pregunta, ni ellas pueden decirlo á nadie. Sigue el duelo por quince dias, con los mismos gemidos, y se van matando cada dia caballos del difunto hasta no dejar ni uno, porque todos sus bienes han de quedar destruidos sin que puedan darse á nadie, ni menos habria quien los admitiese, sabiendo que eran del muerto, porque este es un sagrado para ellos inviolable. Todas las lunas se repite un dia el duelo y llanto, y se mata caballo ò yegua si hay amigo ò pariente que quiera darlo, porque al difunto ya no le ha quedado ninguno. Cumplido el año, se repite el duelo por tres dias, con llantos, hoguera, arrojar en ella prendas, y demas ceremonias, cuantas pueden hacer para que se renueve el funeral, como en el dia de la muerte. Despues de estos tres dias, ya no vuelven á acordarse mas del difunto para nada. Toda esta fúnebre pompa y ceremonias se hacen solo por jòvenes ó personas de buena edad y robustas, pues á los que mueren viejos ni se les hace duelo ni se les llora, ni se acuerdan mas de ellos, creyendo que su muerte era precisa, y se contentan con matar en ella un caballo, el peor ó mas desechado que tenga.

Se matan caballos por casamientos y muertes, por la salida de los dientes á los muchachos, cuando comienza la menstruacion á las mugeres, por cualquiera leve mal, por aplacar al ídolo enojado, que creen lo està cuando tienen enfermedades, cuando les cuesta mucho trabajo el tomar la caza, cuando otros indios los hostigan y no tienen fuerzas suficientes para hacerles guerra, porque en este caso aguantan las injurias que les quieran hacer: y toda esta matanza de caballos é yeguas es la causa de no èstar toda la costa poblada de este ganado; pues aunque las yeguas paren todos los años, con todo, como dejan pocas, no hay suficientes caballos para surtirlos, sino fuera por los que los indios Pampas de Buenos Aires les

cambian por los cueros que les llevan cuando bajan al Rio Negro, de que resulta tener los de San Julian menos ganado de este que los del golfo de San Jorge y Santa Elena, porque no pueden bajar al Rio Negro con la continuacion que estos.

Creen en la transmigracion del alma, y que las de los que mueren pasan á los que nacen en la familia, en esta forma: el que muere viejo transmigra el alma sin detencion, y por eso no se le llora ni hacen sentimiento, porque dicen vá aquella alma à mejorar de puesto: pero la del que muere jóven ò robusto, queda detenida debajo de tierra, sin destino hasta que se cumple el tiempo que le faltaba para ser viejo, que entonces pasa al primero que nace, y por esta detencion, en que juzgan está comprimida y violenta, le hacen todos los sacrificios al ídolo, para que le dé algun desahogo, interin llega el tiempo decretado. Y son tan supersticiosos en esta materia, que unos se persuaden es conveniente poner en el sepulcro à los difuntos alguna comida y alhajas para que coman sus almas y se diviertan, y otros lo tienen esto por ocioso, creyendo que el ídolo les darà todo lo necesario. Esta materia se gobierna en cada familia segun el modo de pensar del embustero santon, que se engaña y los engaña como quiere, sin que se repare en sus inconsecuencias, aun cuando sus pensamientos y sus disposiciones varíen á cada paso. Estos embusteros les hacen creer que el ídolo hace gestos y habla, haciéndolos ellos conforme les dicen que les vieron hacer; y aunque los mismos indios se hallen presentes al tiempo que el santon descubre el ídolo, y con sus mismos ojos vean que es mentira, como el santon diga que hablò ò hizo gestos, basta para que ellos lo crean así ciegamente.

Júzganse incapaces de poder ofender con alguna de sus operaciones á la deidad que adoran, y así creen que los contratiempos ò castigos que les envia, no es porque ellos los merezcan por sus delitos, sino porque le dà gana al ídolo de tratarlos mal. Así la benignidad de esta potencia consiste en tener buenos caballos, salud y paz, hallar mucha y buena caza, y lograr fidelidad de parte de sus vecinos.

El número de indios que se hallan aquí establecidos, seràn hasta 4,000 personas: ocupan el terreno de la costa que queda señalado. No pueden salir de él, impidièndoselo por el E la mar, por el N el Rio Negro è indios Pampas de Buenos Aires, y por el O y S la Cordillera, imposible de pasar aquí por su altura, y por hallarse

en todo tiempo cubierta de nieve, sin que se verifique la habitan en estos parages ni aun las aves.

En sus batallas pelean à pié, dejando á las mugeres en custodia de los caballos, y se ponen unas como camisas de hombre con mangas cerradas, hechas de diez ó doce cueros de venado, bien sobados, que no los puede pasar el sable ni la daga. En la cabeza se ponen una especie de sombrero, ó casco hecho tambien de cuero de buey ó de caballo, con cuyos resguardos procuran tirarse las cuchilladas á las piernas por ser mas fácil herir en ellas, cortando las botas. Son muy firmes y constantes en la batalla, y no la dejan, una vez que entran en ella, hasta ser vencidos ó muertos. Usan tambien de las bolas, y todo partido que es vencido, ordinariamente son muertos, porque se ensangrientan de manera que ninguno huye: y esta es la causa de no ser mucho mas poblados estos terrenos, porque las mugeres son muy fecundas, y padecen muy pocas enfermedades.

Los toldos los ponen clavando en tierra dos palos de dos ó tres varas de alto, y una y media distantes uno de otro; al lado de cada palo, y á igual distancia clavan otros dos mas cortos, y al O de los seis, clavan otros seis mas cortos à la misma distancia, y al O de estos con igual distancia otros seis de poco mas de media vara de largo. Sobre estos diez y ocho palos echan el cuero con el pelo para afuera, y lo aseguran á las cabezas de todos los palos, de los cuales cuelgan como cortinas de cuero por dentro, que forman las divisiones segun las necesitan, atàndolas de alto abajo à los mismos palos á manera de mamparos firmes: por afuera llega el cuero hasta el suelo por el NO y S, dejàndole siempre la puerta al E de toda la anchura del toldo, el cual queda como si fuese una cueva ovalada. A la puerta no se le pone cosa alguna con que cerrarla, sino en el rigor de los yelos, que la tapan, colgando de ella otro cuero. Las separaciones interiores las acomodan desde el centro hasta el fondo para cada matrimonio, y los hijos y demas familia y parentela duermen todos revueltos en el resto, que queda franco hasta la puerta, uniéndose aquí viudos, viudas, solteros, solteras, parientes, criados y esclavos, y en fin, cuantos dependen ò tienen relacion con la cabeza principal ò amo del toldo. Las doncellas aqui, sin embargo de esta ocasion, procuran, como queda dicho, guardar su virginidad, mientras

tienen esperanza de casarse : pero si llegan à perderla se dan à cualquiera, y tanto ellas como las vuidas pasan buena noche, acomodàndose indistintamente con el que primero se les acerca á dormir con ellas.

Las querellas de los hombres dentro de una misma tolderia se deciden entre ellos à moquetes, sin que puedan usar para ello de otras armas, ni que se atreva nadie á separarlos hasta que ellos se rinden ò separan, y los demas estàn mirando, celebràndolos ó riéndose. Las mugeres cuando riñen se estan muy asentadas, diciéndose palabras ofensivas, hasta que la una echa mano à deshacerse las trenzas del pelo con mucha flema, lo que igualmente hace la otra con la misma, continuando en los improperios : y en teniendo ambas el pelo todo suelto, se lo sacuden, se levantan y se arremeten furiosas, dàndose buenos tirones de él, en que se quitan una á otra cuanto pueden sacar, enredado en las uñas, y las demas mugeres y hombres se las estan mirando, sin que se atreva nadie à separarlas ; hasta que ellas mismas se apartan en estando cansadas, y se quedan tan amigas de resultas de esto, como si nunca hubiesen reñido, permaneciendo todo aquel dia con el pelo suelto : y en la querella no pueden darse como los hombres moquetes, ni tirarse à romper el vestido, sino solamente el pelo, siendo de lo contrario corregidas de las circunstantes espectadoras. En tiempos de duelo, en marchas, en dias de mucho viento, muchos frios ó heladas, se pintan el rostro de negro ò morado, tanto hombres como mugeres, para que no se les corte el cutis.

Generalmente tienen estos indios índole muy dulce è inocente, y me tomaron tanto afecto y trataron con tanta sencillez, principalmente el cacique de San Julian, que si hubieramos tenido caballos bastantes, pienso no quedaria un palmo de aquellos terrenos que no pudiese registrar en su compañia.

ANTONIO DE VIEDMA.

Buenos Aires,
10 de Diciembre de 1783.

No. 14.

Extract from Byron's Narrative of the Loss of the Wager.

"These people* were of a small stature, very swarthy, having long, black, coarse hair, hanging over their faces. It was evident, from their great surprise, and every part of their behaviour, as well as their not having one thing in their possession which could be derived from white people, that they had never seen such. Their clothing was nothing but a bit of some beast's skin about their waists, and something woven from feathers over the shoulders; and as they uttered no word of any language we had ever heard, nor had any method of making themselves understood, we presumed they could have had no intercourse with Europeans. These savages, who, upon their departure, left us a few muscles, returned in two days, and surprised us by bringing three sheep." . . . . "At this interview we bartered with them for a dog or two, which we roasted and eat."

"In one of my walks, seeing a very large bird of prey upon an eminence, I endeavoured to come upon it unperceived with my gun, by means of the woods which lay at the back of that eminence; but, when I had proceeded so far in the wood as to think I was in a line with it, I heard a growling close by me, which made me think it advisable to retire as soon as possible: the woods were so gloomy I could see nothing; but, as I retired, this noise followed me close till I had got out of them. Some of our men did assure me, that they had seen a very large beast in the woods; but their description of it was too imperfect to be relied upon."†

"The first night we put into a good harbour, a few leagues to the southward of Wager Island; where, finding a large bitch big with puppies, we regaled upon them. In this expedition we had our usual bad weather and breaking seas, which were grown to such a height the third day, that we were obliged, through distress, to push in at the first inlet we saw at hand. This we had no sooner entered than we were presented with a view of a fine bay, in which, having secured the barge, we went ashore, but the weather being very rainy, and finding nothing to subsist upon, we pitched a bell tent, which we had brought with us, in the wood opposite to where the barge lay. As this tent was not large enough to contain us all, I proposed

* Natives of the Guaianeco Islands.

† Showing that the puma crosses arms of the sea.—R. F.

to four of the people to go to the end of the bay, about two miles distant from the bell tent, to occupy the skeleton of an old Indian wigwam, which I had discovered in a walk that way upon our first landing. This we covered to windward with sea-weed; and, lighting a fire, laid ourselves down in hopes of finding a remedy for our hunger in sleep; but we had not long composed ourselves before one of our company was disturbed by the blowing of some animal at his face; and, upon opening his eyes, was not a little astonished to see by the glimmering of the fire, a large beast standing over him. He had presence of mind enough to snatch a brand from the fire, which was now very low, and thrust it at the nose of the animal, who thereupon made off." . . . . "In the morning, we were not a little anxious to know how our companions had fared; and this anxiety was increased upon our tracing the footsteps of the beast in the sand, in a direction towards the bell tent. The impression was deep and plain, of a large round foot well furnished with claws. Upon acquainting the people in the tent with the circumstances of our story, we found that they too had been visited by the same unwelcome guest, which they had driven away by much the same expedient. We now returned from this cruise, with a strong gale, to Wager's Island; here we soon discovered, by the quarters of dogs hanging up, that the Indians had brought a fresh supply to our market. Upon inquiry, we found that there had been six canoes of them, who, among other methods of taking fish, had taught their dogs to drive the fish into a corner of some pond, or lake, from whence they were easily taken out by the skill and address of these savages."

"Upon returning up the Lagoon,* we were so fortunate as to kill some seal, which we boiled and laid in the boat for sea-stock. While we were ranging along-shore in detached parties, in quest of this and whatever other eatable might come in our way, our surgeon, who was then by himself, discovered a pretty large hole, which seemed to lead to some den, or repository, within the rocks. It was not so rude, or natural, but that there were some signs of its having been cleared and made more accessible by industry. The surgeon for some time hesitated whether he should venture in, from his uncertainty as to the reception he might meet with from any inhabitant; but his curiosity getting the better of his fears, he determined to go in; which he did upon his hands and knees, as the

* Holloway Sound—near Port Otway.

passage was too low for him to enter otherwise. After having proceeded a considerable way thus, he arrived at a spacious chamber; but whether hollowed out by hands, or natural, he could not be positive. The light into this chamber was conveyed through a hole at the top; in the midst was a kind of bier, made of sticks laid crossways, supported by props about five feet in height. Upon this bier, five or six bodies were extended, which, in appearance, had been deposited there a long time; but had suffered no decay or diminution. They were without covering, and the flesh of these bodies was become perfectly dry and hard; which, whether done by any art or secret the savages may be possessed of, or occasioned by any drying virtue in the air of the cave, could not be guessed. Indeed, the surgeon finding nothing there to eat, which was the chief inducement for his creeping into the hole, did not amuse himself with long disquisitions, or make that accurate examination which he would have done at another time; but, crawling out as he came in, he went and told the first he met of what he had seen. Some had the curiosity to go in likewise. I had forgot to mention that there was another range of bodies, deposited in the same manner, upon another platform under the bier. Probably this was the burial-place of their great men, called caciques; but from whence they could be brought, we were utterly at a loss to conceive, there being no traces of any Indian settlement hereabout. We had seen no savage since we left the island, or observed any marks in the coves or bays to the northward, where we had touched, such as fire-places, or old wigwams, which they never fail of leaving behind them; and it is very probable, from the violent seas that are always beating upon this coast, its deformed aspect, and the very swampy soil that every where borders upon it, that it is little frequented."

"A few days after our return, the mystery of the nailing up of the hut, and what had been doing by the Indians upon the island in our absence was partly explained to us; for about the fifteenth day after there came a party of Indians to the island in two canoes, who were not a little surprised to find us here again. Among these was an Indian of the tribe of the Chonos, who live in the neighbourhood of Chiloe. He talked the Spanish language, but with that savage accent which renders it almost unintelligible to any but those who are adepts in that language. He was likewise a cacique, or

leading man of his tribe, which authority was confirmed to him by the Spaniards; for he carried the usual badge and mark of distinction by which the Spaniards and their dependents hold their military and civil employments, which is a stick with a silver head."

"This report of our shipwreck (as we supposed) having reached the Chonos by means of the intermediate tribes, which handed it to one another, from those Indians who visited us; this cacique was either sent to learn the truth of the rumour, or, having first got the intelligence, set out with a view of making some advantage of the wreck."

"Having understood my necessities, they (the two women) talked together some little time; after which, getting up, they both went out, taking with them a couple of dogs, which they train to assist them in fishing. After an hour's absence, they came in trembling with cold, and their hair streaming with water, and brought two fish, which, having broiled, they gave me the largest share; and then we all laid down, as before, to rest."

"After rowing some time, they (the women) gained such an offing as they required, where the water was about eight or ten fathoms deep, and there lay upon their oars. And now the youngest of the two women, taking a basket in her mouth, jumped overboard, and diving to the bottom, continued under water an amazing time; when she had filled the basket with sea-eggs, she came up to the boat-side, and delivering it so filled to the other women in the boat, they took out the contents, and returned it to her. The diver then, after having taken a short time to breathe, went down and up again, with the same success; and so several times for the space of half an hour. It seems as if Providence had endued this people with a kind of amphibious nature, as the sea is the only source from whence almost all their subsistence is derived. This element, too, being here very boisterous, and falling with a most heavy surf upon a rugged coast, very little, except some seal, is to be got any where but in the quiet bosom of the deep. What occasions this reflection is, the early propensity I had so frequently observed in the children of these savages to this occupation, who, even at the age of three years, might be seen crawling upon their hands and knees among the rocks

and breakers, from which they would tumble themselves into the sea, without regard to the cold, which is often intense, and showing no fear of the noise and roaring of the surf."

"The water was at this time extremely cold, and when the divers got into the boats, they seemed greatly benumbed; and it is usual with them, after this exercise, if they are near enough to their wigwams, to run to the fire, to which presenting one side, they rub and chafe it for some time; then turning the other, use it in the same manner, till the circulation of the blood is restored. This practice, if it has no worse effect, must occasion their being more susceptible of the impressions of cold than if they waited the gradual advances of their natural warmth in the open air. I leave it to the decision of the gentlemen of the faculty, whether this too hasty approach to the fire may not subject them to a disorder I observed among them, called the elephantiasis, or swelling of the legs. The divers having returned to their boats, we continued to row till towards the evening, when we landed upon a low point. As soon as the canoes were hauled up, they employed themselves in erecting their wigwams, which they despatch with great address and quickness. I still enjoyed the protection of my two good Indian women, who made me their guest here as before. They first regaled me with sea-eggs, and then went out upon another kind of fishery, by the means of dogs and nets. These dogs are a cur-like looking animal, but very sagacious, and easily trained to this business. Though, in appearance, an uncomfortable sort of sport, yet they engage in it readily, seem to enjoy it much, and express their eagerness by barking every time they raise their heads above the water to breathe. The net is held by two Indians, who get into the water; then the dogs, taking a large compass, dive after the fish, and drive them into the net; but it is only in particular places that the fish are taken in this manner."

"I now understood that the two Indian women with whom I sojourned were wives to this chieftain, though one was young enough to be his daughter; and as far as I could learn, did really stand in the different relations to him both of daughter and wife. It was easy to be perceived that all did not go well between them at this time; either that he was not satisfied with the answers they returned

him to his questions, or that he suspected some misconduct on their side; for, presently after, breaking out into savage fury, he took the young one up in his arms, and threw her with violence against the stones; but his brutal resentment did not stop here, he beat her afterwards in a cruel manner. I could not see this treatment of my benefactress without the highest concern for her, and rage against the author of it; especially as the natural jealousy of these people gave occasion to think that it was on my account she suffered. I could hardly suppress the first emotions of my resentment, which prompted me to return him his barbarity in his own kind; but, besides that this might have drawn upon her fresh marks of his severity, it was neither politic, nor, indeed, in my power, to have done it to any good purpose at this time."

"Our untoward circumstances now found some relief in the arrival of the Indians we waited for; who brought with them some seal, a small portion of which fell to our share. A night or two after they sent out some of their young men, who procured us a quantity of a very delicate kind of birds, called shags and cormorants. Their manner of taking these birds resembles something a sport called 'Bat-fowling.' They find out their haunts among the rocks and cliffs in the night, when, taking with them torches made of the bark of the birch tree, which is common here, and grows to a very large size (this bark has a very unctuous quality, and emits a bright and clear light, and in the northern parts of America is used frequently instead of candle), they bring the boat's side as near as possible to the rocks, under the roosting places of these birds; then, waving their lights backwards and forwards, the birds are dazzled and confounded so as to fall into the canoe, where they are instantly knocked on the head with a short stick the Indians take with them for that purpose. Seals are taken in some less frequented parts of these coasts with great ease; but when their haunts have been two or three times disturbed, they soon learn to provide for their safety, by repairing to the water upon the first alarm. This is the case with them hereabouts; but as they frequently raise their heads above water, either to breathe or look about them, I have seen an Indian at this interval throw his lance with such dexterity as to strike the animal through both its eyes at a great distance; and it is very seldom that they miss their aim."

"These Indians are of middling stature, well set, and very active; and make their way among the rocks with an amazing agility. Their feet, by this kind of exercise, contract a callosity which renders the use of shoes quite unnecessary to them. But before I conclude the few observations I have to make on a people so confined in all their notions and practices, it may be expected I should say something of their religion; but as their gross ignorance is in nothing more conspicuous, and as we found it advisable to keep out of their way when the fits of devotion came upon them, which are rather frantic than religious, the reader can expect very little satisfaction on this head. Accident has sometimes made me unavoidably a spectator of scenes I should have chosen to have withdrawn myself from; and so far I am instructed. As there are no fixed seasons for their religious exercises, the younger people wait till the elders find themselves devoutly disposed, who begin the ceremony by several deep and dismal groans, which rise gradually to a hideous kind of singing, from which they proceed to enthusiasm, and work themselves into a disposition that borders on madness; for suddenly jumping up, they snatch fire brands from the fire, put them in their mouths, and run about burning every body they come near: at other times, it is a custom with them to wound one another with sharp muscle-shells till they are besmeared with blood. These orgies continue till those who preside in them foam at the mouth, grow faint, are exhausted with fatigue, and dissolve in a profusion of sweat. When the men drop their part in this frenzy, the women take it up, acting over again much the same kind of wild scene, except that they rather outdo the men in shrieks and noise. Our cacique, who had been reclaimed from these abominations by the Spaniards, and just knew the exterior form of crossing himself, pretended to be much offended at these profane ceremonies, and that he would have died sooner than have partaken of them. Among other expressions of his disapprobation, he declared, that whilst the savages solemnized these horrid rites, he never failed to hear strange and uncommon noises in the woods, and to see frightful visions; and assured us, that the devil was the chief actor among them on these occasions."

"Here I must relate an anecdote of our nominally Christian cacique. He and his wife had gone off, at some distance from the shore, in their canoe, when she dived for sea-eggs; but not meeting with

great success, they returned a good deal out of humour. A little boy of theirs, about three years old, whom they appeared to be doatingly fond of, watching for his father and mother's return, ran into the surf to meet them: the father handed a basket of eggs to the child, which being too heavy for him to carry, he let it fall, upon which the father jumped out of the canoe, and catching the boy up in his arms, dashed him with the utmost violence against the stones. The poor little creature lay motionless and bleeding, and in that condition was taken up by the mother; but died soon after. She appeared inconsolable for some time; but the brute, his father, shewed little concern about it."

"The first thing that the Indians did in the morning, was to take their canoes to pieces: and here, for the information of the reader, it will be necessary to describe the structure of these boats, which are extremely well calculated for the use of these Indians, as they are frequently obliged to carry them over-land a long way together, through thick woods, to avoid doubling capes and head-lands, in seas where no open boat could live. They generally consist of five pieces, or planks; one for the bottom and two for each side; and as these people have no iron tools, the labour must be great in hacking a single plank out of a large tree with shells and flints, though with the help of fire. Along the edges of the plank they made small holes, at about an inch from one to the other, and sew them together with the supple-jack, or woodbine; but as these holes are not filled up by the substance of the woodbine, their boats would be immediately full of water if they had not a method of preventing it. They do this very effectually by the bark of a tree, which they first steep in water for some time, and then beat it between two stones till it answers the use of oakum, and then chinse each hole so well, that they do not admit of the least water coming through, and are easily taken asunder and put together again. When they have occasion to go over-land, as at this time, each man or woman carries a plank, whereas it would be impossible for them to drag a heavy boat entire."

"Quite worn out with fatigue, I soon fell asleep, and awaking before day, I thought I heard some voices at no great distance from me. As the day appeared, looking further into the wood, I per-

ceived a wigwam, and immediately made towards it; but the reception I met with was not at all agreeable; for stooping to get into it, I presently received two or three kicks in my face, and at the same time heard the sound of voices seemingly in anger, which made me retire and wait at the foot of a tree, where I remained till an old woman peeped out, and made signs to me to draw near. I obeyed very readily, and went into the wigwam: in it were three men and two women; one young man seemed to have great respect shewn to him by the rest, though he was the most miserable object I ever saw. He was a perfect skeleton, and covered with sores from head to foot. I was happy to sit a moment by their fire, as I was quite benumbed with cold. The old woman took out a piece of seal, holding one part of it between her feet, and the other end in her teeth, and then cut off some thin slices with a sharp shell, and distributed them about to the other Indians. She then put a bit on the fire, taking a piece of fat in her mouth, which she kept chewing, every now and then spirting some of it on the piece that was warming upon the fire; for they never do more with it than warm it through. When it was ready, she gave me a little bit, which I swallowed whole, being almost starved. As these Indians were all strangers to me, I did not know which way they were going; and, indeed, it was now become quite indifferent to me which way I went, whether to the northward or southward, so that they would but take me with them, and give me something to eat. However, to make them comprehend me, I pointed first southward, and after to the lake, and I soon understood they were going to the northward. They all went out together, excepting the sick Indian, and took up the planks of the canoe, which lay near the wigwam, and carried them upon the beach, and presently put it together; and, getting everything into it, they put me to the oar. We rowed across the lake to the mouth of a very rapid river, where we put ashore for that night, not daring to get any way down in the dark, as it required the greatest skill, even in the day, to avoid running foul of the stumps and roots of trees, of which this river was full.* I passed a melancholy night, as they would not suffer me to come near the wigwam they had made; nor did they give me the least bit of any one thing to eat since we embarked. In the morning we set off again. The weather proved extremely bad the whole day. We

* In March—April: beginning of autumn.—Caño de Perdon?—R. F.

went down the river at an amazing rate; and, just before night, they put ashore upon a stony beach. They hauled the canoe up, and all disappeared in a moment, and I was left quite alone: it rained violently, and was very dark. I thought it was as well to lie down upon the beach, half-side in water, as to get into a swamp under a dropping tree. In this dismal situation I fell asleep, and awaked three or four hours after in such agonies with the cramp, that I thought I must die upon the spot. I attempted several times to raise myself upon my legs, but could not. At last, I made shift to get upon my knees, and, looking towards the wood, I saw a great fire at some distance from me. I was a long time crawling to it; and when I reached it, I threw myself almost into it, in hopes of finding some relief from the pain I suffered. This intrusion gave great offence to the Indians, who immediately got up, kicking and beating me till they drove me to some distance from it; however, I contrived, a little after, to place myself so as to receive some warmth from it; by which I got rid of the cramp. In the morning, we left this place, and were soon after out of the river. Being now at sea again, the Indians intended putting ashore at the first convenient place to look for shell-fish, their stock of provisions having been quite exhausted for some time. At low water we landed upon a spot that seemed to promise well; and here we found plenty of limpets. Though at this time starving, I did not attempt to eat one, lest I should lose a moment in gathering them; not knowing how soon the Indians might be going again. I had almost filled my hat, when I saw them returning to the canoe. I made what haste I could to her; for I believe they would have made no conscience of leaving me behind. I sat down to my oar again, placing my hat close to me, every now and then eating a limpet. The Indians were employed the same way, when one of them seeing me throw the shells overboard, spoke to the rest in a violent passion; and, getting up, fell upon me, and seizing me by an old ragged handkerchief I had about my neck, almost throttled me; whilst another took me by the legs, and was going to throw me overboard, if the old woman had not prevented them. I was all this time entirely ignorant by what means I had given offence, till I observed that the Indians, after eating the limpets, carefully put the shells in a heap at the bottom of the canoe. I then concluded there was some superstition about throwing these shells into the sea, my ignorance of

which had very nearly cost me my life. I was resolved to eat no more limpets till we landed, which we did some time after, upon an island. I then took notice that the Indians brought all their shells ashore, and laid them above high-water mark. Here, as I was going to eat a large bunch of berries I had gathered from a tree, for they looked very tempting, one of the Indians snatched them out of my hand and threw them away, making me to understand that they were poisonous. Thus, in all probability, did these people now save my life, who, a few hours before, were going to take it from me for throwing away a shell."

"One day, we fell in with about forty Indians, who came down to the beach we landed on, curiously painted.* Our cacique seemed to understand but little of their language, and it sounded to us very different from what we had heard before. However, they made us comprehend that a ship had been upon the coast not far from where we then were, and that she had a red flag: this, we understood some time after, to have been the Anna Pink, whose adventures are particularly related in Lord Anson's voyage; and we passed through the very harbour she had lain in."†

* Probably in the neighbourhood of the 'Estero de Aysen.' in lat. 45° S —R. F.

† No—not through the harbour, but within twenty miles of it, I should suppose.—R. F.

No. 15.

In the following fragment of a Vocabulary the vowels should be sounded as in the English syllables, bah, băt, eel, bĕt, I, bĭt, no, tŏp, rule, bŭt, hay; and the consonants as in English, but giving to kh a very guttural sound. One Fuegian expression, something like the cluck of a hen, can scarcely be represented by our letters; its meaning is "no."

FRAGMENT OF A VOCABULARY OF THE ALIKHOOLIP AND THE TEKEENICA LANGUAGES.

Also some Words of those spoken by the PATAGONIAN (TEHUEL-HET) and CHONOS INDIANS.

ENGLISH.	ALIKHOOLIP.	TEKEENICA.
York Minster's name	ĕl'lĕpăru	
Jemmy Button's name		o'rŭndĕl'lĭcŏ.
Fuegia Basket's name	yŏk'cŭshlu	
Ankle	acŭl'lăbe	tŭppallĭ.
Arm	tŏ'quĭm'be	car'mĭnĕ.
Arm (fore)	yŭc'cŭbŭ	dow'ĕlŭ.
Arrow	an'năquŭ	te'ăcu.
Beads (necklace)		ăcon'ăsh.
Back	tŭccăler'khĭtĕ	am'mŭckŭ.
Bark (as a dog)	stŭck'stŭ	wo'onŭ.
Basket	kŭ'ĕkhu (or) kha'lŏ	kŭ'ekhĕm (or) kŭsh.
Beads	ca'ĕcŏl	ah'khĭnnŭ.
Belly	kŭppŭdde	
Birch apple		a'fĭsh-khŭ.
Bird (little)	tŏw'quŭ	be'ghe.
Bite	ĕck'hănĭsh	e'tăŭm.
Black	fcal	
Blood	shŭb'bŭ	shŭb'bŭ.
Baby	cos'hĕ	yărŭmăte'ŭ.
Boat	ăth'lŏ	watch.
Bone	osh'kiŭ	ah'tŭsh
Bow	kĕrĕc-căna	whŷ-ăn'nŭ.
Boy	a'll-walkh	yŭr'ămuŭ.

ENGLISH.	ALIKHOOLIP.	TEKEENICA.
Break	ŭccă'ĭl	ŭttĕrgu'shu.
Brother	ăr're	mar'cŏs.
Butterfly	kĭkeĕŏw'l	yumĕrtĕ'lĕ.
Children	pătete	yăr'hăm.
Catch	ca	ŭt'tă.
Chain	păru	
Chest	yăca'bĭshăcŭn'nĕ	cŭp'pŭneă.
Child	pătete	yăr'hăm.
Chin	ŭf'ca	won'ne.
Cloud	tŭl'lu	
Cold	kĭshăsh'	ŭc'cŏwe.
Cheek	cĭĭt'khŏpcă	ches'hă.
Come here	yămăschun'ă	
Come	hălv'rĕluă	ăh'ĕ.
Cry	yĕlk'ĕstă	ŭrră.
Cut	cŭp'pă	ăt'khĕkŭm.
Cough	yilkĕă	ŭttă.
Day	ăn'ŏquăl	
Dead	wĭllăcar'wŏnă	
Death		apaĭ'nă.
Die	wĭllăcar'wŏnă	ăppăn'na, or ăpăĭ'nă..
Dive	sko	
Dog	shil'ŏkĕ	shi'lăkĕ, or eashŭl'lă.
Drink	ăfkhĕl'lă	ŭl'lă, or ăllĕ.
Duck	ye'keĭp	măh'e.
Duckling	wĕn.	
Ear	tĕl'dĭl	ŭf'kheă.
Earth	bar'be	tănn.
East	yul'ăbă	yăh'cŭf.
Egg	lĭth'le	hĕrch.
Eight		yŭl'cămme.
Elbow	yŏc'kĕ	dŏw'ĭllă.
Eat	lŭf'fĭsh	ăt'tĕma, or ĕt'tŭmă.
Eye	tĕlkh	della.
Eyebrow	tĕth'lĭu	ŭtkhĕl'lă.
Firestone	cath'ŏw	
Fall (to)	ăh'lăsh	lŭp'ăe.
Fat	ŭf'ki	tŭf'flă.
Father	cha'ŭl	ay'mŏ.
Feather	i-Ish	ŏftuku.
Fright (to)	ŭth'lĕthăl	che'ne.
Fist	ŭf'shĕbă	ŭk-ke.
Finger	skŭl'lă	

ENGLISH.	ALIKHOOLIP.	TEKEENICA.
Fire	tĕt'tal	pŭshah'ke, or pŏsh'ăky.
Five		cup'ŭspŭ.
Fish	ăp'pŭbĭn, or appŭffĭn	ăp'pŭr'mŭ (small fish).
Fish (to)	kĕr'rĭkstŭ	ăp'pŭrmŭ.
Fly (to)	ah-lăsh	mŭr'rŭ.
Flower	yĭk'stŭ	ă'nĕăcŭ.
Fly (a)	tŏmăt'tŏlŭ	
Foot	cŭt'lĭcŭlcŭl	cŏecŭ.
Forehead	tĕl'chĕ	oshcar'she.
Four	ĭn'ădăbŭ	cărgŭ.
Fresh water		sheă'mŭ, or shaă'mŭ.
Girl	ăn'nŭ	yarŭmătĕŭ.
Guanaco	harmaŭr	armauŭ.
Go away	ŭs'hăe	khal'drĭsh.
Good	ly'ĭp	
Gown	uckwul	archi.
Grass	kĭttŭ're	hiănăm'bŭ.
Grey		owkush.
Grease	kĭn'	kune.
Grandmother	caŭshĭllĭsh	ghuluŏnnŭ.
Grandfather	cowĭsh, or caŭwĭsh	ghu'luwăn.
Grand daughter	yărrŭkepŭ	
Grass	khall	
Hair	ay'ŭ	ŏsh'tŭ.
Hand	yŭc'cŭbŭ	mar'pŏ.
Head	ŭl'chŏckŭ	lŭk'ŭbe.
Hear (to)	tĕl'lĭsh	mŭr'rŭ
Heavy	pah'cŭl	hah'shu
Humming-bird	ămŏwa'rŭ	ŭt'tŭsh.
Hip	cŏl'khĭstăl	wăsh'nŭe.
Hog	tĕthl	
Hot	kĕt'khĭk	ŭck'hulŭ.
House	hŭt	ukh'rŭl.
Hut	ăht	ŭck'ŭ.
Husband	ăr'rĭk	dugu.
Ice	ătkhur'skŭ	ye'ăteŭ.
Jump	ah'culu	
Kelp		ŭt'chŭ.
Kill	ŭf'tŭclŭ	ŭt'tŭl.
Knee	tŭl'dŭl	tŭl'lăpuŭ.
Knife	ăfta're, or ăftăl'lŭ	tĕt'lŏwăl, or tĕclew'ĕl.
Knuckles	ăh'tellĭs'hăbe	yăsh.
Land	champtl	o'shĕ

ENGLISH.	ALIKHOOLIP.	TEKEENICA.
Large	ŏw'quĕl	o'olu.
Laugh (to)	fĕay'l	tŭsh'că.
Leaf (fall of)		oŏshŏ.
Lean (of seal)	tildum	ŭndŭppă.
Leg	cŭt	hie'tă.
Little	yĭco'-ăt	yŭc'că.
Look		ŭrruks-i.
Man (Vir.)	ăck'ĭnĭsh	ohă.
Many men	ackhĭnĕsh	owĕy.
Man (old)	kĕr'ŏwĭsh	cŭt'tŏăs.
Moon	cŏn'ăk'ho	ănŏcŏ.
Moon	cuunequă	hăn'nŭkă.
Moon (full)	ŏw'quĕl	hul'ush.
Moon (new)	yĕco'ăt	tu'quĭllĕ.
Moon (set)	iko	cay'-e ă.
Moon (rise)	iarsh	carsh.
Morning	ŭsh'quăl, or ilquăllĕf	mawlă.
Mother	chăhp	dah'be.
Mouth	ŭf'fĕăre	ye'ăk.
Nail (finger)	esh'cŭl	gŭl'lŭf.
Neck	chah'ĭĭklhă	yărek'.
Night	yul'lŭpre, or yŏw'lĕbă.	ŭc'cŭsh.
Nine		yŭr'tobă.
No	quĭt'tuk	bar'be.
North	ya'ŏw	uffa'hu.
Nose	nohl	cŭs'hŭsh.
Oar (man's)	wy'ĭc	cŭn'nă.
Oar (woman's)	wŏr'rĭc	ăp'pe.
One	tŏw'quĭdŏw	o'cŏăle.
Owl	tilkibbŏl	lŭf'queă.
Otter	hiăp'pŏ	hiăp'pŏ.
Owl (horned)	shĭp'ĭshĭ	yăputĕllă.
Pain	ahf	ŭm'mayă.
Porpoise	shŏwăn'nĭkĕ	shŏwăn'nĭkĕ.
Rain	căp'pŏcăhsh, or ăb'quăhsh	jŭb'băsha, or wĕrt.
Rope	shŭ'cămĕ	cŭf'ĭĕnnĕ.
Run	cak'ŭsh	dahdu.
Rush	ahl	mŭmpe.
Sail	ŭhnayr (made of seal skin)	
Salt water	chăŭw'ăsh	shĕm'ă, or sheă'mŭ.
Sand		pŭntel.

ENGLISH.	ALIKHOOLIP.	TEKEENICA.
Sea	chah'bŭcl	hay'-ecă.
Seal	ăf'fĕilŏ, or ăf'ăllŏ	dŭp'pă.
Sea shore	wănnŭc	wĭnnŷgătă.
Sea-weed		ŭtchă.
Seven		hŏw'cŭstŭ.
Shell	car'nĭsh	ters'hŏĭn.
Shore	wăn'nŭc	wĭn'nĕgaytă.
Shoulder	chŏ'ŭks	ăh'kĕkă.
Sickness	yaŭ'hŏl	om'ă, or om'ĕy.
Side	ŭcshan'ĭqŭa	ŭcshăn'sĭquă.
Sit	shŭckă	mu'tu.
Sister	chol'ĭcl	way kĭp'pă.
Six		cum'ua.
Skin	ŭc'cŏlaŷk	ăppŭllă.
Sky	ŭc'cŭbă	hŏw'ŭccă.
Sleep	kay'kĕol, or khăk'hŏn	ŭckă, or ăshă.
Sling	shĕn'nĕkăy	wăt'tŏwă.
Small	shoks	
Smell	ŭc'she	ar've.
Smoke	tĕl'lĭcks, or tĕlk'hăsh	ŭsh'cŏ, or ŏch'ăt.
Snow	ăs'hŏ	ŏppŭ'năcă.
Son	părăl	mŭrrĭu.
South	ŭc'cŏay	ah'ne.
Spear	ĭhlcă, or fĭshcă	uway' eă, or ŏway eă.
Spear handle	aĭre	
Speak	yăc'ăftă	ăuru'ŏshĕ.
Spunge		ăllŭf'shĕ.
Stand (to)	arcŏ	cŭmmărt.
Stars	quo'unŭsh, or cŏnăsh'	ăppĕrnĭs'h, or ăp-păn'nă.
Straw		gŏshe.
Stone	kĕhtla'ŏ, or căth'ŏw	ow'ey.
Sun	lŭm	lŭm.
Sunrise	ahlăcŭr'rĭc	cardĭc
Sunset	arshe	coshu
Sunshine	lŭm alkă	lŭm pushĕ.
Swimming	lĭm'pi	căl'ĕ.
Teeth	căŭwăsh, or car'lĭsh	tu'un.
Thigh	cŭt'lăbă	lŭck'hă.
Three	cup'ĕb	mŭt'tă.
Thumb	ŭshcŭc'cŭn	ŭshcŭg'gen.
Thunder	cayru'	kek'ĭkă.
Tired	ŏch'lă	gushă.

ENGLISH.	ALIKHOOLIP.	TEKEENICA.
Tongue	lŭc'kĭn	lŭn.
Tree	e'ărŭckă, or kăfs'hă	wu'urŭsh.
Two	tĕl'keŏw	cŏm'băbe.
Vessel	a'un	ăl'lă.
Vulture	ăhcŭr'rĭgă	
Walk (to)	ahsh	car'dĭk.
Water	chau'ăsh	shă'mĕă.
West	ŭthquăldăl'	ŭppăh-ush.
Whistle	ŭfshĕxcă	lŭfkĕy.
White	ăkĭf'ca	
Wife	ăshwă'llŭk	to'ucu.
Wind	hŭr'rŭquash	wur'ŭp.
Woman	ătlarăbĭsh, or ăck'hănăsh	kepă, or shĕpush.
Wood	ŭf'shă	ăh'-schĭf, or ŏspătŭsh.
Wrist	ăccăl'lăbă	tŭppŭl'la.
Yes	o'o	dăs.

A few Fuegian Words which have some similarity to corresponding Huilliche terms.

ENGLISH.	FUEGIAN.	HUILLICHE.
Belly	kŭp'pudĕ	puay.*
Bones	osh'kiă	voso, or voro.
Cold	ŭc'cŏwe	chosay.
Day	ăn'ŏquăl	antu, or antuigh.
Fire	tĕt'tăl	k'tal, or cutal.
Hand	yŭc'căbă	cuugh, or cuu.
Moon	cuunĕquă	cuyen.
Moon (new)	tu'quĭllĕ	chum cuyen.
Salt-water	chaŭ'ăsh, or shĕa'mă	chasi-co, or chadi-co.
Sea	chah'bŭel, or hay'ĕcă	lavquem.
Sun, (or bright light)	lŭm, or lŏm	antu pelon, or luv.
Shine, to		lumulmen.

* The words in this column are taken from Molina, but compared with Falkner and Febres.

ENGLISH.	PATAGONIAN.
Another	Sark.
Axe	pĭkĕl, or pĭckĕl.
Band, worn round hair	cochĭn.
Barberry (the)	călga.
Boat	tă lĭna căr'rŏ.
Balls (two)	someĭ, or somăĭ.
Balls (three)	ăchĭcŏ.
Boots	chŏcă.
Bridle	sumŏ.
Clothes	tĕrŏna.
Comb made of a coarse dry grass	par'chĭn.
Dog	wărchĭn, or wauchĭn, or wachĭn
Fire	se ăk, or ze ăk.
Give it to me	ey' nĭ ŏts.
Guanaco	co.
Go away	aŭrŏs, or orŏs, and cha'nŏs.
Horse	căl'gŏ.
Knife	pa'ĭkă.
Knife (small)	pepă.
Mantle	chorĭllĭo.
Me	cătĭăm.
Meat	sĕy'prĕ, or zĕyprĕ.
No	cŏmps.
Ostrich	măs'hĭŏrs.
Pole	ask.
Put	caĕ.
Ship	carrŏ.
Sinews of the Ostrich, used for sewing mantles, &c.	ĭllŏyu.
Skunk	sŭrrenă.
Slave	zapallo.
Spurs	ta.
Sword	cuchillo.
Tent	cŏw, or caŭ, or toldo.
Water	la.
Wood	cark.
Yes	ohaĭ.
A particular root which is eaten for food	tŭs.
Another similar root	chalăs.

ENGLISH.	PATAGONIAN.
The Arbutus	ămăcorŏ.
The Cranberry	pĭlecŏ.
Barberry, drink made with the	lĭcone.

ENGLISH.	CHONOS.
Good Deity	yĕrrĭ yŭpon.
Bad Spirit	yăccŷ-ma.
White Men of the Moon	cŭbba.

No. 16.

Remarks on the Structure of the Fuegians.

The general form of the Fuegians is peculiar; the head and body being particularly large, and the extremities unusually small: but the feet are broad though short. This peculiarity, no doubt, is owing to their mode of life: being a people who take little exercise, but sit constantly huddled together in their canoes or wigwams; the blood, the source of nourishment, can only circulate freely, and must in greater quantity, in the head and trunk, from the obstruction to its passage into the limbs, owing to their bent position. From the same cause, the want of exercise, this is the form of the Esquimaux and Laplanders.

A man whom I examined was of the middle size, five feet seven inches, and his muscular power about a medium; the circumference of the—

	Ft.	in.		Ft.	In.
Thorax	3	1	Length of leg	0	17
Abdomen	2	7	——— of arm	1	0
Pelvis	2	5	——— of fore-arm and hand	0	17
Thigh	1	10	——— from spine to sternum, externally	0	13
Calf of the leg	1	0	——— same internally ...	0	10
Arm	1	0	Breadth of thorax	0	13
Fore-arm	0	11	——— of hypochondriac regions	1	0
Length of the head from the chin upwards	0	9	——— of pelvis between superior and spinous processes	0	11
Length of body, from the symphisis pubis to the top of the sternum	2	0			
Length of thigh	0	17			

I consider that this man was about the average stature of the Fuegians: they are generally short and broad.

The Fuegian, like a Cetaceous animal which circulates red blood in a cold medium, has in his covering an admirable non-conductor of heat; the corpus adiposum envelopes the body to preserve that temperature necessary to continue the vital functions and circulation of the fluids. In this individual it was particularly thick over the abdomen and dorsum; on the hips it formed a perfect cushion, and filled up the interstices between the muscles in general. Unlike the limbs of porters, smiths, and other athletæ in Europe, where the form and size of each muscle may be traced while in action, the limbs of these people are round and smooth, like the female sex, or the child in infancy. The quantity of fat is to be imputed to their diet; their food is shell-fish and birds, but the greatest dainty is fat of all kinds, that of the seal and penguin in particular; as for vegetable aliment they have none,* nor any taste for it. The muscles were soft, and the viscera (in particular the heart, liver, and lungs,) in good order, —a circumstance which but rarely occurs: the bones were well-formed, with their processes, foramina, and sutures complete.

The complexion of this man was dark; his skin of a copper colour, the native hue of the Fuegian tribes; the eyes and hair black (this is universal, as far as I have seen, and predominates throughout all the aborigines of America, from the Fuegians to the Esquimaux); the epidermis is thicker than in white men; but in the rete mucosum I saw no difference, the copper hue arising from the vessels of the cutis, shining through a thickened scarf-skin, and from its incorporating the particles of smoke and ochre with which their bodies are continually covered.

The hair on this man's head was jet-black, straight, long, and luxuriant, but scanty on other parts of the body. The Fuegians have little beard and no whiskers.

The features of this individual were rounder than they generally are among those of his nation; the form of whose countenance resembles that of the Laplanders and Esquimaux; they have broad faces with projecting cheek-bones; the eyes of an oval form, and drawn towards the temples; the tunica sclerotica of a yellow-white, and the iris deep black; the cartilage of the nose broad and de-

* Mr. Wilson was not aware that they eat birch excrescences, and berries.—R. F.

pressed; the orifice of the mouth large, when shut forming a straight line, when open an ellipsis. The head is bulky, and the hair straight.

The phrenological marks in the skull (said by some persons to include corresponding organs in the brain,) taken on the spot, were as follows:—

THE PROPENSITIES.

Amativeness—full.
Philoprogenitiveness—moderately full.
Concentrativeness—ditto.
Adhesiveness—full.
Combativeness—large.
Destructiveness—very large.
Constructiveness—small.
Acquisitiveness—small.
Secretiveness—large.

THE SENTIMENTS.

Self-esteem—moderately small.
Love of approbation—large.
Cautiousness—very large.
Benevolence—small.
Firmness—moderately full.
Veneration—small.
Hope—ditto
Ideality—ditto
Conscientiousness—ditto

THE INTELLECTUAL ORGANS.

Individuality—small.
Time—ditto
Tune—ditto
Comparison—small.
Wit—ditto
Form—small.
Number—very small.
Language—full.
Causality—small.
Imitation—ditto

The facial angle, according to Camper, 74°, the occipital, 80°.

The warlike propensities in this man were large, agreeing with the little which I know of his history. Taking a general view of the head, the Propensities (the organs most exercised by a barbarian) are large and full; the Sentiments small, few of which are ever called into action, except cautiousness and firmness, which are large; finally, the Intellectual organs, which are chiefly used by man in a civilized state, are small.

The teeth are perfect, and of the usual number; the incisores flat and apparently worn down; other instances of which I have seen. From this it is probable they are sometimes used as grinders.* The reverse of this has been frequently noticed among savages; some, it is said, file their teeth to render them more terrible in battle, while others pull out the two centre incisores, or the cuspidati, by way

* This man could not have been more than forty: probably he was many years younger.—R. F.

of ornament. Their teeth are generally good, regular, and healthy, arising in all probability from the system being free from any constitutional taint.

The viscera of the thorax were healthy, the heart particularly so, with its valves and columna carnosa in good order; the lower part of the thorax and the whole parietes of the abdomen were unusually expanded; the liver very large though healthy, occupying the right hypochondriac and lumbar, the epigastric, and left hypochondriac regions; the spleen remarkably small; the stomach of a moderate size, and containing some muscles and limpets in a half-digested state; the intestines were filled with flatus, which probably took place after death. The large size of the abdomen is to be referred to the squatting position these people assume, the knees and thighs being brought up against the lower part of the belly, force the viscera and intestines upward and forward, thereby distending the lower part of the thorax and front of the abdomen. Here is a peculiarity from habit becoming inherent in the constitution, and descending to posterity, as the children, male and female, are born with large bellies. In like manner Chinese children, from their parents' custom of compressing the feet, are born with them remarkably small.

Besides distending the abdomen mechanically—to this bent position is to be traced the enlarged state of the abdominal viscera, the passage of blood to the extremities being obstructed; an unusual quantity is thereby determined to, and circulated in, the cœliac and mesenteric arteries; the want of support from dress is also to be taken into account. From this stretched and distended state of the abdomen, separating the fibres of the oblique and transverse muscles, and the open state of the inguinal rings, these people must be peculiarly liable on any exertion to ventral hernia: these passages I found open in this individual; and they appeared to be in the same state in other men whom I examined. Cardiac affections mostly prevail among those who are subject to violent exercise, as porters, carriers, and artillerymen. The healthy state of this heart, which it is probable will be generally the case among the Fuegians, is to be imputed to their moderate exertions. In their canoes they are employed fishing or paddling; in their wigwams, which are seldom many yards from the beach, cooking or making small wares of the bones or skins of beasts. The cremaster muscle was strong and

fleshy; the lower extremities were short and ill-proportioned; the thigh of a moderate size, but from the smallness of the muscles of the leg in general, and gestatorii in particular, it looked large; the calf of the leg was very small. The diminutive size of these muscles must be referred to the cause already mentioned—the want of a due circulation in these parts, produced by a cramped position and want of exercise. Having the feet broad and short is common to all who do not wear shoes, the bones being somewhat separated, the ligaments stretched, and the muscles flattened from constantly sustaining the weight of the body unsupported by any covering to the feet. The kidneys were healthy, but unusually destitute of fat. There was no tunica adiposa; the adeps, in this instance, was chiefly collected on the surface, but little in the internal parts. If this is universally the case, it is a wonderful provision of nature to protect their bodies from the inclemency of this inhospitable region. This is the method adopted by nature during the first years of infancy, to habituate the constitution to the vicissitudes and variations of the atmosphere, which otherwise would be incompatible with existence. The arms were better proportioned than the lower extremities; and this is general throughout the Fuegian tribes; the muscles being firmer, and better formed, from the more constant use of these parts, paddling in their canoes, climbing, and making their wigwams. The muscles in general, throughout the body, were healthy, but soft and flabby, unlike the firm sinewy muscle of hardy mountaineers: and the bones less indented than is usual in those who have been accustomed to vigorous exertion.

In another Fuegian, whom I examined, the marks of the Phrenological organs, as taken from the skull, were as follows:—

THE PROPENSITIES.

Amativeness—small.	Destructiveness—full.
Philoprogenitiveness—very large.	Constructiveness—small.
Concentrativeness—full.	Acquisitiveness—full.
Combativeness—very large.	Secretiveness—large.

THE SENTIMENTS.

Self-esteem—very large.	Veneration—full.
Love of approbation—full.	Hope—small.
Cautiousness—large.	Ideality—small.
Benevolence—small.	Firmness—large.

THE INTELLECTUAL ORGANS.

Form—small.	Colouring—small.
Size—large.	Locality—ditto.
Weight—small.	Order—ditto.
Time—very small.	Number—ditto.
Tune—ditto	Language—ditto
Comparison—small.	Wit—ditto
Causality—ditto	Imitation—ditto

The facial angle, 76°, the occipital, 82°.

In this skull also, the propensities were large; the moral sentiments larger than in the former, but the intellectual organs equally small. Destructiveness, secretiveness, and cautiousness, large—faculties, as I have remarked, necessary to a savage warrior: the more refined sentiments, as benevolence, ideality, and conscientiousness were small, with nearly all the intellectual organs.

In this man, also, the teeth were complete; but the incisores not worn down, as in the former: their general regularity and good arrangement were greatly owing to the expanded state of the jaws, giving good space for their growth and shedding. In those persons who have sharp features, where the sides of the face meet at an acute angle, the teeth are often small; or, if large, from want of room, they overlap each other, or push one another out of the natural positions. The broadness of the face and features is owing to the breadth of the base of the cranium, which gives shape and form to the bones of the face. With respect to the arms and legs of this man, I have only to remark, that they agreed exactly with those of the other, in the largeness of the thigh compared to the leg, breadth of the feet, and better proportion of the upper extremities.

JOHN WILSON, (d) Surgeon.

No. 17.

Phrenological Remarks on three Fuegians.*

Yokcushlu, a female, ten years of age.

Strong in attachment.

If offended, her passions strong.

A little disposed to cunning, but not duplicity.

She will manifest some ingenuity.

She is not at all disposed to be covetous.

Self-will at times very active.

Fond of notice and approbation.

She will show a benevolent feeling when able to do so.

Strong feelings for a Supreme Being.

Disposed to be honest.

Rather inclined to mimicry and imitation.

Her memory good of visible objects and localities, with a strong attachment to places in which she has lived.

It would not be difficult to make her a useful member of society in a short time, as she would readily receive instruction.

Orundellico, a Fuegian, aged fifteen.

He will have to struggle against anger, self-will, animal inclinations, and a disposition to combat and destroy.

Rather inclined to cunning.

Not covetous; not very ingenious.

Fond of directing and leading.

Very cautious in his actions: but fond of distinction and approbation.

He will manifest strong feelings for a Supreme Being.

Strongly inclined to benevolence.

May be safely intrusted with the care of property.

Memory, in general, good; particularly for persons, objects of sense, and localities.

To accustomed places he would have a strong attachment.

Like the female, receiving instruction readily, he might be made a useful member of society; but it would require great care, as self-will would interfere much.

* Made in London, in 1830.

EL'LEPARU, about twenty-eight.

Passions very strong, particularly those of an animal nature; self-willed, positive and determined.

He will have strong attachment to children, persons, and places.

Disposed to cunning and caution.

He will show ready comprehension of things, and some ingenuity.

Self will not be overlooked, and he will be attentive to the value of property.

Very fond of praise and approbation, and of notice being taken of his conduct.

Kind to those who render him a service.

He will be reserved and suspicious.

He will not have such strong feelings for the Deity as his two companions.

He will be grateful for kindness, but reserved in showing it.

His memory, in general, good: he would not find natural history, or other branches of science, difficult, if they can be imparted to him; but, from possessing strong self-will, he will be difficult to instruct, and will require a great deal of humouring and indulgence to lead him to do what is required.

No. 17 (*a*).

INSTRUMENT executed by Mons. LOUIS de BOUGAINVILLE for the delivering up of the Malvinas.

"I, Monsieur Louis de Bougainville, colonel of his most Christian Majesty's army, have received six hundred and eighteen thousand one hundred and eight livres, thirteen sols, and eleven deniers, being the amount of an estimate that I have given in, of the expenses incurred by the St. Malo Company in equipments for founding their *intrusive* establishments in the Malvina Islands, *belonging to his Catholic Majesty*, in the following manner:—

"Forty thousand livres delivered on account to me in Paris, by his Excellency the Count de Fuentes, ambassador of his Catholic Majesty to that court, for which I gave the proper receipt.

"Two hundred thousand livres, which are to be delivered to me at the same court of Paris, according to bills drawn in my favour by

the Marquess of Zambrano, treasurer-general of his Catholic Majesty, upon Don Francisco Ventura Llorena, treasurer-extraordinary of the same; and sixty-five thousand six hundred and twenty-five hard dollars, and three-fourth parts of another, which are equivalent to the three hundred and seventy-eight thousand one hundred and eight livres three sous and eleven deniers, at the rate of five livres per dollar, which I have to receive in Buenos Ayres, on account of bills which have been delivered to me, drawn by his excellency the Baylio Fray, Don Julian Arriaga, secretary of state for the general department of the Indies and navy of his Catholic Majesty.

"In consideration of these payments, as well as in obedience to his Most Christian Majesty's orders, I am bound to deliver up, in due formality, to the court of Spain, those establishments, along with the families, houses, works, timber, and shipping built there, and employed in the expedition; and, finally, every thing therein belonging to the St. Malo Company, as included in the accounts which are so settled, and to his Most Christian Majesty, by this voluntary cession, making void for ever all claims that the company, or any person interested therein may have, or might produce, upon the treasury of his Most Catholic Majesty; nor can they henceforth demand more pecuniary, or any other compensation whatsoever. In testimony whereof, I set my name to this present instrument and voucher, as one principally interested, as well as authorized to receive the whole of this sum, agreeably to a registry in the department of state in St. Ildefonso, 4th October, 1766.

(Signed) "LOUIS DE BOUGAINVILLE."

VISCOUNT PALMERSTON to M. DE MORENO.

Foreign Office, January 8, 1824.

The undersigned, &c. has the honour to acknowledge the receipt of the note of M. Moreno, &c. dated the 17th of June last, in which he formally protests, in the name of his government, "against the sovereignty lately assumed in the Malvina (or Falkland) Islands, by the crown of Great Britain."

Before the undersigned proceeds to reply to the allegations advanced in M. Moreno's note, upon which his protest against this act on the part of his Majesty is founded, the undersigned deems it proper to draw M. Moreno's attention to the contents of the protest which Mr.

Parish, the British Chargé d'Affaires, at Buenos Ayres, addressed, in the name of his court, to the Minister for Foreign Affairs of the Republic, on the 19th of November 1829, in consequence of the British Government having been informed that the president of the United Provinces of the Rio de la Plata had issued decrees, and had made grants of land, in the nature of acts of sovereignty over the islands in question.

That protest made known to the government of the United Provinces of the Rio de la Plata :—

1st. That the authority which that government had thus assumed, was considered by the British Government as incompatible with the sovereign rights of Great Britain over the Falkland Islands.

2dly. That those sovereign rights, which were founded upon the original discovery and subsequent occupation of those islands, had acquired an additional sanction from the fact, that his Catholic Majesty had restored the British settlement, which had been forcibly taken possession of by a Spanish force, in the year 1771.

3dly. That the withdrawal of his Majesty's forces from the Falkland Islands, in 1774, could not invalidate the just rights of Great Britain, because that withdrawal took place only in pursuance of the system of retrenchment adopted at that time by his Majesty's Government.

4thly. That the marks and signals of possession and of property, left upon the islands, the British flag still flying, and all the other formalities observed upon the occasion of the departure of the governor, were calculated not only to assert the rights of ownership, but to indicate the intention of resuming the occupation of the territory at some future period.

Upon these grounds Mr. Parish protested against the pretensions set up on the part of the Argentine Republic, and against all acts done to the prejudice of the just rights of sovereignty heretofore exercised by the crown of Great Britain.

The Minister for Foreign Affairs of the Republic acknowledged the receipt of the British protest; and acquainted Mr. Parish that his government would give it their particular consideration, and that he would communicate to him their decision upon the subject, so soon as he should receive directions to that effect.

No answer was, however, at any time returned, nor was any objection raised, on the part of the government of the United Provinces of

the Rio de la Plata, to the rights of Great Britain, as asserted in that protest; but the Buenos Ayrean government persisted, notwithstanding the receipt of that protest, in exercising those acts of sovereignty against which the protest was specially directed.

The government of the United Provinces of the Rio de la Plata could not have expected, after the explicit declaration which had been so formally made of the right of the crown of Great Britain to the islands in question, that his Majesty would silently submit to such a course of proceeding; nor could that government have been surprised at the step which his Majesty thought proper to take, in order to the resumption of rights which had never been abandoned, and which had only been permitted to lie dormant, under circumstances which had been explained to the Buenos-Ayrean government.

The claim of Great Britain to the sovereignty of the Falkland Islands having been unequivocally asserted and maintained, during those discussions with Spain, in 1770 and 1771, which nearly led to a war between the two countries, and Spain having deemed it proper to put an end to those discussions, by restoring to his Majesty the places from which British subjects had been expelled, the government of the United Provinces could not reasonably have anticipated that the British Government would permit any other state to exercise a right, as derived from Spain, which Great Britain had denied to Spain herself; and this consideration alone would fully justify his Majesty's Government in declining to enter into any further explanation upon a question which, upwards of half a century ago, was so notoriously and decisively adjusted with another government more immediately concerned.

But M. Moreno, in the note which he has addressed to the undersigned, has endeavoured to shew that, at the termination of the memorable discussions referred to between Great Britain and Spain, a secret understanding existed between the two courts, in virtue of which Great Britain was pledged to restore the islands to Spain at a subsequent period, and that the evacuation of them, in 1774, by his Majesty, was the fulfilment of that pledge.

The existence of such a secret understanding is alleged to be proved; first, by the reservation, as to the former right of sovereignty over the islands, which was contained in the Spanish declaration, delivered at the time of the restoration of Port Egmont and its dependencies to his Majesty; and, secondly, by the concurrent description

of the transaction, as it took place beween the parties, given in certain documents and historical works.

Although the reservation referred to cannot be deemed to possess any substantial weight, inasmuch as no notice whatever is taken of it in the British counter-declaration, which was exchanged against it; and although the evidence adduced from unauthentic historical publications cannot be regarded as entitled to any weight whatever with a view to a just decision upon a point of international rights; yet as the allegations above-mentioned involve an imputation against the good faith of Great Britain, to which his Majesty's Government cannot but feel sensibly alive, the undersigned has been honoured with the King's commands to cause the official correspondence with the court of Madrid, at the period alluded to, to be carefully inspected, in order that the circumstances which really took place upon the occasion might be accurately ascertained.

That inspection has accordingly been made, and the undersigned has the honour to communicate to M. Moreno the following extracts, which contain all the material information that can be gathered from that correspondence relative to the transaction in question :—

The Earl of Rochford to James Harris, Esq.

" St. James's, 25th January 1771.

" I enclose to you a copy of the declaration signed on Tuesday last by Prince Masserano, with that of my acceptance of it in his Majesty's name."

Spanish Declaration.

" Sa Majesté Britannique s'étant plainte de la violence qui avoit été commise le 10 Juin de l'année 1770, à l'Ile communément appelée la Grande Maloüine, et par les Anglais dite Falkland, en obligeant par la force le Commandant, et les sujets de sa Majesté Britannique, à évacuer le port par eux appelé Egmont, démarche offensante à l'honneur de sa Couronne, le Prince de Masseran, Ambassadeur Extraordinaire de sa Majesté Catholique, a reçu ordre de déclarer, et déclare, que sa Majesté Catholique, considérant l'amour dont elle est animée pour la paix, et pour le maintien de la bonne harmonie avec sa Majesté Britannique, et réfléchissant que cet évènement pourroit l'interrompre, a vu avec déplaisir cette expédition capable de la troubler; et dans la persuasion où elle est de la réciprocité de ses senti-

mens, et de son éloignement pour autoriser tout ce qui pourroit troubler la bonne intelligence entre les deux Cours, sa Majesté Catholique désavoue la susdite entreprise violente, et, en conséquence, le Prince de Masseran déclare, que sa Majesté Catholique s'engage à donner des ordres immédiats pour qu'on remette les choses dans la Grande Maloüine, au port dit Egmont, précisément dans l'état où elles étoient avant le 10 Juin 1770, auquel effet sa Majesté Catholique donnera ordre à un de ses officiers, de remettre à l'officier autorisé par sa Majesté Britannique, le fort et le port Egmont, avec toute l'artillerie, les munitions, et effets de sa Majesté Britannique et de ses sujets, qui s'y sont trouvés le jour ci-dessus nommé, conformément à l'inventaire qui en a été dressé.

" Le Prince de Masseran déclare en même tems, au nom du Roi son Maitre, que l'engagement de sa dite Majesté Catholique, de restituer à sa Majesté Britannique la possession du port et fort dit Egmont, ne peut ni ne doit nullement affecter la question du droit antérieur de souveraineté des Iles Maloüines, autrement dites Falkland.

" En foi de quoi, moi, le susdit Ambassadeur Extraordinaire, ai signé la présente Déclaration de ma signature ordinaire, et à icelle fait apposer le cachet de nos armes. A Londres, le 22 Janvier 1771.

(L.S.) (Signé) " LE PRINCE DE MASSERAN."

BRITISH COUNTER DECLARATION.

" Sa Majesté Catholique ayant autorisé son Excellence le Prince de Masserano, son Ambassadeur Extraordinaire, à offrir, en son nom royal, au Roi de la Grande Bretagne, une satisfaction pour l'injure faite à sa Majesté Britannique, en la dépossédant du port et fort du port Egmont; et le dit ambassadeur ayant aujourd'hui signé une Déclaration, qu'il vient de me remettre, y exprimant, que sa Majesté Catholique, ayant le désir de rétablir la bonne harmonie et amitié que subsistoient ci-devant entre les deux couronnes, désavoue l'expédition contre le port Egmont, dans laquelle la force a été employée, contre les possessions, commandant, et sujets de sa Majesté Britannique, et s'engage aussi que toutes choses seront immédiatement remises dans la situation précise dans laquelle elles étoient avant le 10 Juin 1770; et que sa Majesté Catholique donnera des ordres en conséquence à un de ses officiers de remettre à l'officier, autorisé par

sa Majesté Britannique, le port et fort du Port Egmont, comme aussi toute l'artillerie, les munitions, et effets de sa Majesté Britannique; et de ses sujets, selon l'inventaire qui en a été dressé; et le dit ambassadeur s'étant de plus engagé, au nom de sa Majesté Catholique, que le contenu de la dite déclaration sera effectué par sa Majesté Catholique, et que des duplicatas des ordres de sa dite Majesté Catholique à ses officiers seront remis entre les mains d'un des Principaux Secrétaires d'Etat de sa Majesté Britannique, dans l'espace de six semaines; sa dite Majesté Britannique, afin de faire voir les mêmes dispositions amicales de sa part, m'a autorisé à déclarer, qu'elle regardera la dite déclaration du Prince de Masserano, avec l'accomplissement entier du dit engagement de la part de sa Majesté Catholique, comme une satisfaction de l'injure faite à la Couronne de la Grande Bretagne. En foi de quoi, moi, soussigné, un des Principaux Secretaires d'Etat de sa Majesté Britannique, ai signé la présente de ma signature ordinaire, et à icelle fait apposer le cachet de nos armes. A Londres, ce 22 Janvier 1771.

(L.S.) (Signé) "ROCHFORD."

JAMES HARRIS, Esq. to the EARL OF ROCHFORD.

"Madrid, 14th February 1771.

"They keep the declaration here as secret as possible. I do not find any to whom they have shown it, except those to whom they are obliged to communicate it. They also report that we have given a verbal assurance to evacuate Falkland's Island in the space of two months."

The EARL OF ROCHFORD to JAMES HARRIS, Esq.

"St. James's, 8th March 1771.

"His Majesty has been pleased to order the Juno frigate of thirty-two guns, the Hound sloop, and Florida store-ship, to be prepared to go to Port Egmont, in order to receive the possession from the Spanish commander there; and as I have spoken so fully to Prince Masserano on the manner of its being executed, it is needless for me to say any more to you upon it.

"I think it right to acquaint you, that the Spanish ambassador pressed me to have some hopes given him of our agreeing to a mutual abandoning of Falkland's Islands, to which I replied, that it was impossible for me to enter on that subject with him, as the restitution must precede every discourse relating to those islands.

"You will endeavour, on all occasions, to inculcate the absurdity of Spain having any apprehensions, from the state in which Port Egmont was before its capture, or the force now sent out, of his Majesty's intending to make use of it for the annoyance of their settlements in the South Sea, than which nothing can be farther from the King's inclination, who sincerely desires to preserve peace between the two nations."

The EARL of ROCHFORD to the LORDS of the ADMIRALTY.

"St. James's, 15th March 1771.

"Your lordships having acquainted me that, in consequence of his Majesty's pleasure, signified in my letter of 22d last, you had ordered the Juno frigate, the Hound sloop, and Florida store-ship, to be prepared to proceed to Falkland's Islands, I am commanded to signify to your lordships his Majesty's pleasure, that you order the commander of the said frigate, as soon as those ships are ready for sea, to repair directly with them to Port Egmont, and presenting to Don Felipe Ruiz Puente, or any other Spanish officer he finds there, the duplicates of his Catholic Majesty's orders sent herewith, to receive, in proper form, the restitution of possession, and of the artillery, stores, and effects, agreeably to the said orders, and to the inventories signed by the Captains Farmer and Maltby (copies of which are annexed), and that you direct him to take an exact account of any deficiency which there may be of the things mentioned in the said inventories, in order that the same may be made good by his Catholic Majesty; giving a copy of the said account, signed by himself, to the Spanish officer, and desiring an acknowledgment under his hand of the same being a true account.

"After the said restitution shall have been completed, it is the King's pleasure that Captain Stott should return immediately to England with the Juno frigate and the Florida store-ship, unless he find it necessary to leave the latter behind; and that the Hound sloop should remain stationed in the harbour till his Majesty's further orders.

"Your lordships will direct Captain Stott to behave with the greatest prudence and civility towards the Spanish commander and the subjects of his Catholic Majesty, carefully avoiding any thing that might give occasion to disputes or animosity, and strictly

restraining the crews of the ships under his command in this respect; but if, at or after the restitution to be made, the Spanish commander should make any protest against his Majesty's right to Port Egmont, or Falkland's Islands, it is his Majesty's pleasure that the commander of his ships should answer the same by a counter-protest, in proper terms, of his Majesty's right to the whole of the said islands, and against the right of his Catholic Majesty to any part of the same.

"In case, from any accident or otherwise, Captain Stott should not, on his arrival at Port Egmont, find any officer there on the part of the King of Spain, your lordships will direct him (supposing he should find it necessary to put any of his men on shore) to avoid setting up any marks of possession, or letting his Majesty's colours fly on shore, as it is for the King's honour that the possession should be formally restored by an officer of his Catholic Majesty; and for that reason it will be proper that the King's commanding officer should keep a good look-out, and, upon perceiving the approach of any vessel of his Catholic Majesty, should re-embark any of his men who may at that time be on shore, that the possession may be indisputably vacant.

"If it should happen that after the King's ships shall have remained as late as all October, no Spanish officer should yet appear, your lordships will direct Captain Stott, in such case, either to proceed himself, or send an officer to Soledad, to deliver his Catholic Majesty's orders to the Spanish commander there, taking care not to salute the fort as a Spanish garrison, and making a protest, in civil terms, against that settlement of his Catholic Majesty's subjects in an island belonging to his Majesty.

"If, within a reasonable time after the delivery of the said order to the Spanish commander, at Soledad, there still shall not arrive at Port Egmont any officer of his Catholic Majesty to make the restitution, it is the King's pleasure that the commanding officer of his ships should then draw up a protest of the inexecution of his Catholic Majesty's late declaration, and should take formal possession, in his Majesty's name; hoisting his Majesty's colours on shore; and that, leaving there the Hound sloop, and Florida store-ship (if the latter is necessary), and sending a duplicate of his protest to the Spanish officer at Soledad, he should proceed to England to lay before your lordships, for his Majesty's information, his report of the manner in which he has executed his commission.

"Your lordships will take care that a sufficient quantity of provisions and necessaries of all kinds may be sent out in the said three vessels; and will, at a convenient distance of time, despatch another store-ship for a further supply.

"P.S. I also enclose to your Lordships the copy of his Catholic Majesty's order to Don Felipe Ruiz Puente, with its translation."

ORDER of the KING of SPAIN.

(Translation.)

"It being agreed between the King and his Britannic Majesty, by a Convention signed in London on the 22d of January last past, by the Prince of Masserano and the Earl of Rochford, that the Great Malouine, called by the English Falkland, should be immediately replaced in the precise situation in which it was before it was evacuated by them on the 10th June last year; I signify to you, by the King's order, that, as soon as the person commissioned by the Court of London, shall present himself to you with this, you order the delivery of the Port de la Cruzada or Egmont, and its fort and dependencies, to be effected, as also of all the artillery, ammunition and effects, that were found there, belonging to his Britannic Majesty and his subjects, according to the inventories signed by George Farmer and William Maltby, Esqs., on the 11th July of the said year, at the time of their quitting the same, of which I send you the enclosed copies, authenticated under my hand; and that, as soon as the one and the other shall be effected with the due formalities, you cause to retire immediately the officer and other subjects of the King which may be there. God preserve you many years. Pardo, 7th February 1771.

"The BALIO FRAY, DON JULIAN DE ARRIAGA.

"To Don Felipe Ruiz Puente."

CAPTAIN STOTT to the ADMIRALTY.

"Juno, Plymouth, 9th December 1771.

"I must beg leave to refer their lordships to the letter I had the honour of writing you from Rio de Janeiro, the 30th of July last, for the occurrences of my voyage to that time; from whence I sailed, with his Majesty's ships under my command, the next day, and arrived at Port Egmont the evening of the 13th of September following. The next morning, seeing Spanish colours flying, and

troops on shore, at the settlement formerly held by the English, I sent a lieutenant to know if any officer was there on behalf of his Catholic Majesty, empowered to make restitution of possession to me, agreeably to the orders of his Court for that purpose, duplicates of which I had to deliver him: I was answered, that the commanding officer, Don Francisco de Orduna, a lieutenant of the royal artillery of Spain, was furnished with full powers, and ready to effect the restitution. He soon after came on board the Juno to me, when I delivered him his Catholic Majesty's orders. We then examined into the situation of the settlement and stores, adjusted the form of the restitution and reception of the possession—instruments for which were settled, executed, and reciprocally delivered (that which I received from the Spanish officer, and a copy of what I gave him, are here enclosed). On Monday, the 16th of September, I landed, followed by a party of marines, and was received by the Spanish officer, who formally restored me the possession; on which I caused his Majesty's colours to be hoisted and the marines to fire three volleys, and the Juno five guns, and was congratulated, as were the officers with me, by the Spanish officer, with great cordiality on the occasion. The next day Don Francisco, with all the troops and subjects of the King of Spain, departed in a schooner which they had with them. I have only to add, that this transaction was effected with the greatest appearance of good faith, without the least claim or reserve being made by the Spanish officer in behalf of his Court."

LORD GRANTHAM to the EARL of ROCHFORD.

"Madrid, 2d January 1772.

"I have received the honour of your lordship's despatch, containing the agreeable intelligence of the restitution of Port Egmont and its dependencies, with the due formalities. On receiving this notice I waited on the Marquis de Grimaldi, to assure him of his Majesty's satisfaction at the good faith and punctuality observed in this transaction. M. de Grimaldi seemed aware of the intention of my visit, and was almost beforehand with me in communicating notice of this event's being known in England. He seemed well pleased at the conclusion of this affair, but entered no further into conversation upon it."

The LORDS of the ADMIRALTY to the EARL of ROCHFORD.

"Admiralty Office, 15th February 1772.

"Having received by the Florida store-ship, lately arrived at Spithead, a letter from Captain Burr, of his Majesty's sloop the Hound, dated at Port Egmont, in Falkland's Islands, the 10th of November last, giving an account that, in the preceding month, two Spanish vessels had arrived there with the artillery, provisions, and stores, which had been taken from thence by the Spaniards, and that he had received the same from a commissary appointed by Don Philip Ruiz Puente, to deliver them up to him; we send your lordship herewith a copy of Captain Burr's said letter, together with a copy of the inventory of the artillery, provisions, and stores, which he had received as aforesaid, for his Majesty's information."

The EARL of ROCHFORD to LORD GRANTHAM.

"St. James's, 6th March 1772.

"It may be of use to inform your Excellency, that his Majesty has determined to reduce the force employed at Falkland's Island to a small sloop with about fifty men, and twenty-five marines on shore, which will answer the end of keeping the possession: and, at the same time, ought to make the court of Spain very easy as to our having any intention of making it a settlement of annoyance to them."

The EARL of ROCHFORD to LORD GRANTHAM.

"St. James's, February 11th, 1774.

"I think it proper to acquaint your Excellency that Lord North, in a speech some days ago in the House of Commons, on the subject of the Naval Establishment for this year, mentioned the intention of reducing the naval forces in the East Indies, as a material object of diminishing the number of seamen; and at the same time hinted, as a matter of small consequence, that, in order to avoid the expense of keeping any seamen or marines at Falkland's Island, they would be brought away, after leaving there the proper marks or signals of possession, and of its belonging to the Crown of Great Britain. As this measure was publicly declared in Parliament, it will naturally be reported to the Court of Spain; and though there is no necessity of your Excellency's communicating this notice offi-

cially to the Spanish ministers, since it is only a private regulation with regard to our own convenience; yet, as I am inclined to think, from what passed formerly upon this subject, that they will rather be pleased at this event, your Excellency may, if they mention it to you, freely avow it, without entering into any other reasonings thereon. It must strike your Excellency that this is likely to discourage them from suspecting designs, which they must now plainly see never entered into our minds. I hope they will not suspect, or suffer themselves to be made believe, that this was done at the request, or to gratify the most distant wish, of the French court; for the truth is, that it is neither more nor less than a small part of an economical naval regulation."

M. Moreno will perceive that the above authentic papers, which have been faithfully extracted from the Volumes of Correspondence with Spain, deposited in the State Paper Office, contain no allusion whatever to any secret understanding between the two Governments, at the period of the restoration of Port Egmont and its dependencies to Great Britain, in 1771, nor to the evacuation of Falkland's Islands, in 1774, as having taken place for the purpose of fulfilling any such understanding. On the contrary, it will be evident to M. Moreno, that their contents afford conclusive inference that no such secret understanding could have existed.

The undersigned need scarcely assure M. Moreno, that the correspondence which has been referred to, does not contain the least particle of evidence in support of the contrary supposition, entertained by the Government of the United Provinces of the Rio de la Plata, nor any confirmation of the several particulars related in M. Moreno's note.

The undersigned trusts, that a perusal of these details will satisfy M. Moreno, that the protest which he has been directed to deliver to the undersigned, against the re-assumption of the sovereignty of the Falkland Islands by his Majesty, has been drawn up under an erroneous impression, as well of the understanding under which the declaration and counter-declaration relative to the restoration of Port Egmont and its dependencies were signed and exchanged between the two courts, as of the motives which led to the temporary relinquishment of those islands by the British Government; and the

undersigned cannot entertain a doubt but that, when the true circumstances of the case shall have been communicated to the knowledge of the government of the united provinces of the Rio de la Plata, that government will no longer call in question the right of sovereignty which has been exercised by his Majesty, as undoubtedly belonging to the Crown of Great Britain.

The undersigned requests, &c.

(Signed) PALMERSTON.

Foreign Office, January 8th, 1834.

No. 18.

By Robert Fitz-Roy, Commander of H. M. sloop "Beagle," off Watchman Cape, on the coast of Patagonia, 22d January 1834.

You are hereby required and directed to proceed in his Majesty's schooner, Adventure, under your command, to survey the Falkland Islands.

New Island appears to me an eligible place for beginning your operations.

Proceeding round the southern coasts, you will endeavour to meet me, in Berkeley Sound, early in March.

After meeting me, or after the twenty-fifth of March, you will proceed to the northern shores of the Falkland Islands, and into Falkland Sound.

If, after going round the islands, you have time enough to make particular plans of any of the best harbours, you will do better than I now anticipate.

All that I think time and weather will allow you to accomplish is a coast survey on a scale of one quarter of an inch to a mile of latitude.

You will time your departure from the Falklands, so as to meet me at the west end of Elizabeth Island, in the Strait of Magalhaens, on or before the first day of next June.

R. F.

To Lieut. J. C. WICKHAM,
commanding H. B. M. schooner "Adventure."

No. 19.

Winds, Weather, and Currents off Chilóe and the Chonos Archipelago.

So much has been stated by Captain King (vol. i.) respecting the weather at Chilóe; and also with regard to that of the Gulf of Peñas, and neighbouring coast, that I need make but few remarks.

There is much less difference between the climate; the prevailing winds, and the order in which they follow; the tides; and the currents on the outer coast of Chilóe, and at the west entrance of Magalhaens Strait, including the intermediate coasts, than persons would suppose who judge only by their geographical positions. North-westerly winds prevail, bringing clouds and rain in abundance. South-westers succeed them, and partially clear the sky with their fury; then the wind moderates, and hauls into the south-east quarter, where, after a short interval of fine weather, it dies away. Light airs spring up from the north-east, freshening as they veer round to north, and augment the store of moisture which they always bring; from the north they soon shift to the usual quarter, north-west, and between that point and south-west they shift and back sometimes for weeks before they take another round turn. When the wind backs (from south-west to west-north-west, &c.), bad weather and strong winds are sure to follow. On that coast wind never backs suddenly, but it shifts with the sun (with respect to that hemisphere) very suddenly, sometimes flying from north-west to south-west or south in a most violent squall. Before a shift of this kind there is almost always an opening, or light appearance, in the clouds towards the south-west, which the Spaniards call an eye (ojo), and for that signal the seaman ought to watch carefully. As the sudden shifts are always with the sun, no man ought to be taken aback unexpectedly; for so long as a north-wester is blowing with any strength, accompanied by rain, so long must he recollect that the wind may fly round to the south-west quarter at any minute. It never blows hard from east; rarely with any strength from north-east; but an occasional severe gale from south-east may be expected, especially about the middle of winter (June, July, August). In the summer southerly winds last longer and blow more frequently than they do in winter, and the reverse. The winds never go completely

round the circle; they die away as they approach east; and after an interval of calm, more or less in duration, spring up gradually between north-east by east and north. Heavy tempests sometimes blow, from west-north-west to south-west; and those winds blowing directly on shore are most to be guarded against. As to the tides, they are simple and uniform in the extreme. High water, at full and change, takes place within half an hour of noon, from Valdivia to Landfall Island; and the rise of tide is every where, on the outer coasts within those limits, nearly the same, namely, from four to eight feet. In the offing no stream of tide is any where discernible, and even close to the land it does not exceed one knot, or at most two knots an hour. On this extent of coast what little current is felt, sets southward, except during or before strong or lasting southerly winds: its influence is, however, but trifling, upon a ship out of soundings.* A heavy swell, from the westward, drives in upon all the coast. A barometer is invaluable.

No. 20.

El Presidente de la República de Chile, &c.

El Señor Roberto Fitz-Roy, comandante del buque de su Magestad Británica Beagle ha recibido de su Gobierno el encargo de reconocer estas Costas y levantar mapas de ellas; y el Gobierno de Chile desea franquear á una operacion de tan conocida utilidad para la navegacion y comercio, y para el adelantamiento de las ciencias, todas las facilidades y auxilios que de él dependan. En su consecuencia, ordeno á todos los Intendentes de Provincia, Gobernadores Departamentales, Jueces de Districto y demas empleados y Ciudadanos por cuyos territorios transitáre el Comandante Fitz-Roy que no solo se le ponga embarazo para que entre con su buque en todos los puertos, bahias y radas de la República que le pareciere conveniente á su empresa, saltando á tierra y ejecutando en ella los reconocimientos y operaciones que crea necesarias, sino que se le proporcione todo el favor de que pueda menester; haciendo y procurando se le haga la mas amistosa acojida por todos los funci-

* By the term out of soundings, I mean in deeper water than three hundred fathoms.

onarios y Ciudadanos con quienes entable relaciones; cual conviene á la importancia de los objetos cientificos de que está encargado, y à la amistad y buena harmonia que cultivamos con la Gran Bretaña. Sala de Gobierno, en Santiago, á cuatro de Agosto de mil ochocientos treinta y cuatro.

JOAQUIN PRIETO.

No. 21.

By ROBERT FITZ-ROY, Commander of his Majesty's surveying Sloop "Beagle."

You are hereby required and directed to proceed, with the boats and party placed under your orders, to examine and survey the eastern coast of the island of Chilóe, and the islands, channels, &c. near that coast.

You will endeavour to meet, or wait for the "Beagle," near the island of San Pedro, at the south-east end of Chilóe, on the 10th of December.

Given on board the "Beagle" at San Carlos de Chilóe, this 24th day of November 1834.

To Lieut. B. J. SULIVAN, R. F.
H. M. S. "Beagle."

By ROBERT FITZ-ROY, Commander of his Majesty's Surveying Sloop "Beagle."

You are hereby required and directed to proceed, with the boats and party placed under your orders, to continue the examination and survey of the eastern coasts of Chilóe, and the islands, channels, &c. lying between it and the main land.

You will endeavour to reach San Carlos on or before the 10th of January, and there await the arrival of the "Beagle."

Given on board the "Beagle" at the island of Chilóe, this 9th day of December 1834.

To Lieut. B. J. SULIVAN, R. F.
H. M. S. "Beagle."

No. 22,

By ROBERT FITZ-ROY, Commander of his Majesty's Surveying Sloop "Beagle."

You are hereby required and directed to proceed in the whale-boat to survey such parts of the western coasts of the Chonos Archipelago between Lemu Island and the northernmost island, as your very limited time and means will allow.

You will endeavour to reach Port Low, and there meet the Beagle, on or before the 31st of this month.

Given on board the "Beagle" in Vallenar Road, Chonos Archipelago, this 13th day of December 1834.

To Mr. JOHN LORT STOKES, R. F.
Mate and Assistant-Surveyor,
H.M.S. Beagle.

No. 24*.

EXTRACTS from Agüeros.

Francisco Machado, Piloto que fué á la expedicion que se acaba be hacer á la parte del Sud, en obedecimiento del Decreto del Señor Gobernador, y Comandante General de esta Provincia, su fecha 29 de Mayo de este presente año, y para su cumplimiento, segun instruye, dando principio desde la Isla de San Fernando, situada en la latitud 45g. 47m., dice: Que el Puerto que tiene esta Isla es pequeño, manso; pero con mal fondo en partes. La Isla de Inche, que demora al S. ¼ al S. E. de la aguja, no tiene Puerto, ni caleta alguna, bien que una embarcacion puede dar fondo á su abrigo por la parte del E. y esto á necesidad, y por poco tiempo.

Acia la Tierra Firme se hallan dos Puertos muy mansos, y seguros:† el que está mas al S. es el estero de Diego Gallegos, que hace una ensenada ácia el S. y el estero que sigue al E. muy hondable. En la entrada de éste tiene una Isla que, aunque estrecha la boca, no por eso dexa de haber bastante fondo para qualquiera embarcacion. De la boca de este dicho estero, corriendo la Costa al Nd.

* No. 23 is placed after this.—R. F. † 46 grados. S.

como tres leguas, ó poco ménos, se halla el Puerto donde ancló el Pingue-Ana de la Esquadra de Anson: tiene varias Islitas á entrada: la mayor es la del S. donde dexa un canal de 10 brazas de agua.

Este Puerto se compone de una ensenada ácia el S. S. O. y un estero al S. E. por qualquiera parte de las Islitas que tiene en la boca se puede entrar: es buen Puerto, manso, y seguro para qualquier embarcacion. Desde la punta que avanza mas E. O. como una y media legua del estero de Diego Gallegos, que se ve desde San Fernando al S. corre la Costa al N d. haciendo como ensenada, y en ella está la dicha Isla de Inche, que es el principio del Archipiélago de los Chonos, entre la qual y la Tierra-Firme está otro de Farallones grandes, y pequeños. Los vientos que se experimentáron por tiempo de 17 dias por el mes de Enero fuéron S. O. y O. que es el que llaman Travesía, y regularmente viene con zerrazon.

La Tierra-Firme es de serranía alta, y pelada, de piedra áspera, color de ceniza, y en las faldas y quebradas bosque, que me parece nada cultivable: todo es península que cercan los dos mares: por la parte del N. termina en un golfito casi circular, que llaman la laguna de San Rafael, y por el S. da principio al golfo de San Estevan donde desemboca el rio de San Tadeo; de uno á otro mar habrá de 2 á 3 leguas, aunque lo navegable del rio pasa de 5, por las vueltas y revueltas, que son muchas. De la dicha laguna al embarcadero del mismo rio habrá como 20 quadras; y éste es el Istmo que llaman de Ofqui, y vulgarmente por otro nombre el Desecho. Este rio de San Tadeo baxa de una cordillera, cuya abra se ve muy cerca de la laguna, y desemboca, como he dicho, en el golfo de San Estevan, cuya boca es algo peligrosa porque tiene poco fondo, y estrecha tanto que solo se puede entrar ó salir quando el mar está tranquilo. Al frente de su boca al S. como 4 leguas está la Isla de San Xavier, y al S. O. de 2 ½ à 3 leguas una punta ó península donde hay varias ensenadas, y caletas que son buenos Puertos; y de estos N. O. un bello estero directo mas de 2 leguas, muy sereno, de suficiente fondo, y bueno; pero con un pequeño baxo que tiene en su entrada del medio al S.: se le puso el nombre de San Quintin.

De la expedicion que los Padres Fr. Benito Marin, y Fr. Julian Real, Misioneros del Colegio de Ocópa, y destinados á las Misiones

del Archipiélago de Chilóe, hiciéron á últimos del año de 1778, y principios del de 1779, á los Archipiélagos de Guaitécas, y Guaianeco, al Sud de aquella Provincia, en solicitud de los Indios Gentiles.

El 10 se hiciéron á la vela, y con viento favorable navegáron casi todo el golfo que media entre Chayamapu, y Tagau, y llegáron por la tarde al Puerto de Tualad.

Surgiéron de éste al amanecer, (11) no obstante que el N. estaba considerablemente fresco, y que les ponia en cuidado, porque permaneciendo anclados conocian mayor riesgo; y lográron en pocas horas anclar en Charraguel, aunque habian ántes arribado á Tagau para comer; y para seguir desde éste el rumbo para el otro dexáron el canal que se dirige á la laguna de San Rafael, y tomáron el de Aú, cuya boca tiene como un quarto de legua de ancho por el O. E. Tomáron este rumbo con el fin de reconocer si habia otra salida mas fácil para el mar de Guaianeco: y diéron fondo en Yepusnec, en donde por la noche estuviéron en manifiesto peligro, porque sentándose la piragua grande sobre una piedra luego que la vaciante tomó su curso, se bolcó por un costado; pero mediante el favor de Dios, y patrocinio de María Santisima, cuyo nombre tenia la embarcacion, y poniendo por su parte las diligencias que en tan arriesgado caso eran necesarias, consiguiéron salir libres en todo, y sin daño alguno en la piragua.

Enderezada ésta, y viéndola ya voyante saliéron de aquel Puerto, y fuéron á comer á otro llamado el Obscuro. (12) Surgiéron luego, y continuáron la navegacion por el mismo canal, dexando al E. otros dos pequeños con rumbo al S. y llegáron á hacer noche en Tucúa: y porque entráron en el canal la víspera de San Diego, y navegáron por él todo el dia de este glorioso Santa, le tituláron con su nombre.

El siguiente dia no pudiéron salir por la mañana por lo mucho que llovió, pero aprovecháron la tarde saliendo para otro sitio, que halláron muy incómodo por la fuerza de la corriente que en êl experimentáron llevaban las aguas.

De éste surgiéron á la mañana siguiente (14) con el fin de entrar por la primera boca de los dos referidos canales; y habiendo navegado hora y media con este designio, no pudiéron romper contra la fuerza de las corrientes que halláron, viendose obligados á arribar: á pocas horas se volviéron á levar, y navegáron por la primera boca; pero encontrándose despues con otra, que tampoco les fué posible

romper contra su corriente impetuosa, y arribáron á una ensenada para esperar proporcion favorable. Por la tarde fuéron algunos marineros, y un práctico con el Padre Fr. Benito á reconocer la boca que esperaban pasar; y regresáron asombrados de haber visto lo encrespado, y entumecido de las olas por el encuentro de unas con otras, todo lo que les causó considerable horror, y llenó su corazon de temor al considerar les era forzoso haber el pasar por tan manifiesto peligro.

Luego que dixéron Misa, (15) y estando el mar en creciente, saliéron de la ensenada, y no obstante el sobresalto que todos llevaban lográron pasar con felicidad la boca: continuáron navegando, y diéron fondo ántes de medio dia. Experimentáron allí el lleno de las aguas entre una y dos de la tarde, siendo en el mar á las nueve.

Prosiguiéron su viage, y viéron el fin de un grande estero. (16) Regresáron, y aunque al O. E. encontráron otro canal no entráron á reconocerle por no perder tiempo, y poder llegar adonde estuviesen asegurados para desembocar por la arriesgada boca referida.

Este dia entre dos y tres de la tarde consiguiéron pasarla felizmente, y fuéron á anclar en un pequeño canal que se dirige al Desecho. (17)

Prosiguiéron la navegacion, y halláron el canal principal que va al Desecho, nombrado Celtau, y llegáron á hacer noche en el Puerto Mosado. (18)

Saliéron de éste, y ántes que principiase la vaciante ganáron la boca de Celtau, lo que no hubieran conseguido con corta detencion que hubiesen tenido, como sucedió á una de las piraguas pequeñas, que se quedó fuera por su demora.

Al siguiente dia navegáron un pequeño golfo que se encuentra ántes de la boca de la laguna de San Rafael, y tomando Puerto ancláron en el, y permaneciéron toda la mañana del otro dia, esperando terminase la vaciante, no obstante haber viento N. claro, y favorable. (21)

Continuáron su derrota, y desembocáron en dicha laguna, la que rebalsáron con tiempo apacible, y tambien lo era su vista por los muchos farallones de nieve que en ella halláron, unos grandes, otros pequeños, y medianos otros. Está situada entre los 46 gr. 55 min. y 47 gr. 5 min. de latitud. Diéron fondo á las nueve de la mañana en el Puerto de San Rafael, el que solamente está resguardado por el S. y O. E. Pasáron luego los prácticos, y el Piloto Oyarsum á reconocer el Desecho, y regresáron con las funestas noticias de que

el palo donde se enganchaba, y afianzaba el aparejo para subir las piraguas se habia ya caido, y que el rio San Tadeo habia rebentado, y formado varios brazos, y diversos rumbos.

Este dia fuéron los Pilotos, (23) con lo mas de la tripulacion, ésta con herramientas para abrir el camino, y aquellos para reconocer, é informarse si era ó no transitable dicho rio: y juzgándose conveniente que todo esto lo presenciase uno de los Religiosos, fué el Padre Fr. Benito con los referidos al reconocimiento. Hecho éste se resolvió continuar el viage. Despues de puesto el sol amenazó el tiempo de borrasca, la que se verificó, y llegó á tanto, que pasáron la noche con mucha afliccion y temores, sin poder descansar en toda ella. Resultó de esta tormenta, que de las dos piraguas pequeñas, la una perdió el codaste, y la otra quedó tan maltratada, que solo su plan y una falca quedáron servibles. Continuó el tiempo en esta disposicion hasta el dia 28.

En este, aunque ayudó poco, pasáron hasta el principio del Desecho, y luego diéron disposicion, y probáron á subir la piragua entera; pero habiendo conseguido llegase su proa á lo último de la escalera, faltó el puño de la garita, y descendió precipitada al principio, pero sin daño alguno.

Este dia, (29) aunque festivo por Domingo, considerando por suficiente y justa causa la notable necesidad en que se hallaban, le empleáron en trabajar, y prevenir lo necesario para subir la piragua: y al siguiente despues de la Misa se principió la maniobra; pero aun con las muchas y eficaces diligencias que hiciéron no pudiéron conseguir el fin que deseaban, y resolviéron quitar las falcas á la piragua, con lo que lográron su deseo, y la subiéron hasta lo mas penoso.

Conseguido esto empleáron este dia (Dic^{e}. 1°.) en que algunos de la tripulacion fuesen á trabajar para levantar nueva piragua, y otros á conducir las cargas: y el dia 2 despacháron la piragua Santa Teresa á la Ciudad de Castro para que diese noticia de quanto hasta este dia les habia acaecido.

El 3 pasáron á pie el Desecho, y baxáron al rancho que ya estaba prevenido en la playa del rio de San Tadeo. Permaneciéron allí hasta que se aprestáron con todo lo necesario las dos piraguas. El dia 17 continuáron el viage navegando rio abaxo. Padeciéron algunos peligros y aflicciones por haberse quebrado las piraguas, y con especialidad la San Joseph; pero pudiéron llegar á la boca, ó desembocadero del rio San Tadeo en el golfo de San Estevan, y tomar Puerto en un estero estrecho y largo.

(A la vuelta.)

Al siguiente dia* emprendiéron la subida por el rio, y logrando la creciente favorable hiciéron buen viage; y el 16 llegáron á comer al Desecho, en donde dentro de un rancho halláron una carta del P. Fr. Francisco Menendez, por la que viéron les esperaba en la laguna de San Rafael: gozosos con tan plausible noticia pasáron por la tarde el Desecho, y encontráron á dicho Religioso en la escalera.

Los dos siguientes dias permaneciéron allí, empleando la tripulacion en conducir á la laguna lo que venia en las piraguas (las que dexáron en piezas en el rancho del embarcadero del rio) y pusiéron boyante la piragua del Patrocinio.

El dia 19 saliéron despues de comer, y navegando á remo toda la tarde llegáron al anochecer á tomar Puerto; pero ántes de dar fondo se asentó la piragua, y pasáron en ella la noche, hasta que con la creciente á la madrugada pudiéron lograr que boyase; y no obstante que habia N. se aprovecháron de la vaciante, y pasáron la segunda boca. Refrescó el viento, y continuáron navegando el golfo atracados al E., y fuéron á comer en el Puerto llamado Chauguaguen, y de allí se leváron, y siguiéron por el E. hasta cerca de la boca de Celtau, donde pasáron la noche. (20)

Segunda Expedicion.

Hecha á los referidos Archipiélagos de Guaitécas, y Guaianeco, por los Religiosos Misioneros P. Fr. Francisco Menendez, y P. Fr. Ignacio Bargas, en solicitud de la reduccion de los Gentiles, á fines del año de 1779, y principios del de 1780.

Primeramente, nuestro viage hasta la laguna† (es la de San Rafael) fué feliz, sin otra novedad que algunos sustos á la salida del golfo: llegamos el dia de los Difuntos despues de haber dicho los dos Misa en Vicuñamo al Desecho.‡ Descargóse en la escalera el mismo dia, y por la tarde se sacó la piragua el Patrocinio hasta media quilla del agua: y al otro dia de mañana se aseguró del todo, y por la tarde la otra. Intentamos hacer otra piragua mas, y por haber caido enfermos cinco marineros no se concluyó; quedó hecho el plan, y costados. El Viérnes siguiente (5) comenzáron los temporales, y continuáron con algunas nevadas, hasta que se hallaba el bastimento en el embarcadero del rio, y las piraguas ya levantadas, que fué á los 24 dias de nuestra llegada.

* Feb°. 15, 1779. † Oct°. 11, 1779. ‡ Nov°. 2.

Parecía que el tiempo se oponia todo á la expedicion. Para botar las piraguas se secó el rio, y comenzó el S.; todo nos iba en contra; pero su Divina Magestad permitió que con buen tiempo creciese el rio, y á los 26 dias, el de San Jacome de la Marca, y primera Dominica de Adviento, baxamos el rio, y fuí á decir Misa á la boca del rio San Tadeo. (Nov°. 28.)

* * * * * *

Uno de los Gentiles nos dixo habia visto por aquellos parages Huampus mas grandes, que andaba la gente por las bergas, y falcas mayores que las nuestras: todas noticias deseadas; pero no lo quieren averiguar.

Nuestro Señor guarde á V. R. muchos años, Castro y Marzo 14 de 1780.

* * * * * *

Huampus es nombre propio del idioma Veliche, y significa qualquiera embarcacion; y en esté dicho dió á entender aquel Gentil á los Religiosos que en aquella altura habia visto navíos, como claramente se infiere de expresar que la gente andaba por las bergas.

No. 23.

Extract from Burney's History of the Discoveries in the South Sea. Vol. iv. p. 118, &c.

Oct. 11th, 1681, they* were in latitude 49° 54′ S., and estimated their distance from the American coast to be 120 leagues. The wind blew strong from the S.W. and they stood to the S.E. On the morning of the 12th, two hours before day, being in latitude by account 50° 50′ S., they suddenly found themselves close to land. The ship was ill prepared for such an event, the fore-yard having been lowered to ease her, on account of the strength of the wind. "The land was high and towering; and here appeared many islands scattered up and down." They were so near and so entangled, that there was no possibility of standing off to sea; and, with such light as they had, they steered as cautiously as they could in between some islands and along an extensive coast, which, whether it was a larger island, or part of the continent, they could not know. As the day advanced, the land was seen to be mountainous and craggy, and the tops covered with snow.

* The buccaneers under Sharp.

Sharp says, "we bore up for a harbour, and steered in northward about five leagues. On the north side there are plenty of harbours." "At eleven in the forenoon they came to an anchor in a harbour in forty-five fathoms, within a stone's cast of the shore, where the ship was land-locked and in smooth water. As the ship went in, one of the crew, named Henry Shergall, fell overboard as he was going into the spritsail top, and was drowned; on which account this was named Shergall's Harbour."

The bottom was rocky where the ship had anchored; a boat was therefore sent to look for better anchorage. They did not, however, shift their berth that day; and during the night, strong flurries of wind from the hills, joined with the sharpness of the rocks at the bottom, cut their cable in two, and they were obliged to set sail. They ran about a mile to another bay, where they let go another anchor, and moored the ship with a fastening to a tree on shore.

They shot geese, and other wild-fowl. On the shores they found large muscles, cockles like those in England, and limpets: here were also penguins,* which were shy, and not taken without pursuit; "they paddled on the water with their wings very fast, but their bodies were too heavy to be carried by the said wings." The first part of the time they lay in this harbour, they had almost continual rain.

On the night of the 15th, in a high north wind, the tree to which their cable was fastened gave way, and came up by the root, in consequence of which, the stern of the ship took the ground and damaged the rudder. They secured the ship afresh by fastening the cable to other trees; but were obliged to unhang the rudder to repair.

The 18th was a day of clear weather. The latitude was observed 50° 40′ S. The difference of the rise and fall of the tide was seven feet perpendicular: the time of high-water is not noted. The arm of the sea, or gulf, in which they were, they named the English Gulf; and the land forming the harbour, the Duke of York's Island; "more by guess than any thing else; for whether it were an island or continent was not discovered."

Ringrose says, "I am persuaded that the place where we now are, is not so great an island as some hydrographers do lay it down; but rather an archipelago of smaller islands. Our captain gave to them the name of the Duke of York's Islands. Our boat which went eastward found several good bays and harbours, with deep water close to the shore; but there lay in them several sunken rocks, as there did

* Steamer ducks. Penguins swim like fish.—R. F.

also in the harbour where the ship lay. These rocks are less dangerous to shipping, by reason they have weeds lying about them."

From all the preceding description, it appears that they were at the south part of the island named Madre de Dios in the Spanish atlas; which island is south of the channel, or arm of the sea, named the Gulf de la S^ma^ Trinidada; and that Sharp's English Gulf is the Brazo de la Conçepçion of Sarmiento.

Ringrose has drawn a sketch of the Duke of York's Islands, and one of the English Gulf; but which are not worth copying, as they have neither compass, meridian line, scale, nor soundings. He has given other plans in the same defective manner, on which account they can be of little use. It is necessary, however, to remark a difference in the plan which has been printed of the English Gulf, from the plan in the manuscript. In the printed copy, the shore of the gulf is drawn in one continued line, admitting no thoroughfare; whereas, in the manuscript plan, there are clear openings, leaving a prospect of channels through.

Towards the end of October, the weather settled fair. Hitherto they had seen no inhabitants; but on the 27th, a party went from the ship in a boat on an excursion in search of provisions, and unhappily caught sight of a small boat belonging to the natives of the land. The ship's boat rowed in pursuit, and the natives, a man, a woman, and a boy, finding their boat would be overtaken, all leaped overboard and swam towards the shore. This villanious crew of buccaneers had the barbarity to shoot at them in the water, and they shot the man dead; the woman made her escape to land; the boy, a stout lad about eighteen years of age, was taken, and with the Indian boat, was carried to the ship.

The poor lad thus made prisoner had only a small covering of seal skin. "He was squint-eyed, and his hair was cut short. The doree, or boat, in which he and the other Indians were, was built sharp at each end and flat bottomed: in the middle they had a fire burning for dressing victuals, or other use. They had a net to catch penguins, a club like our bandies, and wooden darts. This young Indian appeared by his actions to be very innocent and foolish. He could open large muscles with his fingers, which our buccaneers could scarcely manage with their knives. He was very wild, and would eat raw flesh."

By the beginning of November the rudder was repaired and hung. Ringrose says, "we could perceive, now the stormy weather was

blown over, much small fry of fish about the ship, whereof before we saw none. The weather began to be warm, or rather hot; and the birds, as thrushes and blackbirds, to sing as sweetly as those in England."

On the 5th of November, they sailed out of the English Gulf, taking with them their young Indian prisoner, to whom they gave the name of Orson. As they departed, the natives on some of the lands to the eastward made great fires. At six in the evening the ship was without the mouth of the gulf: the wind blew fresh from the N.W., and they stood out S.W. by W., to keep clear of breakers, which lie four leagues without the entrance of the gulf to the S. and S.S.E. Many reefs and rocks were seen hereabouts, on account of which they kept close to the wind till they were a good distance clear of the land. Their navigation from here to the Atlantic was, more than could have been imagined, like the journey of travellers by night in a strange country without a guide. The weather was stormy, and they would not venture to steer in for the Strait of Magalhaens, which they had purposed to do, for the benefit of the provision which the shores of the strait afford, of fresh water, fish, vegetables, and wood. They ran to the S. to go round to the Tierra del Fuego, having the wind from the N.W., which was the most favourable for this navigation; but they frequently lay to, because the weather was thick.

On the 12th, they had not passed the Tierra del Fuego. The latitude, according to observation that day, was 55° 25′, and the course they steered was S.S.E.

On the 14th, Ringrose says, "the latitude was observed 57° 50′ S., and on this day we could perceive land, from which at noon we were due W." They steered S. by E., and expected that at daylight the next morning they should be close in with the land; but the weather became cloudy, with much fall of snow, and nothing more of it was seen. No longitude or meridian distance is noticed, and it must remain doubtful whether what they took for land was floating ice; or their observation for the latitude erroneous, and that they saw the Isles of Diego Ramirez?

Three days afterwards, in latitude 58° 30′ S., they fell in with ice islands, one of which they reckoned to be two leagues in circumference. A strong current set here southward. They held on their course eastward so far, that when at last they did sail northward, they saw neither the Tierra del Fuego nor Staten Island. (End of November 1681.)

No. 24 (a).

EXTRACT from the Voyage of Lionel Wafer in 1686, describing the Island of Santa Maria, under the mistaken name of Mocha.

"The island afforded both water and fresh provision for our men. The land is very low and flat, and upon the sea coast sandy; but the middle ground is good mould, and produces maize, wheat, and barley, with variety of fruits, &c. Here were several houses belonging to the Spanish Indians, which were very well stored with dunghill fowl. They have here also several horses: but that which is most worthy of note, is a sort of sheep they have, which the inhabitants call 'carnero de tierra.' This creature is about four feet and a half high at the back, and a very stately beast. These sheep are so tame that we frequently used to bridle one of them, upon whose back two of the lustiest men would ride at once round the island, to drive the rest to the fold. His ordinary pace is either an amble or a good hand-gallop; nor does he care for going any other pace during the time his rider is upon his back. His mouth is like that of a hare; and the hare-lip above opens as well as the main-lips, when he bites the grass, which he does very near. His head is much like an antelope, but they had no horns when we were there; yet we found very large horns much twisted, in the form of a snail-shell, which we suppose they had shed; there lay many of them scattered upon the sandy bays. His ears resemble those of an ass, his neck is small, and resembling a camel's. He carries his head bending and very stately, like a swan; is full-chested, like a horse, and has his loins much like a well-shaped grey-hound. His buttocks resemble those of a full-grown deer, and he has much such a tail. He is cloven-footed, like a sheep, but on the inside of each foot has a large claw, bigger than one's finger, but sharp, and resembling those of an eagle. These claws stand about two inches above the division of the hoof; and they serve him in climbing rocks, holding fast by whatever they bear against. His flesh eats as like mutton as can be: he bears wool twelve or fourteen inches long upon the belly; but it is shorter on the back, shaggy, and a little inclining to curl. It is an innocent and very serviceable beast, fit for any drudgery. Of these we killed forty-three; out of the maw of one of which I took thirteen bezoar stones, of which some were ragged, and of several forms; some long, resembling coral; some

round, and some oval, but all green when taken out of the maw; yet by long keeping they turned of an ash colour."

No. 25.

By ROBERT FITZROY, Captain of H.M. Surveying Sloop Beagle.

You are hereby required and directed to take charge and command of the schooner Constitucion, and the party placed by me under your orders.

Directly the vessel is ready for sea, you will proceed to survey those parts of the coast of Chile which lie between the parallels of thirty-one and thirty-five: and on or before the 31st of July, you will endeavour to meet me in Callao Roads.

MEMORANDA:

At this time of year, unfavourable foggy weather may be expected to impede your progress very materially; but successful, or the contrary, you must endeavour to be punctual at your rendezvous.

At many places the landing will be bad. Do not on any account land then in a boat. Go near only in a boat; land on a balsa.

On so straight a coast, subject to a continuance of cloudy weather, views of the land may be particularly useful. Mr. King is added to your party, because he draws such views very correctly.

Do not delay in attempting to get deep-sea soundings, when not hove-to for other purposes.

Be very particular in noticing characteristic appearances of the land about anchorages; and such peculiarities of marks, or otherwise, as may help to guide a stranger.

Notice where and how wood and water are to be procured.

Let Mr. King keep a journal for you, to be given afterwards to me. No log will be required by me; but let that journal contain every note which you consider likely to be useful.

I shall be anxious to send away a tracing of your work, as soon as possible after your arrival at Callao.

Remember that Paposo is the northernmost inhabited place over which the government of Chile has authority. In approaching vessels or places on the coast of Peru, be particularly on your guard.

Inquire about the earthquake and waves of the 20th of February.

At each place make the chief Authority acquainted with your busi-

ness, and the accompanying letter from the government of Chile, as soon as possible.

H.M. sloop Beagle, in Port Herradura, Coquimbo,
6th day of June 1835.

To Lieutenant B. J. SULIVAN, R. F.
H.M.S. Beagle.

No. 26.

By ROBERT FITZROY, Captain of His Majesty's Surveying Sloop Beagle.

You are hereby required and directed to take charge and command of his Majesty's surveying sloop Beagle, until I rejoin you at Callao.

You will conform your conduct, in all respects, to the instructions sent to me for my guidance by the Lords Commissioners of the Admiralty.

You will sail from Valparaiso on the 28th of this month, or as soon after as possible, and proceed direct to Copiapo.

Thence you will proceed to Callao, calling at Iquique, if circumstances are favourable ; and at Callao you will await my arrival.

H.M. sloop Beagle, in Valparaiso Bay,
18th of June 1835. R. F.

To Lieut. J. C. WICKHAM,
H.M.S. Beagle.

N.B. Remember that Peru is in a state of anarchy.

No. 27.

JOURNAL of the Proceedings on board the hired schooner, Carmen, in search of the crew of his Majesty's late ship Challenger.

June 22d, 1835.—H.M.S. Blonde's boats getting the schooner Carmen ready for sea; at thirty minutes past eight, P.M. went on board the schooner with the Beagle's whale-boat and surveying instruments.

Tuesday, 23d. Blowing a strong gale from the northward all day, with very heavy rain; a great deal of surf on the beach, made it impossible to land; therefore nothing was done to forward the schooner's sailing.

Wednesday, 24th. More moderate, but very unsettled weather; Blonde's boats preparing schooner for sea; at four, weighed and ran

under the commodore's stern. Asked the commodore for some ballast, a few muskets, and a little powder; was refused. Thirty minutes past four, received final orders; made all sail, with the wind fresh from the southward, and ran through the small passage.

On board the Carmen were:

Mr. Wm. Thayer, master of the vessel.

George Biddlecombe, 2d master of	H.M.S.	Blonde.
Alex. B. Usborne, 2d assist. surveyor,	,,	Beagle.
James Bennett, gunner's mate,	,,	Beagle.
John Nutcher, boatswain's mate,	,,	Blonde.
John MacIntosh, A.B.	,,	Blonde.
John Mitchell, A.B.	,,	Blonde.

and ten men hired at Talcahuano, who were of very little, indeed almost no use as seamen.

At about ten, P.M. the wind died away to nearly a calm, which continued throughout the night.

Thursday, 25th. Daylight. Saw the Paps of Bio Bio E.S.E. by compass, nine miles distant; light, variable airs from the northward throughout the day. Sun-set: north end of St. Mary S.b.W. six miles, calm all night.

Friday, 26th. Daylight. North end of St. Mary S.E. five miles; light winds from the northward, until four, P.M., when the wind freshened from north-north-west, with heavy squalls of wind and rain; sun-set, Carnero Head, E. distant five miles. At thirty minutes past six, observed a fire on Tucapel Head, bearing south-east; burnt a blue light, supposing it might be part of the Challenger's crew on their road to Concepcion; but finding no alteration in the size of the fire, and it not corresponding with the signal agreed on, continued our course towards the supposed place of the Lebu, or Leübu.

Saturday, 27th. Strong winds from the northward, and squally weather, with heavy rain; stood off and under foresail until two, P.M., when the weather cleared a little; made all possible sail, and stood in for the point on which the Challenger was lost. At three, Molguilla Point E. two miles and a half distant, saw nothing of the wreck; bore up, and stood along the land toward the southward, from one to two miles off shore, in search of the river Lebu. At five, P.M., having run ten miles south of Point Molguilla, and five miles south of the supposed place of the Lebu, and not seeing any thing of the wreck or crew of the Challenger, hauled off, and hove-to; at

this time any people on the shore could have seen the vessel five miles north or south of her, she not being more than a mile and a half from the beach, and having a large blue ensign at the fore-top-gallant-mast-head.

At six, fired a rocket, as a signal to the shore; no answer of any description being made, filled and stood off and on, to keep our position during the night; fresh winds and squally, with heavy rain.

Sunday, 28th. Strong winds from north-west, and squally weather, with heavy rain; shortened sail to foresail, and headed to the westward; thirty minutes past ten, saw the island of Mocha south, distant eight miles, sounded in fifteen fathoms; wore to north-east, and carried all possible sail to get out of the bight; fresh gales and squally, with a heavy cross sea.

Monday, 29th. More moderate, but wind still from the northward. At nine A.M. spoke the Blonde, on her way to the supposed place of the Lebu; kept our wind, endeavouring to fetch Tucapel Head, where we had seen the fire three days before; noon, Tucapel Point east-north-east, three-quarters of a mile distant; observed two fires on Tucapel Head; tacked to the westward, to fetch the Head.

At thirty minutes past two, Tucapel Point east-north-east, nine miles; while four men were aloft (James Bennett, gunner's mate, Beagle; John Nutcher, boatswain's-mate; John MacIntosh, A.B.; John Mitchell, A.B., of Blonde), bending the fore-topsail, which had been split the previous night, the vessel gave a very heavy pitch, which sprung the foremast, a little below the cross-trees; and on her recovering herself, the head of the mast snapped short off, a foot below the fore-yard, bringing with it all above, and also the four seamen who were aloft; the mainmast, having no support left from the tryatic stay, and the deck-stay being aft, ready for tacking, the great weight of the main-boom, added to the pressure of the wind on the mainsail, brought the mainmast by the board, fore-and-aft the deck, striking the taffrail in its fall, which again carried it away, leaving the head of the mast hanging by the rigging over the stern, striking heavily against the rudder and the middle-piece in midships on the deck. Fortunately, none of the seamen were seriously injured, as they resolutely kept their hold of the topsail-yard, and were carried with it into the sea, out of which they soon escaped by means of the rigging that was hanging over the side.

Every effort was immediately used to clear the wreck, and get

the temporary rigging up, to secure the stump of the foremast which had carried away the wedges in the partners, and had about three inches play in the step, from the heel of the mast being decayed; nearly the whole of the standing rigging was lost, from night coming on, and it being necessary to get the wreck clear of the vessel as soon as possible, lest it should carry away the rudder, and otherwise damage the hull of the vessel.

Not having an axe, or any thing but a cooper's drawing-knife, that would cut the rigging in the eyes, which had hide on them that had been placed there several years before, we were obliged to haul it up taut and cut on the rail, thereby rendering it useless for any thing but junk.

There were scarcely any nails on board the vessel; and it was with the greatest difficulty we succeeded, by shifting two cleats up a slippery mast, in getting a tackle each side for shrouds, and a hawser for a stay. At eight, P.M., observed the Blonde north-west one mile; fired a rocket, and burnt three blue lights; no answer returned.

At about midnight we set the jib, peak of foresail, and Beagle's boat sail for a main-sail; during the whole of this time it was blowing fresh from the north-west, with heavy rain and a cross sea, which caused the vessel to roll her gunwale under each time; every one was quite exhausted, particularly those men who had been hanging on the mast, getting the tackles secured, the watch therefore was set until daylight.

Tuesday, 30th. Employed getting the foremast better secured, by raising sheers with fore-yard and jib-boom, and placing a pair of shrouds on each side, about twenty feet from the deck, and an extra stay to set a stay-sail on, the whole kept up by a few spikes *drawn out of the beams*. At ten, A.M. strong winds from the westward, with heavy rain; saw the north-west extreme of Mocha, bearing south-south-east, three miles distant; wore to the north-east, to give time to get more sail on the vessel, intending to weather the island, if possible; if not, to run to leeward, and then stretch off to the southward and westward. Noon; wore, strong winds and squally, with a heavy head sea; at two, set foresail, double-reefed; observed the north-west extreme of Mocha, south by east, one mile and a quarter distant. At three, P.M., when the north-west extreme bore north-east, the wind changed suddenly to south-west, bringing the rocks off the

south-west extreme of the island about four points on the lee-bow; but the wind increasing and giving the vessel more way, enabled her to pass about three-quarters of a mile to windward of the outer breaker, on which the sea was breaking furiously; the island itself was only visible at intervals, owing to the thickness of the weather, and constant, heavy rain.

At five, the weather being a little clearer, saw the island, its centre bearing north-east, four miles distant; stood to the southward during the night, fresh breezes from south-west throughout.

Wednesday, July 1st. Daylight, employed rigging the fore-yard as a jury main-mast; calm, with drizzling rain and a heavy swell; by noon got the jury main-mast up, and set fore stay-sail for a main-sail, secured the boat's mast to the taffrail, and set the sail for a mizen. At five, a light air from the southward, stood to the westward during the night (no stars visible).

Thursday, 2d. Strong winds from west-north-west; stood to the south-west; at thirty minutes past eight, observed a schooner west, standing to the northward; hoisted the ensign union down in the fore-rigging; but she passed within a mile to windward, and took no notice of us. Noon, weather the same; wore to north-west; thirty minutes past four, observed the land east-north-east, supposed Cocale Head; wore, and stood to the south-west; fresh breezes and squally, with rain at times; no stars visible throughout the night. Midnight, wore to the northward.

Friday, 3d. Moderate from the westward, with rain at times, employed setting up rigging and securing masts; latitude observed (within a few miles) 39° 23′ S.

Repaired the Beagle's boat, which had been badly stove by the fall of the masts, as well as our means would allow. Moderate from the westward, until two, A.M., when the wind shifted to the northward; wore to the westward.

Saturday, 4th. Moderate, with rain at times, wind north-west; employed as most necessary, fitting grummets for sweeps, in case of a calm, and being drifted near the land. Latitude observed nearly 38° 40′. S. P.M. Employed as before; at eight o'clock, wore to the northward; moderate throughout the night.

Sunday, 5th. Light winds from north-west, and fine clear weather; employed repairing sails, chafes, &c. Latitude observed, 38° 35′ S. At one, P.M., observed the island of Mocha, south extreme bearing

north-east about twenty miles; at five, the south extreme bore north fifty-six east, and by the angle to the north extreme eighteen miles distant. Light airs from north-west and fine weather; at nine, the wind shifted to south; trimmed and steered north by west; midnight, strong winds and fine.

Monday 6th. Strong breezes from south-south-east; at daylight, Tucapel Head north-north-east; hauled up for it; at ten, observed a vessel in shore; but suddenly lost her, and could not again get sight of her.* Noon, Carnero Head east (true), distant ten miles; found a strong current setting along shore to the southward, with at times a heavy ripple, until one, P.M., when it changed and set to the northward, and off-shore withal; at six, Dormido Rocks south-south-east, distant two miles; steered north-east by north for the Paps of Bio Bio; but found it necessary to haul up north-east, and latterly north-east half-east, owing to a strong current setting to the northward and westward; at thirty minutes past nine, Paps of Bio Bio south-south-east, distant three miles; and at two, A.M. (Tuesday, 7th), the north point of Quiriquina bore south one cable distant; stood into the bay, hoping to fetch 'Tomé,' there to anchor, until the wind came more favourable for Talcahuano; but the wind being scant, were obliged to wear (as the vessel would not stay), thereby losing more than she gained on each tack. At eleven, saw H.M.S. Blonde coming down to us; at one, we were taken in tow by the Blonde, and carried into Talcahuano Harbour, at the south-west corner of the bay of Concepcion; and at midnight we anchored.

A. B. USBORNE, July 7th, 1835.

No. 28.

WINDS AND WEATHER.

On the southern coasts of Chile, winds from the southward, or from the northward, prevail more than those from the west; and very much more than those few which come from the east.

From south-south-east to south-west, and from north-west to north (magnetic) are the points whence the wind usually blows—with less or more strength, according to the time of year.

During the summer months, or from September to March, southerly

* The Blonde, shut in by a point of land.—R. F.

winds are prevalent, almost always. They are frequently strong in the afternoon, and sometimes during a part of the night. Towards morning, and during the early part of the day, moderate winds, light breezes, or calms, are to be expected.

Near the land, it is generally calm at night, excepting about once or twice in a month, when the wind blows strongly from the southward until about midnight. Occasional northerly winds are experienced, it is true, during the summer; but they are usually so moderate, during that season, that they pass almost unheeded.

About the end of March, the 'northers,' as they are called, begin to remind one that fogs, heavy and frequent rains, thick gloomy weather, and strong winds, often trouble the southern coasts of Chile.

During a part of March, and throughout April, May, and June, foggy weather is frequent; and although it is not often that a thick fog lasts longer than a few hours, a day, even two days, of continued thick fog, is not an unknown occurrence.

With northerly and north-west winds the sky is overcast, the weather unsettled, damp, and disagreeable. These winds are always accompanied by clouds, and usually by thick rainy weather. From the north-west the wind in general shifts to the south-west, and thence to the southward. Sometimes it flies round in a violent squall, accompanied by rain, thunder, and lightning. At other times it draws gradually round. Directly the wind is southward of west, the clouds begin to disperse, and as a steady southerly wind approaches, the sky becomes clear and the weather healthily pleasant.

A turn of fresh southerly wind is usually followed by a moderate breeze from the south-east, with very fine weather. Light variable breezes follow, clouds gradually overspread the sky, and another round turn is generally begun by light or moderate north-easterly breezes, with cloudy weather, and often rain.

This is the general order of change. When the wind shifts against this order, or backs round, bad weather with strong wind may be expected.

Lightning is always a sign of bad weather. It accompanies or precedes a change for the worse; which, however, is usually a prelude to clearing up. Squalls are rare, excepting at the shift from north-west to south-west, already mentioned. From the westward (south-west by west to north-west by west) the wind does not usually, if ever,

blow nearly so strong as from north-west to north, or from south-west to south.

CURRENTS.

Near the island of Mocha, and to the westward of Cape Rumena, the current usually runs to the north-west, from half-a-mile to one mile and a half, each hour. Distant in the offing, more than twenty or thirty miles from land, this set of current is so diminished that it is hardly sensible; but near Mocha, and especially near the very dangerous out-lying rocks off the south and south-west extreme of that island, it is increased to two, and, at times, even three miles an hour.

From the great river Bio Bio, and from other rivers in the vicinity, floods, escaping to seaward, often cause strong and irregular currents which set to the southward—passing the island of Santa Maria, sweeping round Point Lavapié, and Cape Rumena, and Tucapel Point—into the bay where his Majesty's ship Challenger was wrecked.

These southerly currents are usually found to set strongly alongshore, but seldom reach an offing of six miles to the westward of Cape Rumena.

A very intelligent Hanoverian, Anthony Vogelborg, employed during several years upon these coasts, was once drifted in a small vessel, from six miles south of the Paps of Bio Bio, to the rocks off the north end of the Island of Santa Maria, in one night, during a dead calm.

After the great earthquake of the 20th of February, which affected all the coast about Concepcion, and especially the Island of Santa Maria, the currents set to the south-eastward so strongly, that a boat belonging to the above-mentioned Anthony Vogelborg (which he was steering) running near the Island of Mocha, under sail, with a fresh southerly breeze, could hardly make head against the strong stream that was passing along shore from the north-westward. It is, therefore, to be apprehended, that the strength and direction of the currents in the neighbouring ocean are unsettled and extremely uncertain for some time after a serious earthquake.

No. 29.

Santiago, 12 de Agosto de 1835.

Señor:

He instruido al Presidente del contenido de la carta de V.S. de ayer, en que me incluye una copia de los resultados del viaje de observacion del Capitan FitzRoy, de la fragata de S.M.B. Beagle, en cuanto a la parte de la costa de Chile comprendida en el.

Su E. ha recibido esta prueba de la atencion del Capitan FitzRoy, con el mayor interes y reconocimiento, y me encarga rogar a V.S. se lo manifieste de su parte.

Reitero a V.S. las espresiones de mi mayor consideracion y estimacion; y tengo la honra de ser su mas atento,

Seguro servidor,

(Firmado) JOAQUIN TOCORNAL.

Señor CONSUL JENERAL,
de S.M.B.

No. 30.

By ROBERT FITZ-ROY, Captain of His Britannic Majesty's Surveying Sloop Beagle.

You are hereby required and directed to take upon yourself the charge and command of the schooner Constitucion (tender to the Beagle), and all on board of, or belonging to her.

As soon as you are ready for sea, you will proceed to that part of the coast of Chile, near the Desert of Atacama, at which the survey of Lieut. B. J. Sulivan ended.

From that part you will coast along and survey the shores northward towards Callao, and thence toward Puná, near Guayaquil.

At Puná your survey is to terminate.

You will thence return to Callao in the schooner Constitucion, or you will sell the said schooner, and, with your party, make your way to Callao, by the means which you consider best for his Majesty's service: combining economy with efficiency.

If opportunity should offer, a measurement from Puná to the Galapagos would be very desirable.

On arriving at Callao, from Puná, you will wait upon his Majesty's Consul-general, and request him to assist in procuring a passage to England, for yourself and your party, at the least expense to the public which will be consistent with the necessary accommodation which you will require, in order to prosecute your work during the homeward passage.

When you arrive in England, you will repair with your party to Plymouth, there report yourself to the Commander-in-chief, and request him to inform the Lords Commissioners of the Admiralty.

You will also request him to allow your party to be borne, for victuals only, on the books of one of his Majesty's ships, until the arrival of the Beagle, or the receipt of orders from the Admiralty.

You will endeavour to leave Callao finally before the month of June, and arrive in England before the month of October 1836.

You are furnished with the documents herein named:

Copy of my instructions.
Letter from the President of Chile.
Circular letter from the Government of Peru.
Copies of correspondence with his Majesty's Consul-general in Peru.
Letter to the Bolivian authorities.

And with instruments, stores, and provisions sufficient to last for eight months.

Money for the purchase of fresh provisions is supplied to you; and you will keep a minute account of all money which passes through your hands on account of Government.

When no longer wanted for the survey, the schooner is to be sold, and the produce of her sale carried to your contingent account.

Previous to sale, you will hold a survey on the vessel, her boat, and all such stores as you cannot advantageously carry with you to England; taking to your assistance in the survey the most competent persons whom you can obtain.

Clear reports of survey, and accounts of sale will be required.

You will not on any account take part in, or in any way interfere with any disturbance or disagreement of any kind, which may arise or be pending in your neighbourhood, bearing always in mind that the exclusive object of your mission is of a scientific nature.

You will not on any account, or for any reason whatever, allow a passenger, letters, effects of any kind, gold, silver, or jewels, to be

received or carried on board of the schooner Constitucion, or in her boat, excepting what actually belongs to your own party.

Remembering how frequent and uncertain are political changes, you will be very guarded in your conduct. You will show your instructions; explain distinctly that you are detached from the Beagle in her tender, for the purpose of continuing the survey of the coast of Peru; and you will most carefully avoid every act which might unnecessarily offend.

You will communicate frequently with his Britannic Majesty's Consul-general in Peru, whose influence and zealous support will be of the utmost consequence; and you will endeavour upon all occasions, to follow his advice as exactly as possible.

Given under my hand on board his Majesty's Sloop Beagle, in Callao Bay, this 24th day of August 1835.

R. F.

To Mr. ALEX. B. USBORNE, Master's Assistant, H.M.S. Beagle.

No. 31.

Ministerio de Relaciones Esteriores del Peru.

Palacio del Gobierno, en Lima,
Setiembre 4 de 1835.

Señor;

El Infrascrito Ministro de Relaciones Esteriores tiene la honra de acompañar al Señor Consul Jeneral de S. M. Britanica los documentos que ha credido necesarios para que la "Constitucion" practique sin inconveniente en la Costa del Peru el Viage y esploracion cientifica á que está destinada.

Dichos documentos son, unas Ordenes libradas por el Ministerio de la Guerra á las Autoridades de su Dependencia, áfin de que no impiden el aceso a cualquier punto de la Costa del Buque Espedicionario, ni el desembarco de las personas que conduce, y se faciliten en lo posible sus trabajos:

Ordenes del mismo tenor de la prefectura de este departamento à los funcionarios locales subalternos suyos, y finalmente un amplio pasavante para todas las Autoridades Civiles y Militares del litoral de la Republica.

Tiene el Suscrito la complacencia de dar con estas medidas un Testimonio del Interes que Su Gobierno tomà en el ecsito de la ilustrada empresa del Gobierno Britanico; y de Suscribirse.

Su Muy Atento Servidor,

(Firmado) M. FERREYROS.

Señor CONSUL JENERAL de S.M. Britanica.

Republica Peruana.

Ministerio de Estado del Despacho de Relaciones Esteriores.

Palacio del Gobierno en Lima á 22 de Julio de 1835, 16°,

Señor;

Ha sido muy satisfactorio para el Infrascrito impartir á los Prefectos de este Departamento y del de la Libertad, la Orden que acompaña en Copia á esta comunicacion, relativa al permiso y ausilios que el Señor Consul Jeneral de S.M. Britanica solicita en su apreciable nota de 20 del que exije, se franqueen á los Oficiales del Bergantin "Beagle" para el desempeño de la Comision cientifica que se les ha confiado.

Ya que las Ciencias practicas que mas conspiran á la prosperidad y adelantamiento del Genero humano deben al Gobierno Britanico una proteccion tan decidida, no seria conforme, con los principios ni con los intereses del Gobierno Peruano negarse á dar las facilidades que puede franquear á los Marinos Comisionados para absolver la importante Comision de rectificar al mapa y á contribuer del modo que le es dado á dilatar los limites de la Ciencia, y asegurar el ecsito del Comercio Universal.

Se han hecho prevenciones semejantes al ministerio de Guerra y al de Hacienda para que las trasmita á sus subordinados, y espera el Infrascrito que el Señor Consul Jeneral le indique si aun seran necesarias recever disposiciones que librará gustoso para la consecucion de tan util trascendencia.

Acepte el Señor Consul Jeneral la distinguida consideracion con que es:—

Su Atento Servidor

(Firmado) M. FERREYROS.

Señor Consul Jeneral, de S.M. Britanica.

Ministerio de Estado de Despacho del Relaciones Esteriores,
Palacio del Gobierno á 22 de Julio de 1835. 16°.

A los Señores Prefectos de los Departamentos de Lima y de la Libertad.

Señor;

Se halla surto en el Puerto del Callao y puede ser que recorra al litoral de este Departamento el Bergantin de S.M. Britanica "Beagle" que ha venido al Pacifico espresamente con el designio de determinar con exactitud la posicion geografica de los Puntos principales de la Costa para corregir cualquier error que hubiese en los Mapas y perfeccionar por este medio la ciencia de la navegacion de que dependen en gran manera las seguridades y ventajas del Comercio. Deseando vivamente S.E. contribuir por su parte al bien exito de esta espedicion cientifica en que la humanidad y la civilizacion se interesan al mismo tiempo y dar al Gobierno de S.M. Britanica una muestra de consideracion me ha ordenado prevenir a V.S., bajo de la mas estricta responsabilidad, que permita acercar y desembarcar sin el menor embarazo en cualquier punto de la Costa de su mando á los oficiales del "Beagle" para que puedan hacer con sus instrumentos todas las Observaciones Astronomicas y cientificas que quisieran practicar; y que ademas se les proporcionen todas los auxilios y recursos que puedan necesitar, y pidieren V.S. quien deberas recomendarlos á sus subordinados con la eficacia y esmero que merecen por su carácter y por la grande importancia de su comision. Digolo a V.S. de Orden Suprema á fin de que sin la menor demora espida la necesaria á su cabal cumplimiento.

(Firmado) M. Ferreyros."

A todas las Autoridades civiles y militares de la costa de Yquique y provincia de Tarapaca hasta Puná.

Palacio del Gobierno en Lima.

Sabed: que la Goleta Constitucion construida en Maule y del porte de treinta y cinco toneladas, patache del Bergantin de S.M.B. "Beagle" conduce á su bordo Oficiales de la Marina Real Inglesa, encargados por S.M.B. de recorrer las costas del Pacifico é islas adyacentes, con el fin de rectificar los Mapas hidrográficos. El Gobierno de la República, no solo les hà permitido toda libertad en la práctica

de sus observaciones, sino que quiere y manda bajo de la mas estricta responsabilidad á las autoridades litorales de cualesquiera clase y rango que sean, que no les pongan embarazo alguno para acercarse á todos los puntos de la costa sin ecepcion; permanecer en ellos el tiempo que crean conveniente, y desembarcar y morar en tierra á cualquiera hora, y ademàs, que les ministren todos los ausilios que pudieren. A este fin me ordena expedir este documento ligando á su observancia á los funcionarios á quienes se presentare, y recomendándoles muy encarecidamente que si en el distrito de su mando ecsisten algunos planos geográficos de la costa, trabajados en el Perú, interesen á su nombre á los que los posean para que se sirvan mostrarlos á los referidos Oficiales, á fin de que puedan llenar más cumplidamente el ímportantísimo objeto de su comision. Dado de órden suprema en el Palacio del Gobierno en Lima á 1° de Setiembre de 1835.

(Firmado) M. FERREYROS.

No. 33.

(Duplicado.)

El Ciudadano Mariano de Sierra, Jeneral de Brigada de los Ejercitos Nacionales, Benemerito a la Patria, Ministro de Estado, Secretario Jeneral de S.E. el Presidente de la Republica, &c.

A las autoridades Civiles y Militares de las Costas de la Republica.

Sabed; Que la Goleta "Constitucion" patache del Bergantin de S.M. Britanica Beagle, construida en Maule del porte de veintecinco toneladas, conduce á su bordo Oficiales de la Marina Real de su Nacion con el objeto de recorrer las costas del Pacifico é Yslas adyacentes para la rectificacion de las cartas hidrograficas, que les há sido encargado por S.M. Britanica, y habiendo el Supremo Gobierno de la República permitidoles la necesaria libertad en la practica de sus observaciones, quiere que las Autoridades litorales no les pongan impedimento ni embarazo alguno en la aprocsimacion á los puertos, desembarque y permanencia en ellos por el tiempo que creyesen conveniente los referidos Oficiales Ingleses, y que les proporcionen los ausilios que pidiesen en el orden debido.

A este objeto es que S.E. me ordena espedir el presente documento,

quedando legada su observancia bajo responsabilidad á los funcionarios á quienes estas letras se presentasen. Dado en la Casa del Supremo Gabierno en Lima à 18 de Enero de 1836. 17o de la Independencia: 15° de la República.

El Ministro Secretario Grâl.
MARIANO DE SIERRA.

No. 34.

That multitude of islands, of which the native name is Paamuto, to us more commonly known as the Dangerous Archipelago of the Low Islands, may be said to lie strewed between the parallels of thirteen and twenty-five south, and the meridians of 120 and 150 west: though stricter limits would be 13° and 22° S.; 135 and 150 west; because some of those south of 22, and east of 135, are high islands, and but rarely have communication with the groups in a lower latitude.

Easter Island, though without the boundaries specified, is but an outpost, as it were, of the Dangerous Archipelago; and, no doubt, was first peopled from that extensive region of (generally speaking) low coral islands. The high, or rather hilly exceptions, such as Gambier, Osnaburgh, Pitcairn, Easter, &c. are few, in comparison with the seventy or eighty groups of islets which surround lagoons, besides many mere dry reefs.

By far the larger number of the lagoon islands have at least one harbour in each cluster accessible to shipping; and a considerable trade has been carried on with the natives for pearl oyster-shells.

What the number of inhabitants may be, who are dispersed through the Archipelago, it is exceedingly difficult to estimate, for two reasons: we know very little of them; and they are migratory. From the little I have learned on the subject, I think they cannot be less than ten thousand, nor more than thirty thousand, exclusive of children.

Fish, and shell-fish, hogs, and cocoa-nuts, are the principal subsistence of the Low islanders; but the natives of Gambier, and a few other hilly islands, have plenty of vegetable food in addition.

Those Paamuto islands which are not very remote from Otaheite, affect to receive laws from her sovereign: they have, however, no resident authority among them, except the head of each family.

The language of these islanders differs from that of the Otaheitans so much that they do not easily understand each other: yet I believe that both are radically the same. Taata is man, at Otaheite; in Paamuto, Tanaka; which is almost the same as Kanaka, the word for man in the Sandwich Islands; and not very different from Tangata in New Zealand. Some of the Low islanders say their ancestors came from the south-eastern islands; others say from the Marquesas; again there are some who assert that their forefathers arrived from islands to the westward: so that no reliance can be placed upon the little yet known of their origin. There is, however, reason for supposing that the earlier inhabitants were not of one family, or tribe; but that they were emigrants from more than one quarter.

In most of the entrances to harbours in the lagoon islands, there is a strong current of tide, which sets in and out alternately, about six hours each way. The tide rises nearly two, or at most three, feet. It is high water at about one, on the days of full and new moon, among the western groups of islands, and from half an hour to an hour later among those which lie towards the south-east. The currents which do not appear to be caused by tide are irregular; and, as yet, too little is known of their usual direction to enable any one to say more than that during settled weather, and a steady trade wind (south-easterly), the surface waters in general move westward from five to twenty miles a day; and that in the rainy season, from October to March, when westerly winds, squalls, and rain are frequent, the currents vary most, and occasionally set eastward, at the rate of from half a mile to two miles an hour.

Numerous instances are upon record of canoes being drifted out of their course—even several hundred miles—by currents and westerly winds: few narratives of voyages in the Pacific are without a notice of them: and they materially assist in explaining how remote, and perhaps very small, islands, may have been first peopled from the west: against the direction of the generally prevalent wind.

No. 35.

The British Resident at New Zealand, to His Britannic Majesty's Subjects, who are Residing or Trading in New Zealand.

The British Resident announces to his countrymen that he has received from a person who styles himself "Charles, Baron de

Thierry, sovereign chief of New Zealand, and king of Nuhahiva," (one of the Marquesas Islands) a formal declaration of his intention to establish in his own person an independent sovereignty in this country, which intention he states he has declared to their Majesties the Kings of Great Britain and France, and to the President of the United States; and that he is now waiting at Otaheite the arrival of an armed ship from Panama, to enable him to proceed to the Bay of Islands with strength to maintain his assumed sovereignty.

His intention is founded upon an alleged invitation given to him in England by Shunghi and other chiefs, none of whom as individuals had any right to the sovereignty of the country, and, consequently, possessed no authority to convey a right of sovereignty to another. Also, upon an alleged purchase made for him in 1822, by Mr. Kendall, of three districts on the Hokianga River, from three chiefs who had only a partial property in these districts, parts of which are now settled by British subjects, by virtue of purchase from the rightful proprietors.

The British Resident has also seen an elaborate exposition of the views of this person, which he has addressed to the missionaries of the Church Missionary Society, in which he makes the most ample promises to all persons, whether whites or natives, who will accept his invitation to live under his government; and in which he offers a stipulated salary to each individual missionary in order to induce them to act as his magistrates. It is also supposed, that he may have made similar communications to other persons or classes of his Majesty's subjects, who are hereby invited to make such communications, or any information on this subject they may possess, known to the British Resident, or to the additional British Resident at Hokianga.

The British Resident has too much confidence in the loyalty and good sense of his countrymen, to think it necessary to caution them against turning a favourable ear to such insidious promises. He firmly believes that the paternal protection of the British government, which has never failed any of his Majesty's subjects however remote, will not be withheld from them, should it be necessary to prevent their lives, liberties, or property, from being subjected to the caprice of any adventurer, who may choose to make this country, in which British subjects have now by the most lawful means acquired so large a stake, the theatre of his ambitious projects: nor, in the British Resident's opinion, will his Majesty, after having acknow-

ledged the sovereignty of the chiefs of New Zealand in their collective capacity, by the recognition of their flag, permit his humble and confiding allies to be deprived of their independence upon such pretensions.

But, although the British Resident is of opinion that such an attempt as is now announced must ultimately fail, he, nevertheless, conceives, that if such a person were once allowed to obtain a footing in the country, he might acquire such an influence over the simple-minded native as would produce effects which could not be too much deprecated or too anxiously provided against; and he has therefore considered it his duty to request the British settlers of all classes, to use all the influence they possess with the natives of every rank, in order to counteract the efforts of any emissaries which may have arrived or may arrive amongst them: and to inspire both chiefs and people with a spirit of the most determined resistance to the landing of a person on their shores, who comes with the avowed intention of usurping a sovereignty over them.

The British Resident will take immediate steps for calling together the native chiefs, in order to inform them of this proposed attempt upon their independence, and to advise them of what is due to themselves and to their country, and of the protection which British subjects are entitled to at their hands. And he has no doubt that such a manifestation will be exhibited of the characteristic spirit, courage, and independence of the New Zealanders as will stop at the outset such an attempt upon their liberties by demonstrating its utter hopelessness.

JAMES BUSBY,
British Resident.

British Residency, at New Zealand,
Bay of Islands, 10th Oct. 1835.

No. 36.

DECLARATION of the Independence of New Zealand.

1. We the hereditary chiefs and heads of the tribes of the northern parts of New Zealand, being assembled at Waitangi in the Bay of Islands, on this 28th day of October 1835, declare the Independence of our country; which is hereby constituted and declared to be an independent state, under the designation of "THE UNITED TRIBES OF NEW ZEALAND."

2. All sovereign power and authority within the territories of the United Tribes of New Zealand is hereby declared to reside entirely, and exclusively, in the hereditary chiefs and heads of tribes in their collective capacity: who also declare that they will not allow any legislative authority separate from themselves in their collective capacity to exist; nor any functions of government to be exercised within the said territories, unless by persons appointed by them, and acting under the authority of laws regularly enacted by them in congress assembled.

3. The hereditary chiefs and heads of tribes agree to meet in congress at Waitangi, in the autumn of each year, for the purpose of framing laws for the dispensation of justice, the preservation of peace and good order, and the regulation of trade; and they cordially invite the southern tribes to lay aside their private animosities, and to consult the safety and welfare of our common country, by joining the confederation of the United Tribes.

4. They also agree to send a copy of this declaration to his Majesty the king of England, to thank him for his acknowledgment of their flag: and in return for the friendship and protection they have shewn, and are prepared to shew to such of his subjects as have settled in their country, or resorted to its shores for the purposes of trade, they entreat that he will continue to be the parent of their infant state, and that he will become its protector from all attempts upon its independence.

Agreed to unanimously on this 28th day of October 1835, in the presence of his Britannic Majesty's Resident.

Here follow the signatures, or marks, of thirty-five hereditary chiefs and heads of tribes, which form a fair representation of the tribes of New Zealand, from the North Cape to the latitude of the river Thames.

English witnesses,

(Signed) HENRY WILLIAMS, Missionary C. M. S.
GEO. CLARKE, C. M. S.
JAMES C. CLENDON, Merchant.
GILBERT MAIN, Merchant.

I certify that the above is a correct copy of the declaration of the chiefs, according to the translation of missionaries who have resided

ten years and upwards in the country, and it is transmitted to his most gracious Majesty the King of England, at the unanimous request of the chiefs.

JAMES BUSBY,
British Resident at New Zealand.

No. 37.

Colonial Secretary's Office, Sydney,
29th June 1835.

SIR:

I am directed by the governor to inform you that he has received a despatch from the right honourable the Secretary of State for the Colonies, communicating the representation made by you of the advantages which would result to you personally, as well as to other Europeans who have settled in the district in which you reside, by your being invested with an appointment corresponding to that lately conferred upon Mr. James Busby:—the extreme distance of that gentleman from the quarter in which you and other European settlers reside, preventing him from rendering that assistance which he might otherwise be expected to afford:—and I am accordingly commanded by Sir Richard Bourke to acquaint you, that in pursuance of the authority thus conveyed, his Excellency has been pleased to nominate you to be an "Additional British Resident" at New Zealand.

The creation of the appointment held by Mr. Busby originated in the desire of checking the atrocities and irregularities committed at New Zealand by Europeans, and of giving encouragement and protection to the well-disposed settlers and traders from Great Britain and this colony; and as the general rules by which it is the wish of this government that the British resident should regulate his proceedings, should also guide you in cases in which you may feel yourself called upon to act—

I am directed by his Excellency to transmit to you the enclosed extract of the instructions (13th April 1833) issued to Mr. Busby on his departure to assume the duties of his office.

By an adherence to the principles laid down in these orders, and their discreet application to circumstances, it is hoped that you will not be disappointed in your expectation of being enabled to benefit

not only yourself, but others, and it will, his Excellency conceives, be unnecessary to do more than impress upon you the importance of obtaining the objects you seek by a moral influence over chiefs and natives.

It should further be your particular study not only to act in concert with the British resident, but to maintain with him that good understanding which is necessary to give effect to your appointment, and to preserve the influence of both.

The British resident will be requested to make known your appointment to masters of vessels, and others resorting to New Zealand; and, on your arrival at your destination, you will take such measures as your own experience, and that of any missionaries who may be on the spot, may suggest as the best for apprising the British settlers and the natives, of the nature of your office and objects.

Upon this subject Mr. Busby, to whom I have the honour of transmitting you a letter of introduction, will no doubt be able to afford you valuable information.

The Secretary of State has intimated that you have disclaimed all desire of emolument in soliciting the appointment now conferred upon you.

I have the honour to be,
Sir,
Your most obedient servant,
(Signed) ALEXANDER M'LEAY,
Colonial Secretary.

To THOMAS M'DONNELL, Esq.,
Additional British Resident
at Hokianga, in New Zealand.

No. 38.

EXTRACT from the Instructions of his Excellency, the Governor of New South Wales, to James Busby, Esq., British Resident at New Zealand, dated 13th April 1833.

To check as much as possible the enormities complained of, and to give encouragement and protection to the well-disposed settlers and traders from Great Britain and this colony, it has been thought proper to appoint a British subject to reside at New Zealand, in an accredited character, whose principal and most important duty it will

be to conciliate the good will of the native chiefs, and establish upon a permanent basis that good understanding and confidence which it is important to the interests of Great Britain, and of the colony, to perpetuate.

It may not be easy to lay down any certain rules by which this desirable object is to be accomplished; but it is expected, by the skilful use of those powers which educated man possesses over the wild or half-civilized savage, an influence may be gained, by which the authority and strength of the New Zealand chiefs will be arranged on the side of the resident for the maintenance of tranquillity throughout the islands.

It will be fitting that you explain to the chiefs the object of your mission, and the anxious desire of his Majesty to suppress, by your means, the disorders of which they complain; you will also announce your intention of remaining among them, and will claim the protection and privilege which you will tell them are accorded in Europe and America to British subjects, holding, in foreign states, situations similar to yours.

You will find it convenient to manage this conference by means of the missionaries, to whom you will be furnished with credentials, and with whom you are recommended to communicate freely upon the objects of your appointment, and the measures you should adopt in treating with the chiefs.

The knowledge which the missionaries have obtained of the language, manners, and customs of the natives may thus become of service to you. Assuming, however, that your reception will be as favourable as has been anticipated, I will endeavour to explain to you the manner of proceeding, by which I am of opinion you may best succeed in effecting the object of your mission; you will at the same time understand, that the information I have been able to obtain respecting New Zealand is too imperfect to allow of my presenting you with any thing more than a general outline for your guidance, leaving it for your discretion to take such further measures as shall seem needful, to arrest British subjects offending against British or colonial laws in New Zealand.

By the 9th of George IV., chap. 83, sec. 4, the Supreme Court in New South Wales and Van Diemen's Land have power to enquire into, hear and determine all offences committed in New Zealand, by

the master and crew of any British ship or vessel, or by any British subject living there; and all persons convicted of such offences may be punished as if the offence had been committed in England. The law having thus given the court the power to hear and determine offences, it follows, as a necessary incident, that it has the power of bringing before it any person against whom any indictment should be found, or information filed, for any offences within its jurisdiction.

I would here observe, that I can propose no other means by which you can secure the offender, than the procuring his apprehension and delivery on board some British ship, for conveyance to this country, by means of the native chiefs with whom you shall be in communication. It is well known, that amongst those Europeans who are leading a wandering and irregular life at New Zealand, are to be found transported felons, and offenders, escaped from this colony and Van Diemen's Land. It is desirable that opportunities for the apprehension and transmission of those convicts to either colony should be promptly embraced.

The chiefs are, it is said, well acquainted with the descriptions of the different Europeans residing in their country, and will be found able and willing to point out and secure, at a convenient time, those whom they know to be fugitives from the Australian colonies. You will be furnished from the office of the principal superintendant, with the names and descriptions of those convicts from New South Wales who are known or suspected to be concealed in the islands of New Zealand; and you will use your discretion as to the fittest time for causing their apprehension, and removal of such as may be within your reach, or are guilty of any offence against the peace and tranquillity of the country. You will, of course, take every precaution to avoid the apprehension of a free person in mistake for a convict, as an action for damages would probably follow the commission of such an error.

This government will indeed be disposed to save you harmless in all such cases, where becoming circumspection has been used.

When any of his Majesty's ships are off the coast, you will request the commander to receive the convict, or other person, arrested by your means, for conveyance to this place.

I would further observe, that, by means of the information which you are likely to receive from the chiefs, you may become acquainted

with the criminal projects of Europeans before their execution; and by a timely interference you may be able altogether to prevent their mischievous designs, or render them abortive.

In the character which you hold you will be justified in addressing any British subject, to warn him of the danger to which he may be exposed, by embarking or persevering in any undertaking of a criminal or doubtful nature.

In the manner I have now described, and by proceedings of a similar character, it may be possible to repress the enormities which have heretofore been perpetrated by British subjects in New Zealand. It may also happen that this salutary control will not affect British subjects only, but that the knowledge of there being a functionary stationed in New Zealand, through whom offences committed by the subjects of any other State against the people of that country will be made known to the British Government, and through that Government to the other European and American powers, may induce the subjects of those powers to adopt a less licentious conduct towards the New Zealanders, and other inhabitants of the South Sea Islands.

There is still another form in which the influence, it is hoped, the British Resident may obtain over the minds of the New Zealand chiefs, may be more beneficially exhibited.

It is possible, by your official moderation, that the evils of intestine war between rival chiefs or hostile tribes may be avoided, and their differences peaceably and permanently composed. It is also possible, that at your suggestion, and by the aid of your councils, some approach may be made by the natives towards a settled form of government; and that by the establishment of some system of jurisprudence among them, their courts may be made to claim the cognizance of all crimes committed within their territory: and thus the offending subjects, of whatever state, may be brought to justice by a less circuitous and more efficient process than any which I have been able to point out.

If, in addition to the benefits which the British missionaries are conferring on those islanders, by imparting the inestimable blessings of Christian knowledge and a pure system of morals, the Zealanders should obtain through the means of a British functionary, the institutions of courts of justice, established upon a simple and comprehensive basis, some sufficient compensation would seem to be rendered for the injuries heretofore inflicted by our delinquent countrymen.

Having thus explained to you, generally, the course of proceeding by which I think your residence in New Zealand may be made conducive to the suppression of the enormities which British subjects, and those of other states, have been in the habit of committing in these islands, I have only further to observe, that it will be your duty to assist, by every means in your power, the commercial relations of Great Britain and her colonies with New Zealand. It would indeed be desirable that you should become the medium of all communications between the New Zealand chiefs and the masters of British or colonial vessels frequenting the coasts, and the merchants and settlers established in the islands. This arrangement will probably grow out of your residence in the country, and you should keep it in view as an important object. You will be pleased to forward by every opportunity a shipping report, setting forth the names, masters, number of crew, tonnage, and countries, of vessels arriving at the Bay of Islands, or other parts of New Zealand, whence you can obtain correct accounts; with the cargoes of such vessels, their objects in touching at New Zealand, as far as you are informed; and any other particular concerning them that may be worthy of notice.

I beg to call your attention to the strange and barbarous traffic in human heads, which certainly did exist to some extent, but which, I am given to understand, is now nearly abandoned. Should it be found to continue or revive, some legislative act may be necessary to prohibit, in this colony, the crime and disgrace of participating in so brutalizing a commerce.

Having already mentioned the assistance which I anticipate you will receive from the missionaries, I have now only to impress on you the duty of a cordial co-operation with them in the great objects of their solicitude, namely, the extension of Christian knowledge throughout the islands, and the consequent improvement in the habits and morals of the people.

RICHARD BOURKE.

No. 39.

The modes of surveying coasts, where there is anchorage, and water smooth enough to admit of boats being frequently employed, have been so often detailed, that, without repeating what is said in every treatise on the subject, I will only try to describe in this

place the methods adopted by the officers of the Beagle, in the examination of a wild sea-coast—such, for example, as that of the south-western part of Tierra del Fuego.

On that coast the weather was so continually bad, there was so much swell, and the water near the steep precipitous shores always so deep, that anchorage (except in harbours) was impracticable: boats were seldom able to assist (while under way), and the bearing compass, though particularly good, and well placed, was of very little use: it was therefore never trusted in important bearings. Another impediment, and not a slight one, was the current; which set irregularly from one knot to three knots an hour, along the shore.

But there are seldom evils, unbalanced by remedies. The stormy and desolate shores of Tierra del Fuego are broken into numerous islands, about which anchorages are abundant, and they are excellent, when once a vessel is in them. To find, and enter, or leave them in most instances, was troublesome, and often dangerous. But, with the help of those havens, and the distinct marks afforded by a high rocky shore; and by the sharp peaks of more distant heights, a correct survey was effected.

Beginning at the western extreme, near Cape Pillar (because the prevailing winds are westerly, and the current sets to the eastward), our first object was to find a safe harbour in which to secure the ship. There we made observations for latitude, time, and true bearing; on the tides, and magnetism. We also made a plan of the harbour and its environs; and triangulations, including all the visible heights, and more remarkable features of the coast, so far as it could be clearly distinguished from the summits of the highest hills near the harbour. Upon these summits a good theodolite was used, which was set, invariably, to a well-defined mark, near the observatory; from which mark the true bearings of the stations on the summits of the hills were ascertained by observations of the sun made with a theodolite.

Many leagues of exposed, and difficult coast, were looked down upon, in this manner; and, at the least, their exact bearings from one fixed spot ascertained. But if more than one height afforded a round of angles with the theodolite, and the position of each of those heights was accurately known by triangulation depending upon a base measured at the harbour, then the positions of various other hills or marks were ascertained; and so much easier became

the sea-work afterwards executed in the ship. I need hardly allude to the facilities, afforded by heights, for making eye sketches of the coast line, and other details, such as the ranges of hills, forms of banks, &c. Ascending heights near the sea is advantageous in another point of view; for not a rock or a shallow escapes notice, if the day is tolerably clear. While in harbour, every place in the vicinity which could be examined in boats, or overland excursions, was explored, as far as our means and time would allow.

Before I speak of the sea-work, it may be useful to say a word about 'bases,' of four kinds, arranged according to their relative value.

The first are those derived from good astronomical or chronometrical observations, made at two stations several miles apart.

The second are deduced from angular measurements of small spaces exactly known.

The third are obtained by actual measurement with a chain, with rods, or with a line:—

And the fourth are the rather uncertain bases obtained by sound.

This statement of the relative value of bases, is only meant to refer to their employment in sea-surveying. I need hardly remind the reader of these notes, that the third description of bases, however exact nominally, requires a host of minute precautions, in addition to what I never found between Valdivia and Cape Horn, namely, a nearly level and accessible space, of considerable length, on which to measure.

To attain the utmost precision is a laudable endeavour, no doubt, when carrying on extensive trigonometrical operations on land; but it should be borne in mind, that every hour employed in what is commonly called 'hair-splitting'—in minute details that do not affect the chart or plan which is the result of a sea-survey, is not only an hour lost, but an hour taken away from useful employment.

The second kind of bases are so quickly and easily measured, either with a sextant or micrometer, across any kind of land or water, and have been so repeatedly proved in every part of the Beagle's surveys, that I consider them unobjectionable, when used for such limited operations as making plans of harbours, or fixing the positions of objects only a few miles distant. By multiplying bases, which with such easy methods is soon effected; and by a frequent use of the sextant, artificial horizon, and chronometer, material errors may be

kept out of the work of a practised surveyor. With a sextant, horizon, and chronometer (in a sheltered spot), a micrometer and board,* a theodolite, and intelligent assistants, much work may be done in a short time.

When ready to proceed, the chronometer rates being ascertained, and the weather glasses affording reasonable hope of a day or two without a gale of wind, we started at day-light, and worked against time. Those officers who were engaged particularly with the survey, did not take part in the routine duties of the vessel. One attended to the bearing compass, and usually wrote the various angles and bearings, taken by others as well as himself, in a bearing-book. Another officer took angles. A third attended to the ship's course, the soundings, and the patent log. When many angles were required at one time, or when observations for time, latitude, or true bearing, were made while taking a round of angles, other officers assisted.

If the bearing compass was steady enough it was used, even when true bearings were obtained; or when, if cloudy, the triangulation was carried on by points fixed from the last harbour. As the compass was so placed as to be uninfluenced by local attraction, the bearings it gave, when steady, were satisfactory; yet it was never trusted implicitly; nor at all in matters of consequence. Its use was as an auxiliary; not as a principal. Bearings, or angles, of the highest points, or of marks so well defined as not to be mistaken in consequence of a change of the place of an observer, were, of course, always selected, if such were visible: and vertical angles of all notable heights were not omitted.

For the sake of perspicuity, we considered that positions, fixed points, or marks, were separated into three classes. In the first class, were observatories or places at which the latitude, longitude, and true bearing, were accurately ascertained; besides those high peaks, or other well-defined objects which could be seen at a distance of some leagues, and whose exact places were known by a triangulation which connected them with an observatory; and the highest points of islands, which were neither low, nor small enough for the eye to overlook them at the first glance.

* A board some feet long, painted black on one side, white on the other; exactly measured, and suspended horizontally, at right angles to the observer.

In the second class we considered all the minor fixed points which were included in the triangulation, excepting the details of the coast, and 'boundary lines,'* which belonged to the third class.

We supposed that the ship had sailed from the 'first' harbour.† At six, in the morning, (marked 6) the position of the vessel was fixed by two or more angles between marks, already fixed, upon the land. At 6·30, and at 7 similar means were used to fix the ship's place. Soundings were taken, and laid down by proportioning to the times of each sounding, the portions of distances run between the two stations, as shewn by patent log, by bearings of a mark, such as 6 (in the figure) while sailing from 6·30 to 7: by independent double angles, (two angles between three marks), or by simple cross-bearings.

Transit bearings were always sought for, by compass as well as by noting when marks were 'on;' or, in a line, one with another, without reference to the compass. We endeavoured to ascertain (or fix) the ship's position at the same moment, by the most available of the numerous methods so readily occurring while the log was going, the time noted carefully (as often as angles or bearings were taken), and several first class marks in sight. Transit bearings were useful in the details of the coast line, as may be seen by the lines drawn from 6·30, 7 and 8; and they corroborated the correctness of the triangulation, when applied to first and second class marks.

By a judicious selection of objects, and a clever application of transit bearings, I have seen extensive and correct triangulations carried on from data, obtained at sea, which appeared utterly inadequate.‡ I do not imply that the absolute position of any one point was independently correct, because all depended at first upon observations at sea; but that the points of the triangulation were all so correct, relatively, that, upon after examination, when the regular routine of harbour work had been combined with the data obtained afloat, and their truth ascertained by connection with the previous observatory, no alteration was found necessary.

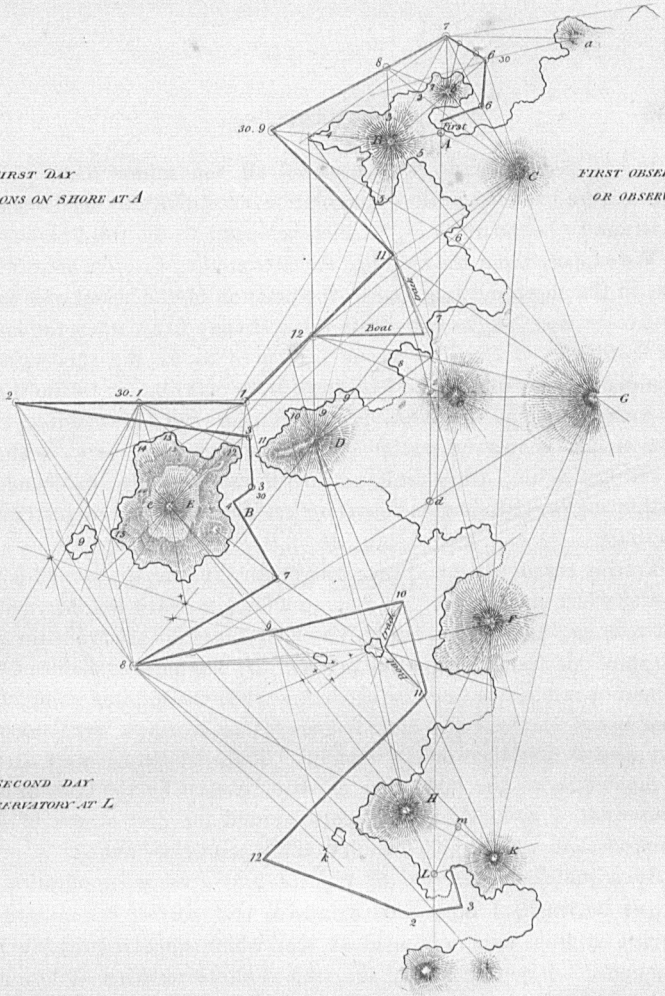
Perhaps I should explain, that in the plan of the 'first' harbour all depended upon the base Ab; by which also were fixed B and C. From the summits B and C;—G, D, E, F, were fixed, as well as a

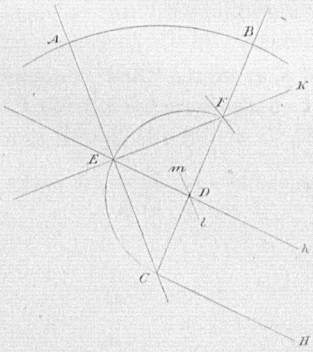
* By 'boundary lines' I mean limiting outlines of shoals, or rocky places. † See figure. ‡ By Mr. Stokes.

FIRST DAY
OBSERVATIONS ON SHORE AT A

FIRST OBSERVATION PLACE
OR OBSERVATORY AT A

SECOND DAY
OBSERVATORY AT L





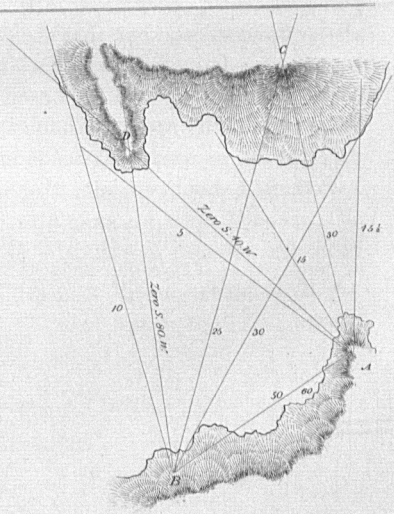


Fig. 2

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number of inferior marks; by a 'round' of angles taken with a theodolite, at each station (B and C), the instrument being in each case set to A. From A, the true bearings of B and C were ascertained astronomically. When the position of L was exactly determined by latitude, and distance from the meridian of A, the long and accurate base AL became known. With that, as a foundation, the work was laid down: and by that base, if necessary, the former positions of G, D, E, and F, were corrected. But so well did angular measures answer, that it was scarcely ever requisite to make such corrections.

It has been shewn that the log served only to place soundings, or help to fill up a space, while clouds obscured marks. I should add that it was serviceable in ascertaining the direction and strength of currents. Currents altering in strength, as well as in direction, prevented our applying the patent log to other uses, although we had every reason to put implicit confidence in its indications, and have often proved their value in the still waters of a deep sound, where no stream of tide, or current, existed: as well as in harbours, where angular bases were measured for the special purpose. Views of the lands, both in plan and profile, were very frequently taken. When boats could be lowered, and a sufficient object demanded their employment (as at 11, of the first day, and at 10 of the second day) they did not hang idly at their davits.

In the example I have given, circumstances conspired in our favour, a rare event in Tierra del Fuego, or on any similar coast, exposed to the prevailing westerly winds of high latitudes; but when we failed to find anchorage, the triangulation was carried on by first class marks; and by the ship's positions, when fixed by good observations at sea. But however well such a method may answer in a fine climate—on that coast it was in general unsatisfactory, and very inferior to that of going from one harbour to another.

Among many kinds of notation useful in surveying, the annexed sketch shews a method used by Mr. Stokes, which I had not then seen adopted. It is very convenient, and assists the memory more than any other. In figure 2, A and B are stations, at which the angles specified were taken right and left of a mark, whose bearing was ascertained. Or, the angles only were taken, and the triangles afterwards calculated, or protracted, by reference to the base upon which they depended, such as A B. A sketch on this principle, how-

ever slightly made, brings the place to mind in an instant, and avoids any necessity for names* or letters.

No. 40.

Nautical Remarks on the Northern Coast of Chile.

Scarcely any extensive coast less requires particular description than that of Chile. With a tolerable chart, and the lead going, a stranger may sail into, or out of, almost any Chilian port without hesitation. As there are, however, some anchorages and landing-places hitherto little known, except to coasters, it may be useful to give a few notices of them.

Valparaiso, and the ports southward, have been described so often, that I will not occupy any of these crowded pages with remarks on such well-known places; although in another publication, strictly nautical, they will appear.

Quintero, Horcon, and Papudo, have no hidden dangers. The two former lie to the southward and northward, respectively, of a straggling cluster of black rocks, above water: the first is now little frequented, being rather shallow, and out of the way: the second is a summer roadstead, with a good landing-place, and easy communication thence to Puchancavi. Papudo is a small open bay, with a good landing-place. Northerly winds throw in a heavy swell. Its situation is pointed out by a high, peaked hill, called Gobernador, immediately over the port.

Pichidanque, sometimes called Herradura, has a rock near the middle, on which, at low tide, there are but fifteen feet of water: it is in a line between the north end of the little island in front of the harbour, and a gully at the north-east side, through which a river runs from Quilimari, and four cables' lengths from the island. The tide rises five feet, and syzygial high water is at nine. The Silla, over Pichidanque, I have already mentioned (p. 426).

Conchali is an exposed roadstead, seldom used but by smugglers. The landing is everywhere bad, excepting in one little cove at the north side of the bay.

* Short characteristic names are preferable to letters, or numbers, because they help the memory so much.

MAYTENCILLO is a little cove, fit only for a boat to land in at particular times.

The next opening in this high rugged coast is that of the river LIMARI, which looks large from seaward, but is inaccessible. The coast near Limari is steep and rocky. Two miles from the entrance of the river, there is a low, rocky point, with a small beach on which boats sometimes land; but a heavy surf breaks on it. Near a mile from the coast the land rises suddenly to a range of hills, about one thousand feet high, which runs parallel to the coast, and extends two or three miles north and south of the river; the summits of the hills to the northward are covered with wood. The north entrance point is low and rocky; the south is a steep slope, with a remarkable white sandy patch on the side of it. The river at its mouth is about a quarter of a mile wide; but the surf breaks heavily right across; inside it turns a little to the north-east, and then runs to the eastward through a deep gully in the range of hills before-mentioned. Mount Talinay is a remarkable hill, 2,300 feet high; it is three miles from the coast, and seven miles southward of the river; it is thickly wooded on the top; the sides are quite bare. Ten miles southward of Mount Talinay lies a deep valley, with a remarkable sandhill on its north side, close to the coast; at the mouth of the valley there is a small sandy beach. Within five miles of Maytencillo there is a point with several rocks, running off it about a quarter of a mile; from which to Maytencillo the coast is composed of blue rocky cliffs, about one hundred and fifty feet high; the land above the cliffs rises to between three and four hundred feet; and then about three miles in shore the range of hills runs from three to four thousand feet high.

About fourteen miles northward of Limari is a small bay, with a sandy beach in the north corner; but a heavy surf. From this bay northward the coast is rocky and much broken: about eight miles southward of Point Lengua de Vaca is a small rocky peninsula, with a high, sharp rock in the centre of it, southward of which lies a small, deep cove, with a sandy beach at the head; but the entrance is nearly blocked up by small islets, and rocks both above and below water. The entrance is too bad for the smallest vessel; though in fine weather boats can land in the cove. The outer breaker is not more than two cables from the shore; but when calm the swell sets directly on it. This cove is Tortoral de Lengua de Vaca.

Point Lengua de Vaca is a very low, rocky point, rising gradually in-shore to a round hummock, about a mile to the southward of the Point. There are rocks nearly awash about a cable's length from the Point, and at two cables' lengths distant there are but five feet. After rounding Point Lengua de Vaca, the coast runs to the south-east, and is rocky and steep for about two miles from the Point, where there are fifteen fathoms about half a mile from the shore. About three miles from the Point, a long, sandy beach commences, which extends the whole length of the large bay as far as the island or peninsula of Tongoy. The south part of the beach is called Playa de Tanque, the north and north-east side of the bay Playa de Tongoy. Off the south-west extreme of the beach there is anchorage about half a mile from the shore, in from five to seven fathoms; the bottom is a soft, muddy sand in some places, but in others it is hard. With a southerly wind it is very smooth, and the landing is very good, but a heavy sea sets in with a northerly breeze. This is an anchorage that was once frequented by American whalers. The village, which is called the Rincon de Tanque, consists of about a dozen 'ranchos.' The only water to be got is brackish; about two miles and a half to the E.N.E.* where there is good water, the landing is generally very bad, and the water is some distance from the beach.

From TANQUE to the peninsula of Tongoy there is anchorage in any part of the bay, at from one to two miles from the shore, in from seven to ten fathoms, sandy bottom. There is good anchorage with a northerly wind for small vessels, to the southward of the peninsula, abreast of the small village on the Point, with the outer Point bearing W.N.W. in four fathoms sandy bottom, with clay underneath it; but no vessel, however small, should go into less than four fathoms, as the sea breaks a little inside that depth when blowing hard from the northward. Large vessels would also find a little shelter with the wind to the northward of north-west. With a strong southerly breeze a vessel would not be able to remain at anchor to the southward of the peninsula; but there is a small bay on the north side, which is completely sheltered from southerly winds. In the south-east corner of this bay there is a small creek, into which, when smooth, boats can go; it runs about a mile inland, and near the head there is fresh water for which the whalers sometimes send their boats.

* All bearings are magnetic, unless otherwise specified.

The village of Tongoy consists of half a dozen small houses, built on a high point at the south side of the peninsula.

The coast on the west side of Huanaquero Hill is broken and rocky, affording no shelter for any thing but a boat; to the northward there is a deep bay, well sheltered from southerly and westerly winds, but open to the northward: between this and Port Herradura there is no place fit for a vessel.

HERRADURA and COQUIMBO are well known. Teatinos is a bold rugged point, the land behind it rising in ridges, which gradually become higher as they recede from the coast to Copper Hill, which is 6,400 feet high. The point which makes as the north extremity of the bay, in coming from the northward, is a low rocky point, called Poroto; about four miles to the northward of Point Poroto, is the port of ARRAYAN, or Juan Soldado; but it does not deserve the name: it is merely a small bight behind a rocky point, scarcely affording shelter for a boat from southerly winds, and entirely open to northerly. A little to the northward of Copper Hill is another hill, on the same range and about the same height: the north side of the hill is steep, and at the foot of it is the small Bay of OSORNO, which is about half a mile long, but not deep enough to afford any shelter for the smallest vessel. About half a mile to the northward of the bay there is a hamlet, consisting of a few small houses, called Yerba Buena.

The PAJAROS ISLANDS are two low rocky islands, lying about twelve miles from the coast; the northern is much smaller than the southern, and, as far as could be seen from the shore, there is no danger round or between them. A little to the northward of Yerba Buena there is a small island, called Trigo, separated from the shore by a channel about a cable's length broad; but it is only fit for boats: the island, except when very close, appears to be only a projecting point; there is a large white rock on the west point of it.

About three miles to the northward of Trigo Island, is the PORT of TORTORALILLO, which is formed by a small bay facing the north, with three small islands off the west point. In coming from the southward, the best entrance for small vessels is between the southernmost island and the point, where there is a channel about a cable's length wide, with from eight to twelve fathoms water. The dry rock off the point on the main land, should not be approached nearer than half a cable, as a sunken rock lies nearly that distance from it. There

is no channel between the northern and middle islet, as it is blocked by breakers: a vessel may anchor about half a mile from any part of the beach in from six to eight fathoms, sandy bottom. The landing is not good, the best is on the rocks near the entrance; but nothing could be embarked from there: the east end of the beach is the best for that purpose. From the land to the northward, running so far westward, it is not likely that a heavy sea would be caused by a northerly gale.

TEMBLADOR is a small cove in the east side of Tortoralillo, but the landing there is worse than on the other beach, and it is not so well sheltered.

About three miles to the northward of Tortoralillo, there is the small island of Chungunga; it is about a mile from the shore, and is a good mark for knowing the port: there is a rocky point a-breast of it; a little in-shore of which there is a remarkable saddle hill, with a nipple in the middle, which, to a person coming from the southward, appears as the extreme of the high range, that runs thence to the eastward of Tortoralillo, and is from two to three thousand feet high.

A little to the northward of Point Chungunga, there is a large white sand-patch, which is seen distinctly from the westward; it is at the south end of the Choros beach, which runs for seven or eight miles to the north-west, to Point Choros; a heavy surf always breaks upon it.

Off Point CHOROS there are three islands, the inner one is low and nearly joins the shore; nothing but a boat can pass inside it. About a mile to the westward of this island, there is another small island; between them the channel is clear of danger. To the south-west of this island about a mile, is the largest of the Choros islands; it is about a mile long, the top is very much broken, and at the south-west end it very much resembles a castle: there is a small pyramid off the south end, and rocks break about a quarter of a mile from the shore. The channel between the two outer islands is clear of danger; but about half a mile to the westward of the small island, there is a rock nearly awash. Five miles to the south-east of the southern Choros Island, there is a very DANGEROUS REEF of rocks only a little above the water.

POINT CARRISAL is a low rocky point, about five miles to the northward of Point Choros, with a remarkable round hummock; to the

southward of it is the small cove of Polillao, where there is shelter for small vessels, but the landing is bad: there are two small rocky islets off the south point of the cove. To the northward of Point Carrisal is the bay of the same name, but it is not fit for vessels; at the bottom of the bay a heavy surf breaks about half a mile from the shore. The north side of the bay is formed by a rocky point, with outlying rocks and breakers about a quarter of a mile off all sides of it. There is a landing-place in the bay, near the south-east corner, where the rocky coast joins the beach, but in bad weather the surf breaks outside it.

Nearly one mile to the northward of the north point of Carrisal Bay is the Port of CHANERAL; it is well sheltered from northerly and southerly winds, but the swell sets in heavily from the south-west, which makes the landing bad; the best is in a small cove on the north side of the port, near the beach at the head of it: there is also a landing-place on the south side, but it is bad when there is any swell. On the beach at the head of the port there is always too much surf to land, except after very fine weather. About four miles and a half to the westward of it is the Island of Chañeral; it is nearly level, except on the south side, near which there is a remarkable mound with a nipple in the centre of it. There are rocks nearly half a mile from the south point of the island, and one about the same distance off the north-west point. On the north side there is a small cove, where boats can land with the wind from the southward; there is anchorage close off it, but the water is deep. An American sealing schooner was lost there a few years ago, from a norther coming on while she was at anchor.

The land round Chañeral is low, with ridges of low hills running from the points, the tops of which are very rugged and rocky, and the land is sandy and very barren; the range of high hills is several miles from the shore at this part, but between the range and coast there are several smaller hills rising out of the low land. The village of Chañeral is about three miles from the port, and is said to consist of about twenty houses. There are no houses near the port. We were told by some of the people that came off, that the only vessel that had ever been here was a small schooner, called the Constitucion (our vessel), which had taken a cargo of copper to Huasco. There was a large quantity of copper, said to belong to Mr. Edwards, ready to be embarked.

To the northward of Chañeral Bay the coast is low, and projects to the N.W. for about ten miles. The extreme west point, Point Pajaros, has a small rocky islet off it, about two cables from the shore: the land in-shore rises gradually to a low ridge, about half a mile from the coast, the high range is about three miles in-shore. To the northward of Point Pajaros the coast runs to the East, forming a small bay, open to northerly, but well sheltered from southerly winds; there is anchorage in from eight to twelve fathoms, about one-third of a mile from the shore, but the landing is bad.

About four miles N.E. of Point Pajaros is another point, with a high rock off it, to the northward of which is the Bay of Sarco, in which there is also shelter from southerly winds. A deep gully runs inland from the S.E., corner of the bay, at the mouth of which is a sandy beach, with anchorage about one-third of a mile off, in from eight to twelve fathoms, but the landing is not good. There are two or three small huts close to it. To the northward of Sarco the high land runs close to the coast, the sides of the hills are covered with yellow sand, the summits are rocky, and the whole coast has a miserably barren appearance. To the northward of the deep gully about four miles, there is a projecting rocky point, at the foot of a high range of hills, with a very remarkable black sharp peak near its extreme, the coast to the northward of this runs nearly north and south, and is very rocky for about eight miles, when it turns to the westward, forming a deep bay, in the N.E. corner of which is a small beach called Tongoy. To the northward of the bay a high range runs out towards Point Alcalde, the extreme point of the bay, which is nearly seven miles to the southward of Huasco; the point is very rocky with small detached rocks close to it: in-shore it rises a little, and there are several small rocky lumps, running out of the sand, one of which, from the southward, shows very distinctly: it is higher than the rest, and forms a sharp peak; a little in-shore of which the land rises suddenly to the extreme of the high range. About seven miles to the northward of Point Alcalde, is the point forming the Port of Huasco, it is a low rugged point, with several islands off it, one of which only is of any size, it is separated from the main by a very narrow channel, and appears from sea-ward to be the point of the main; it is covered with low rugged rocks, one of which on its north side is much higher than the rest, and shows distinctly coming from the southward, but from the northward it is

mixed with the other rocks behind it; to the south-west of this island there are several other small rocky islets, which appear as two small islands when seen from a distance. A little in-shore of the extreme point there is a short range of low hills, forming four rugged peaks, which show very distinctly from the southward and westward: the land falls again inside them for a short distance more, and then rises suddenly to a high range running east and west, which is directly to the southward of the anchorage. The top of the range forms three round summits, the easternmost of which is a little higher, and the middle a little lower than the other.

Nearly three miles to the N.E. of the anchorage, there is another range of hills about 1,400 feet high: on the south slope of which there is a sharp peak, from which it slopes to the valley that the river runs through, The river is small, and a heavy surf breaks outside it, the water however is excellent; there is another lagoon small river in the valley, nearer the port, but the water is very brackish. The anchorage is very much exposed to northerly winds, and a heavy sea then rolls in, but a heavy norther does not occur more than once in two or three years. The village consists of about a dozen small houses, scattered among the rocks on the point dividing the old and new ports. The country round presents a more barren and miserable appearance than any part even of this desolate coast: the ground is composed of a mass of small stones mixed with sand, out of which project masses of rugged, craggy rocks. A little in-shore the stony ground is changed for a loose yellow sand, which covers the sides and bases of nearly all the hills round: the summits are stony without any appearance of vegetation; but in the low grounds a few stunted bushes grow among the stones, and after rain (a rare blessing) they look much fresher than might be expected in such soil, and then the valley through which the river runs also appears green, forming a striking contrast to the country around.

Point Lobo, about ten miles to the northward of Huasco, is rugged, with several small hummocks on it; to the southward of this there are several small sandy beaches with rocky points between them, but a tremendous surf breaks on them, allowing no shelter even for a boat. A little in-shore of the point, there are two low hills, and within them the land rises suddenly to a range about 1,000 feet high. In the bay to the northward of Point Lobo, there

are several small rocks, and about six miles from it there is a reef which runs perhaps half a mile off a low rocky point: the outer rock is high and detached from the others.

About eleven miles to the northward of Point Lobo, is a very rugged point, with several sharp peaks on it, about half a mile to the northward of which is the small port of HERRADURA, which can hardly be distinguished till quite close to it. Off the rugged point, and between it and the entrance to Herradura, there are outlying rocks and breakers, about a quarter of a mile from the shore: off the south entrance point there is a patch of low rocks, which in coming from the southward appear to extend right across the mouth of the port. The entrance faces the N.W., and is between this low patch of rocks, and a small islet to the N.E. of it: there is no danger within half a cable of either point. The port runs in about three-quarters of a mile to the eastward of the islet, and is sheltered from both northerly and southerly winds, but with a strong northerly breeze a swell rolls in round the islet. It is rather small for large vessels, and they would not be able to lie at single anchor in the inner part of the cove, but there is quite room enough to moor across it, about a quarter of a mile above the islet, in four fathoms, fine sand. In this place an American ship, the Nile, of 420 tons, was moored during a northerly gale, which blew very heavily; and she was perfectly sheltered. The landing is better than in any place between it and Coquimbo: but there is a very serious inconvenience in the want of water. There is a small lagoon about a mile from this place, in the valley at the head of Carrisal Cove, but it is worse than brackish; yet the 'peones,' who are at work shipping the ore, make use of it. A deep valley runs in from the head of the cove, separating the high ranges of hills, and is a good mark to know it by. The range to the southward of the valley is the highest near the coast, and is distinctly seen from both the northward and southward; there is a small nipple in the highest part of it. CARRISAL is a small cove about a mile to the N.E. of Herradura, well sheltered from southerly winds, but as it is so close to Herradura, which is so much superior, it is not likely to be of much use.

To the northward of Carrisal the coast is bold and rugged, with outlying rocks a cable's length off most of the points. About nine miles to the northward of Herradura there is a high point with a

round hummock on it, and several rugged hummocks a little in-shore. To the northward of this there is a cove, sheltered from the southward, where small vessels may anchor, but it is not fit for large vessels; there is another cove similar to it about a mile to the northward of it. A little to the northward of the second cove, there is a high rocky point, which is the termination of the high part of the coast; to the northward of the point there is a small port, which from the chart appears to be Tortoralillo: it is well sheltered from southerly winds, and the landing is good. In the inside part of it a vessel, not drawing more than ten or twelve feet, might moor sheltered from northerly winds, in three and four fathoms, but with a northerly wind there would be a heavy swell in: there is anchorage farther out under the point, in from eight to ten fathoms; but a vessel should not go nearer the shore than eight fathoms, as the bottom inside is rocky.

During the summer months this would be a very good port for small merchant vessels; but there is no appearance of water near. Abreast of it the high range of hills recedes from the coast, which is low, with some low rocky hills a little in-shore.

About two miles to the northward of Matamores there is a low rocky point, a little to the northward of which there is a small deep bay, at the mouth of a valley, in which, apparently, there is anchorage for a vessel; but there was a heavy surf on the beach, and as the landing was bad we did not wait to examine it. To the northward of this the low hills are not so rocky, but are covered with yellow sand, except near the summits, where they are stony.

About six miles to the northward of this bay there is a remarkable rocky point, with a detached white rock off it, and a lump with a nipple on it, a little in-shore. About half a mile to the northward of this, is the small port of PAJONAL, which, in coming from the southward, may be easily known by this nipple, and a small island, with a square topped lump in the centre of it, which is off the point to the northward of the port. A range of hills, higher than any near, rises directly from the north side of the port; and in the valley, about a mile from it, there is a range of small and very rugged hills rising out of the low land.

The anchorage is better sheltered from southerly winds than any to the southward, except Herradura, and there would not be much swell, as the point and island to the northward project considerably

to the westward. The southerly swell rolls into the mouth of the port, but on the south shore it is smooth, and the landing pretty good: there is a dangerous breaker about a quarter of a mile to the south-west of the south extreme point, which only shows when there is much swell. The best anchorage is about half way up the cove, near the south shore, in five fathoms: near the head it is very flat. We found a cargo of copper ore ready to be shipped here, but no vessel had ever been in the port: there is no water within two miles, and there it is very bad indeed. The name of Pajonal was told to us by a young man who was getting the ore down, but he appeared to know scarcely anything of the coast, and there were no inhabitants near the place.

About a mile and a half to the northward of the island before mentioned, there is another point, with an island and several rocks off it; both the islands may be passed within half a mile, but there is no passage inside them. To the northward of the northernmost island, the coast runs to the eastward, forming a large and deep bay, which at a distance looks very inviting; but before we were within a mile of the depth of it, we were in three fathoms, with rocks all round us, some above and others a little below water. From the bay being well sheltered from the southward, they do not show till close to, except two patches which are off the north point, and are always uncovered. A mile to the northward of these rocks there is another bay, which is quite clear of danger; and in the south corner of it, a small cove, there is good anchorage in seven fathoms, well sheltered from southerly winds, but very open to northerly. The water is perfectly smooth with a southerly wind, and no swell could ever reach it unless it blew from the northward. There is a small bay, half a mile to the northward of this, where a vessel may anchor, but it is not so well sheltered; there were no signs of inhabitants, nor the least appearances of water in the valleys. The land at the back of the bay is low, but to the northward of the north bay it rises to a ridge of sand hills, running east and west, and terminating in a steep rocky point, with a cluster of steep rocky islets off it. To the northward of this point the coast is rocky and broken, with rocks a short distance from the shore for about four miles, where there is a rugged point with a very high, sharp-topped hill a little in-shore, which from the southward shews a double peak; directly to the northward of this point, there is a deep rocky

bay, with a small cove close to the point where we anchored in five fathoms, but half a cable off shore on either side: it is not fit for a vessel. The bay is partly sheltered from northerly winds, but a northerly swell rolls in, and it does not appear to be a proper place for a vessel to enter.

From an old fisherman, who was living in a hut, we learned that the name of the place is BARRANQUILLA DE COPIAPO, and to our surprise saw a cargo of copper prepared for shipping. He also told us that another cargo had been shipped from the same place about a year before; though the cove is too small for any vessel to anchor in with safety, and outside it the water deepens very suddenly. There is no anchorage in the cove at the head of the bay, and the landing there is very bad; in the small cove the landing is good. There is no fresh water nearer than the river of Copiapo, which is about fifteen miles off.

The deep bight to the southward of this, in which are the three bays before mentioned, is called Salado Bay; the south point of it, with the island off it, is Point Cuernos. No vessel had ever been in either of these bays, but the middle one is much superior to Barranquilla, and might be a much better place to embark the ores.

From Barranquilla to Point Dallas the coast is rocky and broken, without any place sufficient to shelter the smallest vessel. Point Dallas is a black rocky point, with a hummock on its extreme, which, coming from the southward, appears to be an island; the land rises to a range of low sandy hills, with rocky summits.

The Caxa Grande is a small sharp-topped rock, which is the only one of the reef that shows above water; the patch near the point was a-wash when we passed.

The channel between it and Point Dallas appears to be wider than it is given in former charts, but the reef off the point projects much farther. The sea was high, and there was occasionally a breaker above a quarter of a mile from the point; at about that distance from the breakers on the reef, the least water we had was eleven fathoms; when the swell is not high, the breaker off the point would not show; it appeared to be detached from the reef which joins the point.

COPIAPO is a very bad port; the swell rolls in heavily, and the landing is worse than in any port to the southward; it may easily be known by the Morro, to the northward, which is a very

remarkable hill, nearly level at the top, but near the east extreme of it there are two small hummocks; the east fall is very steep, the end of another range of hills shews to the northward. To the S.W., apparently forming part of the same range, is another hill, the west side of which forms a steep bluff; in coming from the southward, these hills will be seen in clear weather, before the land about the port can be made out. From a fisherman, who knew the coast to the southward, we learned that the small port we passed the night in, to the northward of Port Herradura, is called Matamores; the high point to the southward of it is Point Matamores. Tortoral, or Tortoral baxo, is the bay between it and Pajonal. He described it as having always a heavy surf in it, and the landing bad. The south point of the Bay of Salado, with the islet off it, is called Point los Cachos. He was in the vessel that took the cargo of copper from Barranquilla. She was a large brig of 300 tons, and was anchored off the mouth of the cove. The island to the north of Copiapo Bay, called Isla Grande, is very remarkable; it has a small nipple on each extreme, that on the eastern is the highest: to the westward of the middle of the island, there is another small round nipple.

The channel between Isla Grande and the main is clear of danger in the middle; but such a heavy swell rolls through, that it is scarcely fit for any vessel. Off the north extreme of the island there is a reef under water, projecting two cables to the eastward; at a cable's length distance from the reef we had eight fathoms; the point on the main appeared to have no danger off it; the rocks to the southward of it are inside the line of the points. The swell in the channel was by far the worst we had experienced on this coast: to the northward of the island there are several small rocks, one of which is high. There is no danger within a quarter of a mile of them.

The point on the main, to the northward of the island, is very rocky; on the S.W. point there are two rugged hummocks, and several rocks and islets close to the shore, but no danger outside them: from this to Point Morro, the shore is steep and cliffy, with remarkable patches of white rock in the cliffs to the south of the point, which is steep, with rugged lumps on its summit. The Morro rises suddenly, a little in-shore.

On rounding the point, you open a deep bay which runs in to the

S.E.; there are several small rocky patches in it, and at the north end of the long sandy beach there is a piece of rocky coast, the north extreme point of which has a small island off it. The entrance to PORT YNGLES is to the southward of this point, round a low rocky point, to the southward of which, close in-shore, there is a small island off a sandy cove; there is a rock a-wash at high-water, about a cable's length to the N.W. of the south extreme point, but it always shows; after passing this rock the point is steep-to, and may be approached within a cable's length. The harbour inside forms several coves, in the first of which, on the starboard hand going in, there is anchorage for small vessels, but the bottom is stony and bad. There is a low island to the S.E. of this cove, above which is the best anchorage, with southerly winds. About half-way between it and a projecting rocky point on the east shore, small vessels may go much closer into the cove, to the southward of the island, where the landing is very good. The bay in the N.E. corner is well sheltered from northerly winds, and no sea could ever get up in it; but the landing is not so good there, the best is at a rocky point at the south end of the northernmost beach, where there is a small cove among the rocks perfectly smooth: it is by far the best harbour, but there is no fresh water near. The cove at the head of the harbour is very shoal; no vessel should go higher up than abreast of the projecting rocky point on the east shore, where she would have four and five fathoms in mid-channel. The bottom is hard sand, and may be seen in twelve fathoms water, which makes it appear very shallow. In the entrance there are eighteen fathoms close to the shore on both sides.

PORT CALDERA is close to the northward of Port Yngles, and is directly round the point with the small island off it; it is a fine bay, well sheltered, but the entrance more open than Port Yngles, and the landing not so good. There was a cargo of copper ore ready to be shipped in the south corner of the bay; but no vessel had then ever taken a cargo away. There were a few fishermen living in a hole in the cliff during the fishing season: the only vessel they had ever seen in the port was a brigantine, with provisions for the mines. No vessel had ever been in Port Yngles. There is water near the beach, on the east side, but it is very salt; it appears wonderful how they can make use of it, but they have no other nearer than Copiapo. The land is entirely covered with loose sand, except a few

rocks on the points; the bottom of the bay is low, but the hills rise a little inland, and the ranges become higher as they recede from the coast: the first hill to the eastward is a very remarkable sharp-topped hill, the sides of which are covered with sand, with two low paps to the eastward of it. They have had strong northers here for two days, and sometimes a good deal of sea in the south corner of the bay; but in the north-east corner, which they call Calderillo, it is then smooth; they very seldom have heavy northers. There are fish to be got in the bay, but only with a net: in all the ports we visited we caught none alongside. Near the outer points of the ports there are rock fish to be caught, but there is always a heavy swell in such places.

Point Cabeza de Vaca is a remarkable point, about twelve miles to the northward of Caldera: it has two small hummocks near its extreme; inside them the land is nearly level for some distance in-shore, where it rises to several low hills, which form the extremity of a range. The coast between Caldera and the point forms several small bays, with rocky points between them, off all of which there are rocks a short distance: there is no danger within a quarter of a mile from Point Cabeza de Vaca. To the northward of the point there is a small rocky bay, called Tortoralillo, off the north entrance point of which there is a reef of rocks, with a high rock at the extreme of it, which extends above a quarter of a mile from the shore: about half a mile to the north-west of this there is a heavy breaker when there is much swell.

To the northward of this the coast is steep and rocky for three or four miles, with a high range of hills running close to the shore; then there is a small cove, called Obispito, with a white rock on the south point of it: to the northward of this the land is low and very rocky, with breakers about a quarter of a mile from the shore. About two miles from the cove there is a point, with a small white islet off it; to the northward of which the coast trends to the eastward, and forms the small cove of Obispo, in which we anchored, but it is not fit for any vessel. There was a fire on shore in the night, but we saw no ore, and as the landing was bad we did not attempt it. There is a very high sand hill, with the summit stony, a little in-shore of the cove, and to the northward of it a higher range of stony hills running close to the

* For more information respecting the vicinity of Copiapo, see pages 229 and 230.

coast for about seven miles, where it terminates in low rugged hills a little in-shore of a brown rugged point, with a large white patch on its extreme, which is an islet, but does not show as one from the sea. To the northward of this point there is a fine bay, in which we anchored, and, from a fisherman who came off, learned that it is FLAMENCO: it is a very good port, well sheltered from southerly winds, and better from northerly, as the point projects far enough to prevent a heavy sea getting up. The landing is good in the S.E. corner of the bay, either on the rocks, or on a beach in a small cove in the middle of a patch of rocks, a little more to the northward, where there are a few huts, in which two brothers, with their families, were living; their chief employment was catching and salting fish, called congre, and drying them to supply Copiapo. In one day they had caught four hundred. They appeared to live in a miserable way, in huts made of seal and guanaco skins, much worse than a Patagonian "toldo"; the only water they had to drink was half salt, and some distance from the shore. They sometimes get guanacoes, that they run down with dogs, of which they have a great number.

The only vessel they had ever seen here, was a ship which anchored one night, on her way to Las Animas for copper ore, six years ago; they described Las Animas as a very bad place, not fit for any vessel, and in consequence no cargo had ever been shipped again, but taken to Chañeral, which was better, but not so good as Flamenco. There are no mines so near Flamenco as to Chañeral.

Flamenco may be known by the white patch on the brown rugged point, to the southward of which, in-shore, there are low rugged hills, rising to a high range. On the north side of the bay the land is very low: the north point is a low rocky point, with a detached hill rising out of the low land a little in-shore. To the northward there is another hill very much like it; in the depth of the bay the land is very low, and a deep valley runs back between two ranges of rugged hills. The hills are all covered with yellow sand near their bases, and to about half way up their sides, the tops are stony, with a few stunted bushes.

In the bay, to the northward of Flamenco, in which Las Animas was said to be, we could see no place fit even for a boat to land; the whole bay is rocky, with a few little patches of sand, and a heavy surf was breaking on the shore. The north point of this bay is

low, but a little in-shore there is a high range of hills, the outside of which is very steep: to the northward of this point there is a small rocky bay, which appears to answer better to the description of Las Animas than the other; it did not appear a fit place for vessels, and the landing was bad. The north point of this bay is a steep rocky point, with a round brown hill rising directly from the water's edge; the sides of the hills are crossed by dark veins, running in different directions, which are very remarkable. To the northward of this point there is a deep bay, which, from the description, must be Chañeral: the south side of it is rocky with small coves, but the landing appeared to be bad; the east and north shores of it were low and sandy, and a heavy surf was breaking on the beach. We could see no signs of any people, or piles of ore, along the coast; and as it did not appear a good place for vessels, and our time was short, it was not thought worth a more particular examination. The north point of the bay is low and rocky, with a high range a little in-shore. To the northward of this point the hills and coast are both composed of brown and red rocks, with a few bushes on the summits of some of the hills: the sandy appearance the hills have to the southward ceases, and the prospect is, if possible, more barren.

Nearly nine miles to the northward of the point of this bay is Sugar Loaf Island, which is about half a mile from the shore; in coming from the southward, there is a high sugar loaf hill on the main, a little to the southward of the island, for which it may be mistaken, but the island is not so high and the summit is sharper. Between Sugar Loaf Island and Chañeral, the coast is rocky and affords no shelter: there is a small bay to the southward of the passage, between the island and the main, which would afford shelter from northerly winds, but with southerly it is exposed, and the landing is very bad. In the middle of the passage there are five fathoms in the shallowest part: the water in the northern end of it is smooth, and a vessel might anchor off the point of the island, sheltered from southerly winds, in six or seven fathoms; but after eight fathoms it deepens suddenly to thirteen and twenty fathoms, about half a mile from the island. There is a small bay on the main, to the northward of the channel, where a vessel would be sheltered from southerly winds, but we did not examine it.

About twenty miles to the northward of the Sugar Loaf Island

there is a projecting point, with some small rocky islets off it, which we supposed to be Point Ballena, from the description given at Port Caldera. Between the point and the Sugar Loaf Island, the coast runs back a little, and is rocky, with a high range of hills running close to the shore. A little to the northward of Point Ballena there is a small bay, with a rocky islet about half a mile off the south point of it; the top of the islet is white, and answers the description given to us of a port called Ballenita: but it is not worth the name of a port; it is very rocky, with two or three small patches of sandy beaches, in which a heavy surf was breaking; the hills run close to the water, and have a very rugged appearance. A little to the northward of this there is another bay, which seemed to be Lavata: the south point has several low rugged points upon it, and in-shore the hills rise very steep. There is a small cove with excellent landing, directly behind this point, on which we anchored; there was a better-looking port inside, but it was so far from the outer coast, that our time would not allow more than a hasty glance.

The inner cove of the bay in which we anchored appeared to afford good shelter from southerly winds, and the water was very smooth. A little to the northward of this bay there is a point, which, till close, appears to be an island: but it is joined to the shore by a low shingle spit: the summit of it is rugged, with several steep peaks on it: several rocky islets lie scattered off the point.

Near three miles and a half to the northward of this, there is another point, very rugged, and with a high round hummock a little in-shore: to the southward of this point there is a deep bay, in which we expected to find Paposo, as we were some distance to the northward of its position in the old charts, but there were no appearances of any houses or inhabitants: the bay is very rocky, and does not afford good anchorage; several rocks lie off the south point, and a little inside it there is a reef running half-a-mile from the shore: in the bottom of the bay there are several small white islets; and two or three small sandy coves, which are not large enough to afford shelter for a vessel. This bay is called Isla Blanca.

About three miles from the north point of the bay, there is a white islet, with some rugged hummocks upon it: a little in-shore there is a hill of a much lighter colour than any round it; to the northward of this there is a deep bay, in which we were certain of finding Paposo, and, as we were becalmed, I went in a boat to search for it;

on landing at the point we saw a smoke on the east side of the bay, and, on pulling over there, found two fishermen, who told us that the place was HUESO PARADO, and that Paposo was round another point about eight miles to the northward. On inquiring for water, they brought us some, which was better than what was used in some other places to the southward, but it was still scarcely fit for use; they said it was similar at Paposo, and they thought it very good. In the south corner of the bay there appeared to be fit anchorage for vessels, and the landing good, but very open to northerly winds. No vessel had ever been there in the recollection of the men that we spoke to, neither had they heard of any; they described Paposo as having only four 'ranchos' and a few fishermen: the port not good. The bay that Paposo is in they called Nuestra Señora, the north point of the bay Point Rincon, and the south, Point Grande; the projecting point, answering to the Point Nuestra Señora of the Spanish charts, they called Point Plata. The bay to the northward of Point Ballena, is Ballenita; the bay in which we anchored to the northward of it is called Lavata; the point, with the peninsula, is Isla de las Tortolas: the point to the northward of it Point San Pedro; the bay which we were in afterwards is Isla Blanca, and the point of Hueso Parado Bay, Point Taltal.

The only place at which we observed the time of syzygial high-water, quite satisfactorily, was Huasco,* where it is 8.30, and the rise four feet at neap tides; at springs, it rises about two feet more. From the swell on all this coast, it is very difficult to get the time of high-water at all near the truth; the rise and fall appeared to be five or six feet on all parts of the coast. The only perceptible current we experienced was in the channel between Sugar Loaf Island and the main, where there was a very slight one to the northward, not more than a quarter of a mile an hour; and this was after a fresh breeze from the southward for several days. It is said, however, by coasters, that there is usually a set, towards the north, of about half a mile an hour.

* And here the tide was very carefully observed in a cove, where there was no swell; yet from the small rise, the exact time could not be taken within a few minutes. The water remained at the same level about half an hour.

WINDS ON THE COAST OF CHILE.

Very few words will suffice to give strangers to the coast of Chile a clear idea of the winds and weather they may expect to find there, for it is one of the least uncertain climates on the face of the globe.

From the parallel of 35° S., or thereabouts, to near 25° S., the wind is southerly, or south-easterly, during nine months out of twelve; in part of the other three there are calms, or light variable breezes, and the remainder is really bad weather: northerly gales and heavy rain prevailing, not only on the coast, but far across the ocean in parallel latitudes.

From September to May is the fine season, during which the skies of Chile are generally clear, and, comparatively speaking, but little rain falls. I do not, however, mean that there are not occasional exceptions to the general case: strong northers have been known (though rarely) in summer; and two or three days of heavy rain, with but little intermission, now and then disturb the equanimity of those who have made arrangements with implicit confidence in the serenity of a summer sky. These unwelcome interruptions are rarer, and of less consequence, northward of 31° than they are to the south of that parallel: so nearly uniform, indeed, is the climate of Coquimbo, that the city is called 'La Serena.'

In settled weather a fresh southerly wind springs up a little before noon (an hour sooner or later), and blows till about sunset, occasionally till midnight. This wind is sometimes quite furious in the height of summer; so strong, indeed, that ships may be prevented from working into anchorages, especially Valparaiso Bay, although they may take every previous precaution, by sending down top-gallant yards, striking top-gallant masts, and close-reefing their sails. But the usual strength of the southerly sea-breeze (as it is called, though it blows along the land from the south) is such as a good ship would carry double-reefed top-sails to, while working to windward.

This is also nearly the average strength of a southerly wind in the open sea, between the parallels above-mentioned, and there it is neither so strong by day, nor does it die away at night. Within sight of the land a ship finds the wind freshen and diminish,

nearly as much as in the ports of this coast, where the nights are generally calm, till a land breeze from the eastward springs up. This light message from the Cordillera is never troublesome, neither does it last many hours. With these winds the sky is almost always clear; indeed, when the sky becomes cloudy it is a sure sign of little or no sea breeze in summer, and probably a fall of rain: in the winter it foretels an approaching northerly wind, with rain.

In summer, ships anchor close to the land, to avoid being driven out to sea by strong southerly winds; but as the winter approaches a more roomy berth is advisable, though not too far out, because near the shore there is always an undertow, and the wind is less powerful. Seamen should bear in mind that the course of the winds on this coast, as in all the southern hemisphere, is from north to south, by the west: that the hardest northerly blow, with most sea, comes from the westward of north, and that, therefore, they should get as much as possible under the shelter of rocks or land to the westward of them, rather than of those which only defend from north winds, 'Northers,' as they are called, give good warning: an overcast sky; little or no wind unless easterly; a swell from the northward; water higher than usual; distant land remarkably visible, besides being raised by refraction; and a falling barometer; are their sure indications: but all northers are not gales: some years pass without one that can be so termed; though few years pass in succession without ships being driven ashore on Valparaiso beach. Thunder and lightning are rare: wind of any disagreeable strength from the east is unknown. West winds are only felt while a 'norther' is shifting round, previous to the sky clearing and the wind moderating. The violence of southerly winds lasts but a few hours: that of a northerly gale seldom continues beyond a day and a night, generally, indeed, not so long.

Some persons say that the strength of northerly winds is not felt to the northward of Coquimbo, but I have evidence of gales, with heavy seas, at Copiapo: and Captain Eden informed me that he had a very heavy gale of wind in H.M.S. 'Conway,' in latitude 25° S., and longitude 90° W., where such an interruption to the usual southerly winds was little expected.

How to make passages is easy to tell, for there are but two ways. When going northward, steer direct to the place, or as nearly so as is consistent with making use of the steady winds which prevail in

the offing: and if bound to the south, steer also direct to the place, if fortunate enough to have a wind which admits of your doing so; but if not, stand out to sea, by the wind, keeping every sail clean full: the object being to get through the adverse southerly winds as soon as possible, and reach a latitude from which the ship will be sure of reaching her port, on a direct course. Every experienced seaman knows that no method is more adverse to making quick passages than that of 'hugging the wind,' as it is called. When Sir Thomas Hardy was on this coast, he used to cross the southerly winds with a topmast studding-sail set, as many men cross the trades, his object being to get into other winds. The current on the coast of Chile is northerly, about half a mile an hour; varying a little with the wind.

The idea some persons have of Copiapo being a difficult place to make is rather unfounded; the following is the manner in which we made it in the Beagle, when strangers to that part of the coast.

July 3. A dull gloomy day, wind moderate from the southward; at 10 A.M. we were thirty miles south of Copiapo, by the dead reckoning from noon yesterday; but being aware of the northerly set, which near the shore is half a mile an hour, we steered an E.N.E. course in for the land; at noon it was in sight, forming two long rounded-topped hills: the northern one was the highest, it ended in a bluff, with a low point sloping off it; this we rightly supposed was the Morro of Copiapo, it bore N.E.; and the other which was a-head the high land of Tortoral; this had a gradual slope to seaward. A round and rather peaked black rock, about ten feet high, a little open, of a low level (eighty-five feet high) of a light brown colour, with some remarkable white patches on it, was seen at three; and a little before it, about a point south of the Morro, was a low, black, rocky island. The latter was Isla Grande, and the former the Caxa Grande rock, with the west point of the anchorage cove, on which there is a flag-staff: as we neared the land the wind gradually left us; and, as the day closed, we were four miles from the Caxa Grande. The clouds that covered the high land in-shore of Copiapo, lifted off a little in the evening, showing us two remarkable hills, one with a notched top, and the other like a sugarloaf, with rather a flat top; this was in a direction a little south of the Caxa Grande, and

the other nearly over Isla Grande. (Head to the westward during the night with light variable airs.)

July 4. A perfect calm all day, and no observation: we were drifted abreast of the bluff under the Morro by the afternoon; it has some very curious white patches, which are seen at some distance; indeed the whole of the land is very remarkable. Plyed to the southward during the night, wind light.

July 5. Wind light from the N.N.E., and gloomy weather; at 10 A.M., passed one mile to the N.E. of the reef; north of the Caxa Grande rock we had eighteen fathoms, between it and the Isla Grande, with fifty-seven outside, and sixteen in. As we stood in we could not, from the mast-head, see any thing of the breakers said to be off the Caxa Grande rock: as the breakers ran high on the other reefs; had there been any thing of the sort there, we should most likely have seen it: all the information we have been able to get on the subject denies their existence. Detached, but close to the N.E. part of the anchorage point, are two black rocks, ten feet high; they show well from the northward. About twenty-five miles to the N.E. of the Morro, are two singular peaks: they are higher than any of the other land; the summit of the northern one is very pointed, and the southern is rather saddle-topped; these, it would seem, must be very remarkable from seaward. We anchored in seven fathoms, Caxa Grande rock bearing S. 67° W., distant three cables from the two rocks before-mentioned.

As Iquique is situated on a part of the coast where calms are frequent, and exposed to a constant swell from the westward, there may perhaps exist some difficulty in finding it; indeed, from this very circumstance, persons do not go sufficiently near the shore, although the position of the spot is nearly correct in the common charts.

The centre of the island lies in lat. 20° 12′ 30″ S. and long. 70° 15′ W. The slight indentation the bay makes in this high precipitous coast is not perceptible from an offing of nine or ten miles, neither is the collection of sand behind and south of the bay likely to catch the eye of a stranger: should there happen to be a vessel there, her dark masts against the white sand make an excellent mark; without which, there is nothing to guide a stranger until he gets within sight of the church steeple, or some white patches in the cliffs under Ta-

rapaca Mountain; the latter will probably be seen first; they are nine miles to the southward of the anchorage.

The houses in the village, when first seen, have just the appearance of so many black rocks on a sandy beach. The anchorage is very tolerable, as it is sheltered from the S.W. swell by the island; which is surrounded by numerous small detached rocks, particularly on the N.E. and W. sides; therefore it should not be approached nearer than half a mile.

This island was once much higher; the many cargoes of birds' dung* it has afforded have reduced it to its present low state. The landing is bad at the best time, as you have to thread your way among patches of sunken rocks; on which the sea breaks with great violence at the full and change of the moon: several boats have been knocked to pieces, and lives lost. In the summer it is a calm nearly all night, sometimes there is a light air from the land. The sea breeze sets in from the southward or south-west about ten or eleven in the forenoon; it seldom blows fresh, but lasts until eight or ten at night. In the winter, calms, hazy weather, and light northerly winds are common.

The only trade now to Iquique is for saltpetre; the rich silver mines formerly worked are exhausted.

The water the inhabitants use is brought from Pisagua, a small bay thirty miles to the northward, for which they pay dearly, brackish as it is. Forty houses and an old church, situated on a bare sandy flat, without a vestige of verdure of any kind near, are the features Iquique presents; in vain does the eye wander for something green to rest upon—extreme desolation reigns every where, from shore to summit.

No. 41.

Remarks on the Coast of Peru.

All the bearings are magnetic.

From Point San Pedro (the south point of the bay of Nuestra Señora), at the distance of twenty miles, is Point Grande, the north point of the before-named bay. This point, when seen from the S.W., appears high and rounded, terminating in a low rugged

* Called 'guano:' it is a valuable manure.

spit, with several hummocks on it, and surrounded by rocks and breakers to the distance of a quarter of a mile. N. 21° W., nine miles and a quarter, is Point Rincon, having a large white rock off it; between these two points, in the latitude of 25.02 S., lies the village of Paposo, the most northern village on the coast of Chile. This is a miserable place, containing about 200 inhabitants, under an Alcalde; the huts are scattered, and difficult to distinguish, from their being the same colour as the hills at the back of them. Vessels touch here occasionally for dried fish and copper ore: the former plentiful but the latter scarce. The mines lie in a S.E. direction, seven or eight leagues distant: but are very little worked. Wood and water may be obtained on reasonable terms; the water is brought from wells two miles off, and is difficult to embark. Vessels bound for this place should run in on a parallel of 25.05., and when at the distance of two or three leagues, the white islet off Point Rincon will appear, and shortly after the low white head of Paposo. The course should be immediately shaped for the latter; for with that head bearing S.S.E., distant half a mile, is the anchorage, in from fourteen to twenty fathoms, sand and broken shells. Should the weather be clear (which is seldom the case), a round hill, higher than the surrounding ones, and immediately over the village, is also a good guide.

North twenty-three degrees west from Point Grande, at the distance of twenty-three miles, is Point Plata, similar in every respect to Point Grande, terminating in a low spit, off which lie several small rocks, forming a bay on the northern side, with from seventeen to seven fathoms water; rocky, uneven ground.

From this point to Point Jara, which lies north ten degrees west, fifty-two miles, the coast runs in nearly a direct line, a steep, rocky shore, surmounted with hills, from 2,000 to 2,500 feet high, and without any visible shelter, even for a boat.

Point Jara is a steep, rocky point, with a rounded summit, and has on its northern side a snug cove for small craft; it is visited occasionally by sealing vessels, who leave their boats to seal in the vicinity. Water is left with them; and for fuel they use the kelp, which grows in great quantity, as neither of these necessaries of life are to be had within twenty-five leagues on either side ofthem.

Nearly four miles due north from this point is the south point of the large bay of Moreno, or Playa brava, high and rocky, with a

black rock lying off it; and N. 26° W., twenty-two miles distant, is Point Davis (the south-west point of Moreno peninsula), which slopes gradually from Mount Moreno, and has two nipples on its extreme.

Mount Moreno, formerly called George Hill, is the most conspicuous object on this part of the coast; its summit is 4,060 feet above the level of the sea, sloping gradually on the south side to Point Davis, where it terminates; and on the north more abruptly towards the barren plain on which it stands. It is of a light brown colour, without the slightest sign of vegetation, and has a deep ravine on its western side.

Immediately under Mount Moreno is Constitucion Harbour, a small but snug anchorage, formed by the main land on one side and Forsyth Island on the other. Here a vessel might careen and undergo repairs without being exposed to the heavy rolling swell which sets into most of the ports on this coast; and the landing is excellent: the best anchorage is off a sandy spit at the north-east end of the island, in six fathoms water, muddy bottom; farther out the holding ground is bad; it would be advisable to moor ship securely, as the sea-breeze sometimes sets in strong. In running in, the island, or weather side, should not be hugged too close, as a number of sunken rocks lie off the low cliffy points—some only being buoyed by kelp. A mid-channel course would be the best, provided the wind allowed of reaching the anchorage before-mentioned: neither wood nor water are to be found in this neighbourhood—therefore provision must be made accordingly.

N. 8° W., twelve miles from this harbour, is Moreno Head, a steep bluff, the termination of a range of table land, which runs in a line from Mount Moreno; on the northern side of this head is Herradura Cove, a narrow inlet, running in to the eastward, without affording any shelter.

N. 4° W., nine miles from this head, lies Low Point, with some sunken rocks lying off it, and five miles farther on is Leading Bluff; this is a very remarkable headland, and with the hill of Mexillones, which lies a few miles south of it, is an excellent guide for the port of Cobija; it is about one thousand feet high, and facing the north is entirely covered with guano, which gives it the appearance of a chalky cliff. There is an islet about half a mile to the north-west, attached to the main by a reef of

rocks, but no danger of any description outside it. The hill of Mexillones is 2,650 feet high, has the appearance of a cone with the top cut off, and stands conspicuously above the surrounding heights. This in clear weather is undoubtedly the best of the two marks; but as the tops of hills on the coast of Peru are frequently covered with heavy clouds, the bluff is the surer mark, for it cannot be mistaken; as, besides its chalky appearance, it is the northern extreme of the peninsula, and the land falls back several miles to the eastward of it.

Round this head is the spacious bay of Mexillones, eight miles across—but of little use, as neither wood or water is to be obtained. The shore is steep-to; there is anchorage on the west side, two miles inside the bluff, a cable's length off a sandy spit, in seven fathoms sandy bottom: at the distance of three cables there is thirty fathoms.

From this bay the coast runs nearly north and south, without any thing worthy of remark, until you reach the Bay of COBIJA, or LA MAR. This lies N. 13° E. thirty-one miles from Leading Bluff, is the only port of the Bolivian Republic, and contains about fourteen hundred inhabitants. Vessels call occasionally to take in copper ore and cotton; but the trade is small (particularly in 1835, as the revolution in Peru had destroyed the little they had). Water is scarce, at least, that which is good: there are wells, but the water from them is very brackish, and will not keep in casks. Fresh meat may be procured at a high price; but fruit and vegetables, even for their own consumption, are brought from Valparaiso, a distance of seven hundred miles. They have a mud-built fort, of five or six guns, on the summit of the Point; the only fortification about the place.

If coming from the southward toward this bay: after having passed the Leading Bluff (which should always be made), it would be advisable to shape a course so as to close the land two or three leagues to windward of the port, and then coast along until two white-topped islets, off False Cobija Point, are seen; a mile and a quarter to the northward of them is the port. On the Cobija Point there is a white stone, which shews very plainly, in relief against the black rocks at the back of it: a white flag is usually hoisted at the fort, when a vessel appears in the offing—which is also a good guide. In going in there is no danger; the point is steep-to, and may be rounded at a

cable's length distant, and the anchorage is good in eight or nine fathoms, sand and broken shells. In the bay there are a number of straggling rocks, all well pointed out by kelp. It is high water at the full and change at 9 h. 54 m., and the tide rises four feet. Landing, at all times is indifferent, and at full and change, owing to the heavy swell, it requires some skill in winding through the narrow channel, formed by rocks on each side. Two miles north and east is Copper Cove, a convenient place for taking in the ore; there is anchorage in twelve fathoms, a short distance from the shore.

After leaving the north point of Cobija Bay, which has a number of straggling rocks a short distance off it, the coast takes a rather more easterly direction; generally shallow sand bays, with rocky points, and hills from two to three thousand feet high close to the coast, but no anchorage or place fit for shipping, until you reach ALGODON BAY, twenty-eight miles from Cobija.

This bay is small, and the water deep; we anchored a quarter of a mile from the shore, in eleven fathoms, sand and broken shells, over a rocky bottom; its only use is as a stopping-place for water, should it be required. It may be obtained at the Gully of Mamilla (seven miles to the northward) from a spring, a mile and a half from the beach; the usual method of bringing it is in bladders made of seal-skin, holding seven or eight gallons each, with which most of the coasters are provided—the only vessels that profit by a knowledge of these places.

Algodon Bay may be distinguished by a gully leading down to it, and that of Mamilla to the northward, which has two paps on the heights, over the north side of it; there is also a white islet off Algodon Point.

N. 2° W., ten miles from this bay, is a projecting point, called in the Spanish chart SAN FRANCISCO, but known more generally by the name of PAQUIQUI; on the north side of it, and near the extreme, is a large bed of guano, so much used on this coast for manure, that it may be said to be quite a trade. A brig of one hundred and seventy tons was loading with it for Islay at the time we passed; she was moored head and stern within a cable's length of the rocks, on which a considerable surf was breaking, and the guano was brought off in a balsa to a launch just outside the surf. There is better anchorage farther in the bay; but this is chosen for convenience.

N. 2° W., sixteen miles from Paquiquí, is POINT ARENA, a low, sandy point, with rocky outline: between the two is a small fishing village, near a remarkable hummock: anchorage may be obtained under Point Arena, in ten fathoms; fine sandy bottom.

N. 6° E., twelve miles from Point Arena, is the gully and river of LOA, which forms the boundary line between Bolivia and Peru. It is the principal river on this part of the coast; but its waters are extremely bad, in consequence of running over a bed of saltpetre, and the hills surrounding it containing a quantity of copper ore. It is said that the ashes of a volcano fall into it, which add greatly to its unwholesomeness; but bad as it is, the people residing on its banks have no other. At Chacansi, in the interior, where it divides, it is tolerably good. In the summer season it is about fifteen feet broad and a foot deep, and runs with considerable strength to within a quarter of a mile of the sea, where it spreads, and flows over, or filters through the beach; but does not make even a swatchway, or throw up any banks, ever so small. A chapel on the north bank, half a mile from the sea, is the only remains of a once populous village. People from the interior visit it occasionally for guano, which is in abundance.

There is good anchorage, but rather exposed to the sea-breeze, with the chapel bearing north, half a mile from the shore, in from eight to twelve fathoms, muddy bottom; and landing may be effected under Point Chileno; but the best anchorage near here is the Bay of Chipana, six miles N. 39° W. from the river, and a snug cove for landing, near the extreme of the point; but at the full and change, a heavy swell sets in, and I doubt a boat being able to land with goods at those times.

The best distinguishing mark for the Loa is the gully through which it runs, that may be easily known from its being in the deepest part of the bay, formed by Point Arena on the south and Point Lobo on the north; and the hills on the south side being nearly level, while those on the north are much higher and irregular.

For the BAY OF CHIPANA—after making the land in the latitude of the Loa, a large white double patch is seen on the side of a hill near the beach, and another similar one, a little to the northward: on discovering these marks (which may be seen three or four leagues), a course should be shaped directly for the southern end, where lies the anchorage in seven fathoms, sand and broken shells, under a low,

level point. No danger need be feared in entering; as although the land is low, it may be approached within half a mile, in from six to ten fathoms. The anchorage inside the long kelp-covered reef might perhaps, be preferred; but the landing is not so good.

N. 27° W. of this bay, at the distance of eighteen miles, is POINT LOBO, or Blanca, high and bold, on its extreme are several hillocks. Between these two is a small fishing village, called CHOMACHE, under a point, which has a long reef off it, on the outer part of which a cluster of rocks shew themselves a few feet above water. The people of this village get their water from the Loa—a passage requiring, on a balsa, four days or more.

N. 21° W., fourteen miles off Point Lobo, is POINT PACACHE, a low rugged projecting point, with an islet a quarter of a mile off it, but quite clear outside this islet: half way between these two points is the CONE (Pabellon) of PICA, a remarkable hillock of guano appearing as if it had been covered with snow which had thawed at the top, leaving the lower half frozen, contrasting strongly with the surrounding hills, which are of a barren sun-burnt brown. This is also a place of resort for the guano vessels; they find pretty good anchorage close to the northward of the Pabellon.

East, a little southerly, a few miles in-shore of this, is a bell-shaped mountain, named CARRASCO, 5,500 feet high: in clear weather it is a good mark for the neighbourhood of Iquique.

From Point Pacache to Point Grande, N. 8° W. twenty-eight miles, the coast is low and rocky, the termination of a long range of table land, called the heights of OYARVIDE, or BARRANCAS, from its cliffy appearance: it has innumerable rocks and shoals off it, and should not be approached on any account nearer than a league, for the frequent calms and heavy swell peculiar to this coast render it unsafe for nearer approach.

POINT GRANDE at the north end of the Barrancas, is a low cliffy point, with three white patches on its northern side; round this point is the Bay of Cheuranatta.

N. 3° W., eleven miles from Point Grande is the anchorage and town of Iquique; a miserable place that affords scarcely sufficient provisions for the consumption of its inhabitants, about five hundred souls; and no water nearer than Pisagua (a distance of nearly forty miles), from which place it is brought by boats built for the purpose, and is very dear. Yet, with these disadvantages, it is a place of con-

siderable trade, from the quantity of saltpetre, and the silver mines of Huantacayhua, in its neighbourhood: the latter are little worked, as the saltpetre is a surer profit, large cargoes of which are annually taken in English vessels. There are no imports; all the property belongs to merchants in Lima, where vessels are chartered, and have only to call here and take in their cargoes.

Vessels bound for this place should run in on the parallel of Point Grande, until the white patches on that point are discerned, when a course should be shaped for the northern of three large sand hills: stand boldly in on this course till the church steeple appears, when shortly after, the town and low island will be seen, under which is the anchorage; care must be taken in rounding this island to give it a good berth, a reef extending off it to the westward, to the distance of two cables' lengths.

The anchorage is good in eleven fathoms, with Point Piedras bearing N. 9° W.; W. extreme of the island, W. 32° S.; church steeple S. 15° E.

Vessels have attempted the passage between the island and the main by a mistake, and thereby got into danger, from which they have been extricated with difficulty: it is only fit for boats or very small vessels.

Landing is bad and the way hazardous, owing to the number of blind breakers with which it abounds; boats have been lost at the full and change of the moon, when the heavy swell sets in. Balsas are employed to bring cargoes to a launch at anchor outside the danger, as is the case in most of the ports on this coast.

N. 12° W., eighteen miles from Point Piedras (the north point of Iquique Bay, which has a cluster of rocks round it), is the small bay of Mexillones, appearing as a low black island with a white rock lying off it, and may be known by the Gully of Aurora a little to the southward, and a road apparently well trodden on the side of the hills, leading to the mines. And N. 20° W., thirty-three miles from Point Piedras, is Point Pichalo, a projecting ridge at right angles to the general trend of the coast, with a number of hummocks on it. Round to the northward of this point is the village and roadstead of Guano Pisagua; this, as well as Mexillones, is connected with Iquique in the saltpetre trade, and is resorted to by vessels for that article. In rounding the point, a sunken rock lies about half a cable's length off, and should be looked out for, as it is necessary to

hug the land close to ensure fetching the anchorage off the village at the beginning of the ridge; baffling winds are frequent, which may throw you near the shore, but do not signify, as the water is smooth and the shore steep-to. The best anchorage is with the extreme of Pisagua Point, N. 7° 30′ W.; and Pichalo Point, W. 19° S., two cables' length off the village, in eight fathoms, by which you will avoid a rock with four feet water on it, lying off the sandy cove at the distance of two cables.

North of this, at the distance of two miles and a half, is the gully and river of PISAGUA, the water of which supplies the neighbouring inhabitants; it is not, when at its greatest strength, more than ten feet across, and then does not overflow, but merely filters through the beach into the sea. Generally speaking, it is dry nine months in the year; wells are dug near it where water, such as it is, may always be found: but no vessel should trust to watering at this place, as, besides its unwholesomeness, the difficulty and expense attending it would be very great.

From this to Point Gordo the coast is in low broken cliffs, with a few scattered rocks off it, and ranges of high hills near. Point Gordo is a low jutting point, where a long line of cliff, several hundred feet high, commences; which continues, with only two breaks, to Arica.

These breaks or gullies, as they are called, are very remarkable, and are useful in making Arica from the southward. The first is the gully of Camarones, which lies seven miles north of Point Gordo, and is about a mile in width, running at right angles to the coast towards the mountains, with a stream of water running down it, and a quantity of brush-wood on its banks; it forms a slight sandy bay, scarcely sufficient to shelter a vessel from the heavy swell.

The Gully of Victor is the other; it lies N. 17° W., twenty-nine miles from that of Camarones, and fifteen miles from Arica; it is about three quarters of a mile in width, and from a high bold point, called Point Lobo, jutting out to the southward, forms a tolerably good anchorage for small vessels; it also runs toward the mountains in a similar manner to that of Camarones, and like it has a small stream running through, with verdure on its banks. Vessels bound to Arica should endeavour to make this gully or ravine, and when within three or four leagues of it they will see Arica Head, which appears as a steep bluff, with a round hill in shore, called Monte Gordo. Upon nearer approach the island Huano will be observed, joined to

the head by a reef of rocks. To the northward of this island, and round the head is the port and town of Arica, the sea-port of Tacna. Of late this place has been the seat of civil war from which it has severely suffered. It was in contemplation in the latter end of 1836 to make it the port of the Bolivian territory; should that take place, it would perhaps become next in importance to the harbour of Callao, the principal port in Peru: its present exports are bark, cotton, and wool; for which is received, in return, merchandize, chiefly British. Fresh provisions and vegetables, with all kinds of tropical fruit, may be had in abundance and upon reasonable terms; the water also is excellent, and may be obtained with little difficulty; as a mole is run out into the sea, which enables boats to lie quietly while loading and discharging: the only inconvenience is having to carry or roll it through the town. Fever and ague are said to be prevalent; this in all probability arises from the bad situation which has been chosen for the town, the high head to the southward excluding the benefit of the refreshing sea-breeze, which generally sets in about noon. In entering this place there is no danger whatever; the low island may be rounded at a cable's distance in seven or eight fathoms, and anchorage chosen where convenient.

Hence the coast takes a sudden turn to the westward, and as far as the river Juan de Dios, is a low sandy beach with regular soundings: from this river it gradually becomes more rocky, and increases in height till it reaches the Point and Morro Sama, known by some as the Devil's Headland. This is the highest and most conspicuous land near the sea, about this part of the coast, and appears from its boldness to project beyond the neighbouring coast line; on its western side is a cove formed by the point called Sama, where coasting vessels occasionally anchor for guano; there are three or four miserable looking huts, the residence of those who collect the guano; it would be quite impossible to land except in a balsa, and even then with difficulty. Should a vessel be drifted down here by baffling winds and heavy swell, which has been the case, she should endeavour to pass the head (as a number of rocks surround it); and about a mile to the westward anchorage may be obtained in fifteen fathoms.

N. 45° W., nine miles from Point Sama, is a low rocky point, called Tyki, and between the two, the small river Lucumbu, having low cliffs on each side of it; this, like most of the rivers on the coast, has not strength to make an outlet for itself, but is lost in the

shingle beach at the foot of the before-mentioned cliffs; regular soundings, which continue gradually increasing until you reach Point Coles, may be obtained at the distance of two miles, in from fifteen to twenty fathoms.

W. 21° N., at the distance of thirty-one miles from Point Sama, is Point Coles; the coast between is alternately sandy beach, with low cliff, and moderately high table land a short distance from the coast. I doubt if landing could be effected any where between Arica and Port Coles, as a high swell sets directly on this part and appears to break with redoubled violence.

Point Coles is very remarkable; it is a low, sandy spit, running out from an abrupt termination of a line of table land. Near its extreme is a cluster of small hummocks, the whole, at a distance, appearing as an island; off the point, to the south-west, is a cluster of rocks or islets, but no hidden danger exists, although there is generally a quantity of froth, under which a reef may be suspected. N. 13° E., five miles and a half from this point, is the village and roadstead of Ylo. This is a poor place, containing about three hundred inhabitants, under the local governor and captain of the port. But little trade is carried on, and that chiefly in guano: a mine of copper has been lately discovered, which may add to its importance. The inhabitants have to supply the necessaries of life by cultivation, and do not care to trouble themselves about luxuries. Water is scarce, and wood is brought from the interior, so that it is not on any account a suitable place for shipping. The best anchorage is off the village of Pacoche (a mile and a quarter south of the town), in twelve or thirteen fathoms, and the best landing is in Huano Creek: but bad, indeed, is the best, and great care must be taken lest the boat be swamped, or hurled with violence against the rocks.

In going into Ylo, the shore should not be approached nearer than half a mile (as many sharp rocks and blind breakers exist), until three small rocks, called 'the Brothers,' always visible inside the table end, bear east, when the village of Pacoche may be steered for, and anchorage taken abreast of it, as convenient.

English Creek affords the best landing, but boats are forbidden that cove, to prevent contraband trade being carried on.

From Ylo, the coast trends to the westward, with a cliffy outline, from two to four hundred feet in height, and with one or two

coves, useful only to small coasters, until you reach the VALLEY OF TAMBO, which is of considerable extent, and may be easily distinguished by its fertile appearance, contrasting strongly with the barren and desolate cliffs on either side: those on the east maintain their regularity for several miles, while on the west the regularity is broken, and from the near approach of the hills their aspect is bolder.

The next point of this valley is called Mexico, it is E. 18° S., twenty-one miles from Islay Point, and is exceedingly low, projecting considerably beyond the general trend of the coast; it is covered with brushwood to the water's edge, and at the distance of two miles in a southerly direction, soundings may be obtained in ten fathoms, muddy bottom; from that depth, in the same direction, it increases to twenty fathoms; but on each side of the bank there are fifty fathoms.

W. 18° N., twenty-one miles from Point Mexico, is Point Islay, and between the two, five miles from the latter, the cove of MOLLENDO, once the port of Arequipa; but of late years the bottom has been so much altered, that it is only capable of affording shelter to a boat or very small vessel; in consequence of which it has been thrown into disuse, and the bay of Islay now receives vessels that bring goods to the Arequipa market.

ISLAY, the port of Arequipa, formed by a few straggling islets off the point, extending to the north-west, is capable of containing twenty or five and twenty sail. The town is built on the west side of a gradually declining hill, sloping toward the anchorage, and is said to contain fifteen hundred inhabitants (chiefly employed by the merchants of Arequipa). As in all the sea-ports of Peru, a local governor and captain of the port are the Authorities; this is also the residence of a British vice-consul. Trade was in a more flourishing condition here, even during a civil war, than at any place we visited; there were generally four or five, and often double that number of vessels discharging or taking in cargoes. The principal exports were wool, bark, and specie, in exchange for which British merchandize was chiefly coveted.

Islay being much frequented by British merchant vessels, and differences of opinion having arisen as to the best method of making it, detailed and clear directions should be given. Vessels have frequently been in sight, to the westward of the port, yet from the strength of the current (half a knot, and at the full and change often

as much as one knot per hour) setting to the westward, have been prevented from anchoring for several days.

This, no doubt, has been partly owing to the hitherto inaccurate position assigned it, and from a proper reluctance to expose a vessel on an imperfectly known coast, to be baffled and drifted about by light and variable airs, in addition to a heavy swell continually rolling directly toward the shore.

With the following directions, it is to be hoped that more confidence will be acquired, and consequently less delay occasioned in sailing to the seaport of the second city of Peru.

Coming from the southward, the land abreast of Tambo should be made, and a certainty of that place ascertained, which (according to the state of the weather) may be seen from three to six leagues: the course should then be shaped toward a gap in the mountain to the westward, with a defined sharp-topped hill in the near range, a short distance from it. In this gap is the road leading to Arequipa, which winds along the foot of the before-named hill from Islay.

As the coast is approached, the foot of the hills will be seen to be covered with white ashes (said to have been thrown from the volcano of Arequipa), not found on any other part of the coast. This peculiarity commences a little westward of Tambo, and continues as far as Point Ornilius, and when within three leagues, the Point Islay and white islets forming the bay, will be plainly observed, and should be steered for.

Care must be taken in closing the point, as a rock, barely covered, lies a quarter of a mile to the southward. It is the custom to go to the westward of all the islands; but, with a commanding breeze, it would unquestionably be better to run between the third outer and next island,* which enables you to choose your berth at once; this can seldom be done by the other route, the wind heading as you enter, obliging you to anchor, and use warps. The best anchorage is just within Flat Rock Point, off the landing-place, in ten or twelve fathoms. A hawser is necessary to keep the bow to the swell, to prevent rolling heavily, even in the most sheltered part. Vessels from the eastward should close the land about Tambo, and observe the same directions.

If from the eastward the parallel of seventeen degrees five minutes

* His Majesty's ships Menai and Challenger passed in between these islands.

should be made, and run in on, this will be about a league to the southward of the point; and, if the longitude cannot be trusted, Point Ornelius, being the most remarkable land, and easily seen from that parallel, should be searched for in passing. It lies W. 28° N., fourteen miles from Point Islay—is about two hundred feet high—has the appearance of a fort, with two tier of guns, and is perfectly white; the adjacent coast to the west is dark, and forms a bay; and on the east are low black cliffs; with ashes on the top extending half-way up the hills. If the weather be clear, the valley of Quilca may be seen, which is the first green spot west of Tambo. Ornelius, however, must be searched for, and when abreast of it Point Islay will be seen, topping to the eastward, as two islands off a gradual declining point, the sharp hill before-named in the near range, will also be seen, if favourable weather; and shortly after the town will appear like black spots, in strong relief against the white ground, when a course may be shaped for the anchorage under the white islets, as before. Landing at ISLAY is far from good; a sort of mole, composed of a few planks, with a swinging ladder attached to it, enables you generally, with a little management, to get on shore in safety; but often at the full of the moon vessels are detained three days or more, without being able to land or take in cargo. Fresh provisions may be had on reasonable terms; but neither wood nor water can be depended on. There are no fortifications of any description.

The coast between Islay and Point Cornejo is an irregular black cliff, from fifty to two hundred feet high, bounded by scattered rocks to the distance of a cable's length; about two leagues from Islay is a cove, called Mollendito, the residence of a few fishermen: there is a similar cove a little to the eastward of Point Cornejo. Westward of that point the coast retires and forms a shallow bay, in which are three small coves—Aranta, La Guata, and Noratos; and W. 36° N., thirteen miles distant, is the valley and river of QUILCA, off which vessels occasionally anchor, under the Seal Rock lying to the south-east of Quilca Point. This anchorage is much exposed; but landing is good in the cove westward of the valley. Watering is sometimes attempted, by filling at the river and rafting off, but must always be attended with much difficulty and danger. The valley is about three-quarters of a mile in width, and differing from the others, which are level, runs down the side of a hill; and from the regu-

larity of the cliffs by which it is bounded, has the appearance of a work of art.

W. 6° N., at the distance of six leagues, is the valley of CAMANA; the coast between is nearly straight, with alternate sandy beach and low broken cliff, the termination of the barren hills immediately above. Camana is from two to three miles broad, near the sea; and apparently well cultivated: the village is situated about a mile from the sea; but is scarcely perceptible, being small, and surrounded by thick brushwood.

On approaching from the eastward, a remarkable cliff, resembling a fort, will be seen near the sea; this is an excellent guide till the valley becomes open. There is anchorage in ten or twelve fathoms, muddy bottom, due south about a mile; but landing would be dangerous.

W. 18° N., twenty-three miles, is the the valley of Ocoña, the next remarkable place; it is smaller and less conspicuous than the former; but similar in other respects. An islet lies at its southern extreme, and several rocks near the extreme of the cliff, on its eastern side.

W. 11° N., fourteen miles, is a projecting bluff point called PESCADORES, it has a cove on its east side surrounded by islets; and off the point, at the distance of three quarters of a mile in a southerly direction, lies a rock barely covered: to the westward of the point is a bay, but no anchorage; the coast then runs in nearly a direct line until you reach POINT ATICO, a rugged point, with a number of irregular broken hillocks on it, barely connected with the coast by a sandy isthmus. At a distance it appears like an island, the isthmus not being visible far off: there is tolerable anchorage in nineteen or twenty fathoms on its west side, and excellent landing in a snug cove at the inner extreme of the point. By keeping a cable's length off shore, no danger need be feared in running into this roadstead. The valley of the same name lies a league and a half to the eastward, where are about thirty houses, scattered among the trees, that grow to the height of some twenty feet. From this point the coast continues its westerly direction (low and broken cliff, with hills immediately above) until you reach Point Capa, where a bay commences that runs as far as Point Chala; in it there are several coves, but none that could be serviceable to shipping.

Point Chala bears from Point Atico W. 20° N. and distant sixteen

leagues and a half, is a high rocky point, the termination of the Morro, or hill of that name. This mount shows very prominently, and has several summits to it; on the east side is a valley that separates it from another lower hill, with two remarkable paps, and on the west it slopes suddenly to a sandy plain; the nearest range of hills to the westward are thrown in-shore considerably, making Morro Chala still more conspicuous.

W. 26° N., eighteen miles from Point Chala, is Point Chavini, which appears like a rock on the beach; between the two is a sandy beach, with little green hillocks and sand-hills; there are also two rivulets, running from the valleys of Atequipa and Lomas, that are seen in the distance.

Half a mile to the westward of Chavini is a small white islet, and a cluster of rocks level with the water's edge; hence to the roadstead of Lomas a sandy beach continues, with regular soundings off it, at two miles from the shore.

Point Lomas projects at right angles to the general trend of the coast, and, similar to Atico, is all but an island; it may easily be distinguished although low, by its marked difference (being black rock) from the adjacent coast.

This road is the port of Acari, affords good anchorage in from five to fifteen fathoms, and tolerable landing; it is the residence of a few fishermen, and used as a bathing place for the inhabitants of Acari, which, from the information obtained, is a populous town several leagues in-land. All supplies, even water, are brought here by those who visit it: the fishermen have a well of brackish water scarcely fit for use. Boats occasionally call here for otters, which are plentiful at particular seasons.

W. 21° N., twenty-three miles from Lomas Road, is the Harbour of San Juan; and eight miles further, that of San Nicolas. The former is exceedingly good, and fit for a vessel to undergo any repairs in, or heaving down, in case of necessity, without being inconvenienced by a swell; but all materials must be brought, as well as water and fuel, none of which are to be found there.

The shore is composed of irregular broken cliffs, and at the head of the bay is a sandy plain; still the harbour is good, indeed much better than any other on the south-west coast of Peru, and might be an excellent place to run for if in distress. It may be distinguished by Mount Acari, a remarkable sugar-loaf hill, almost perpendicu-

larly over the cliff on the north side of the bay; and three leagues to the eastward, a short distance from the coast, a high bluff head, the termination of a range of a table land. Between this bluff and the harbour the land is low and level, with few exceptions, and has a number of rocks lying off it to the distance of half a mile.

S.W. three-quarters of a mile from Steep Point (the southern point of the harbour) lies a small black rock, always visible, with a reef of rocks extending a quarter of a mile to the northward; and nearly two miles to the S.E., there is an islet that shows distinctly. A passage may exist between this reef and the point, but prudence would forbid its being attempted; the safest plan is to pass to the northward, giving it a berth of a cable's length; and not close the shore until well within the next point (a sunken rock lies off it), when you may haul your wind and work up to the anchorage at the head of the bay, and come to in any depth from five to fifteen fathoms, muddy bottom. In working up, the northern shore may be approached boldly; it is steep-to, and has no outlying dangers.

The harbour of San Nicolas lies N. 41° W. eight miles from San Juan, is quite as commodious and free from danger as the latter, but the landing is not so good.

Harmless Point may be rounded within a cable; there are a number of scattered rocks to the southward of it, but as they all appear, there is no danger to be feared. There are no inhabitants at either of these ports, so that vessels wanting any repairs may be sure of not being interrupted while so employed.

N. 59° W., eight and a half miles from Harmless Point, is POINT BEWARE, high and cliffy, with a number of small rocks and blind breakers round, and some heights close above it; from this point the coast is alternately cliff and small sandy bays, till you reach Point Nasca, round which is what has been termed Port Caballos.

Point Nasca may be readily distinguished: it is a bluff head of a dark brown colour, 1,020 feet in height, with two sharp topped hummocks of a moderate height at the foot of it; the coast to the westward falls back to the distance of two miles, and is composed of white sand hills; in the depth of this bight is Caballos, a rocky shallow hole, that should only be known to be avoided; we lay at anchor in seven fathoms, as far in as it was thought prudent to go, for twenty four hours, without being able to effect a landing: the wind came round the head in heavy gusts, which, combined with the

long ground swell, made it doubtful if two anchors would hold us till our observations were concluded. The only traces we saw of there ever having been any inhabitants at this dreary place, was a pole sticking up on the top of a mound, near the head of the bay.

N. 64° W., thirteen leagues from Point Nasca is Point Santa Maria, and the rock called the Ynfiernillo. This point is low and rugged, surrounded by rocks and breakers. At the distance of a league and a half, inland, to the eastward, is a remarkable table topped hill, called the table of Doña Maria; this hill may be seen in clear weather at a considerable distance from seaward, and from its height and peculiar shape is a good mark for this part of the coast.

The Ynfiernillo Rock lies due west from the northern extreme of the point, at the distance of a mile; it is about fifty feet high, quite black, and in the form of a sugar loaf; no dangers exist near it: there are fifty-four fathoms at two miles distance. Between this rock and Point Caballos, the coast to a short distance west of the small River Yca is a sandy beach, with ranges of moderately high sand hills. From thence to the Ynfiernillo it is rocky, with grassy cliffs immediately over it, and some small white rocks lying off.

N. 31° W., ten and a half miles from Santa Maria, is Point Azua, a high bluff, with a low rocky point off it; between is a sandy beach, interrupted by rocky projections, and a small stream running from the hills.

N. 3° W., from Point Azua, and at the distance of twenty-one miles, is the southern entrance to the bay of the Yndependencia. This extensive bay which is fifteen miles in length in a N.W. and S.E. direction, and three miles and a half broad, has been till of late years, completely unknown or overlooked: no mention is made of it in the Spanish charts, and it was not till the year 1825 that the Hydrographer at Lima became aware of its existence, and then only by an accidental discovery. It has two entrances: the southern called Serrate, which takes its name from the master of the vessel by whom it was discovered, is formed by the Island of Santa Rosa on the north, and Point Quemada on the south: it is three quarters of a mile wide and free from danger. The northern entrance is named after the Dardo and Truxillano, two vessels that were conveying troops to Pisco: they ran in, mistaking it for that place, and were wrecked: many of the people on board perished. It is formed by Point Carretas on the north and the Island of Vieja on the south,

is five miles in width, and clear in all parts. It is bounded on the west by the Islands of Vieja and of Santa Rosa, and on the east by the main-land, which is moderately high, cliffy, and broken by a sandy beach, at the south end of which is a small fishing village called Tungo. The people of this village are residents of Yca, the principal town in the province, which is about twelve leagues distant; they come here occasionally to fish and remain a few days, bringing with them all their supplies, even to water, as that necessary of life is not to be obtained in the neighbourhood. There is anchorage in any part of this spacious bay; the bottom is quite regular, about twenty fathoms all over, excepting off the shingle spit on the north-east side of Vieja Island, where is a bank running off that spit to the northward, on which are five and six fathoms: this is decidedly the best place to anchor, for on the weather shore, near Quemado Point, it blows strong and in sudden gusts off the high land, and great difficulty would be found in landing; whereas, at the spit, you are not annoyed by the wind, and there is a snug cove, or basin, within it, where boats may land or lie in safety at any time.

Approaching this part of the coast from seaward, it may be distinguished by three clusters of hills, Quemado, Vieja Island, and Carretas; they are nearly of the same height, and at equal distances from one another. The S.W. sides of Morro Carretas and the Island of Vieja are steep dark cliff, but Morro Quemado slopes gradually to the water's edge, and is of a much lighter colour. At the southern extreme of Vieja Island, is a remarkable black lump of land, in the shape of a sugar loaf: off which lies the white level island of Santa Rosa, the S.W. side of which is studded with rocks and breakers, but there is no danger a mile from the shore.

N. 35° W., six leagues and a half from the north head, or Point Carretas, is the Boqueron, or southern entrance to the Bay of Pisco; between the two is a deep angular bay, with the Island of Zarate near its centre. The Boqueron is formed by the main land on the east, and the Island of San Gallan on the west; this island is two miles and one-third long in a north and south direction, and one mile in breadth: it is high, with a bold cliffy outline. There is a deep valley dividing the hills; which when seen from the south-west, gives it the appearance of a saddle; the south extreme terminating abruptly, while at its northern end it slopes more gradually and has

several peaks on it. Off this end are some detached rocks, the northern of which has the appearance of a nine-pin, and shews distinctly.

S. ¼ E., at the distance of a mile from its south extreme, lies the Pinero Rock, which is much in the way of vessels bound to Pisco from the southward; it is just level with the water's edge, and in fine weather can always be seen; but when it blows hard (which it sometimes does through this channel) and a weather tide is running, there is such a confused cross sea that the whole space is covered with foam, rendering it difficult to distinguish the rock; at such a time the shore should be kept well aboard on either side, and when in a line with the outer extreme of the island and the white rock off Point Huacas, you will be within the rock and may steer for Point Paracca; on rounding which you will open the Bay of Pisco.

This extensive bay, formed by the Peninsula of Paracca on the south, and the Ballista and Chincha Islands on the west, is the principal port of the province of Yca. The town of Pisco is built on the east side, about a mile from the sea; and is said to contain three thousand inhabitants, who derive considerable profit from a spirit they distil, known by the name of Pisco or Italia, great quantities of which are annually exported to different parts of the coast: sugar is also an article of trade, but the pisco is the staple commodity. Refreshment may be obtained on reasonable terms: wood is scarce: excellent water may be had at the head of Paraccas Bay, under the south cluster of trees, two miles from the fishing village of Paracca: the landing there is very good, and the wells are near the beach.

The best anchorage off the town is with the church open of the road, bearing E. 14° N., in four fathoms, muddy bottom, three-quarters of a mile from the shore. A heavy surf beats on the beach with rollers to the distance of a quarter of a mile off, rendering it dangerous to land in ship's boats; launches built for the purpose are used in loading and discharging vessels; but at times even these cannot stand it, and all communication is cut off for two or three days together.

There are four entrances to this capacious bay: that to the southward already named; between San Gallan and the Ballista Islands; between those and the Chincha Islands; and the great or northern entrance; all of which, from appearances, may be safely used; but,

between the islands, time would not allow a full examination, and, therefore, there may be dangers that were unseen by us.

In coming from the southward, after passing Point Paracca, a course may be shaped midway between Blanca Island and the church of Pisco, which will be seen distinctly: this will lead directly to the anchorage. A mile and a half round Point Paracca is a bay, off which a shoal patch extends, with four fathoms on it; the tail of this bank will be passed in standing towards the anchorage, the water then deepens suddenly, and when abreast of Blanca Island you will have twelve fathoms muddy bottom; from this depth it decreases gradually to the anchorage.

In coming from the northward it is all plain sailing; after passing the Chincha Islands stand in boldly to the anchorage; the water shoals quicker on this side Blanca Island, but there is no danger whatever. Vessels having to ballast here, should work up and anchor under Shingle Point; they can lie close to the shore, and boats may load with expedition.

In coming from seaward this part of the coast may easily be known by the Island of San Gallan, and the high Peninsula of Paracca at the back of it, which make like large islands, the land on each side being considerably lower and falling back to the eastward, so as not to be visible at a moderate distance. As the shore is approached the Chincha and Ballista Islands will be seen; which will confirm the position, there being no other islands lying off the coast about this parallel.

From Pisco the coast runs in a northerly direction, a low sandy beach with regular soundings off it, till you reach the River Chincha; from thence commences a clay cliffy coast, which continues as far as the River Canete. From this river to Point Frayle is a beautiful and fertile valley, in the middle of which is situated the town of Cerro Azul. This valley produces rum, sugar, and chancaca, a sort of treacle, for which it is resorted to by coasters. The anchorage is W.N.W. from the bluff that forms the cove, three-quarters of a mile distant, in seven fathoms; nearer the shore the water is shoal, which causes a long swell; the landing place is on the northern side of the point, on a stony beach, where a heavy surf is constantly breaking.

N. 39° W., fifteen miles from Cerro Azul, lies the Island of Asia, a round, white island, about a mile in circumference, with some rocks

extending from it to the shore. Between the two is a bay, but scarcely affording anchorage. The coast line is partly a rocky and partly a sandy beach; in-shore are hills about fourteen hundred feet in height, inclining gradually toward the coast.

N. 41° W., twenty miles from Asia Island, is CHILCA POINT; it is about three hundred feet in its highest part, has several rises on it, and terminates in a steep cliff, with a small flat rock close off it. The valley of Chilca lies a league to the southward of the point, and the harbour of the same name half a league to the northward. This is a snug cove, but very confined; anchorage is good in any part of it, and landing tolerable; there is a small village at the head of the bay, but no information could be obtained from the inhabitants about Chilca, for they deserted their huts on our arrival.

From Chilca the coast forms a bend to about the Valley of Lierin, off which are the PACHACAMAC ISLANDS. The northern is the largest, half a mile in length, and about a cable's length broad; the next but one to it is the most remarkable, being quite like a sugar-loaf, perfectly rounded at the top: the others are mere rocks, and not visible at any distance. At the northern end of these islands lies a small reef, even with the water's edge: the group run nearly parallel to the coast, in a N.W. and S.E. direction, and are about a league in extent. There is no danger on their outer side, but towards the shore the water is shoal, which causes a long swell, that at times must break. Between these islands and the Morro Solar is a sandy beach, with moderately high land a short distance from the sea. The Morro Solar is a remarkable cluster of hills, situated on a sandy plain; when seen from the southward it has the appearance of an island in the shape of a quoin, sloping to the westward, and falling abruptly on its in-shore side; facing the sea it terminates in a steep cliff, and has a sandy bay on each side of it.

Off the point of the southern sand bay is an islet with some rocks lying about it, and off the point of the northern sand bay is a reef of rocks of about a cable's length; round this reef, on the north side of the Morro, is the town and road of Chorillos. The town of Chorillos, built on the cliff, at the foot of one of the slopes of the Morro Solar, is used chiefly as a bathing-place for the inhabitants of Lima, and during a revolution its road is filled with the shipping from Callao; though it is an exceedingly bad place for them: the bottom is a hard sand, with patches of hard stony clay

mixed together, called tosca; and the heavy swell that sets round the point causing almost a roller, brings a vessel up to her anchor and throws her back again with a sudden jerk, each of which makes her drag, or endangers snapping the cable.

Vessels having to anchor here ought not to shut the southern point the Morro in with the next point to the northward: by keeping this mark open they will be in eight or nine fathoms, and not have so much swell as there is further in. The landing is very bad; canoes built purposely and dexterously managed are the usual means of communication: no doubt there are times when a ship's boat may land without danger, but very seldom probably without the crew being thoroughly drenched. From Chorillos the coast runs in a steady sweep with cliffs of less height, till it reaches the Point of Callao, which is a shingle spit, stretching out toward the Island of San Lorenzo, and with it forms the extensive and commodious Bay of Callao.

The Island of San Lorenzo, which is 1050 feet at its highest part, is four miles and a half long, in a N.W. and S.E. direction, and one mile broad. Off its S.E. end lies a small but bold-looking island, called Fronton, and to the S.W. are the Palominas rocks: its northern end, or Cape San Lorenzo, is clear, and round it is the usual passage to the anchorage at Callao. In rounding this Cape do not close the land nearer than half a mile, for within that distance there are light baffling airs caused by the eddy wind round the island; by getting among which you would be more delayed than if you gave the island a good berth, and should have to make an additional tack to fetch the anchorage.

This is the usual route; but there is another which, with common precaution, may be used to great advantage, by vessels coming from the southward. This is the Boqueron, formed by the Island of San Lorenzo and Callao Point. After making San Lorenzo and Fronton, steer so as to keep the south extreme of the latter about a point open on the bow port; and keep on this course until Callao Castle is seen, which has two martello towers on it, and is situated on the inner part of the shingle spit, that forms the point: then steer for it till Horadada Island (with a hole through it) comes on with the middle of the southern sandy bay of the Morro Solar, and with the inner declivity of the hill on Solar Point bearing S. 66° E.: with these marks on, and steering N. 66° W., for the furthest point of

Lorenzo you can see, you will be clear of all danger; and when the west martello tower in the castle comes on with the northern part of Callao spit, bearing N. 49° E., you may haul gradually round, till the same tower is seen to the northward of the breakers on a shoal lying off the spit; when a direct course may be shaped for the anchorage. There is no regular tide in this passage, but generally a little setting directly through, sometimes to the N.W. and at others the contrary; should the stream be adverse, and it fall calm while in the channel, there is good anchorage in eight or nine fathoms, with the leading marks on.

Callao is well known as the sea-port of Lima, which is seven miles inland, situated five hundred feet above the level of the sea, and at the foot of a range of mountains: when seen from the anchorage on a fine day, it has an imposing appearance.

Trade was in a flourishing condition in 1836, and when the government becomes settled, this may be the first commercial port on the west coast of South America.

Supplies of all sorts may be obtained for shipping; fresh provisions as well as vegetables, with an abundance of fruit: watering is also extremely convenient, a well-constructed mole being run out into the sea, at which boats can lie and fill from the pipes projecting from its side; wood is the scarcest article, and very dear, so that vessels likely to remain at this port should husband their fuel accordingly.

From Callao, the coast is a sandy beach, running in a northerly direction until you reach Point Vernal; it there becomes higher and cliffy, which character continues as far as Point Mulatas, round which is the little bay of Ancon.

To the west and south-west of Ancon lie the Pescador Islands, the outer and largest of which bears N. 31° W. from Callao Castle, and at the distance of eighteen miles. There is no danger among these islands; they are steep-to, with from twenty to thirty fathoms near them.

N. 33° W. from Point Mulatas, twelve miles distant, is the Bay of Chancay and river of that name; this bay may be known by the bluff head that forms the point, and has three hills on it, in an easterly direction; it is a confined place, and fit only for small coasters. From Chancay, the coast runs in a more westerly direction, as far as Point Salinas, a shingle beach, with a few broken, cliffy points; the

hills are near the coast, and from four hundred to five hundred feet high.

The point or head of Salinas is five miles in length, in a north and south direction; off its southern extreme is a reef of rocks, a quarter of a mile from the shore; and at its northern part, called Las Bajas, is an islet at a cable's distance; between these points are two coves fit only for boats; there is a remarkable round hill, called Salinas, at a short distance from the coast, and further in shore, is a level, sandy plain; at the south side of this plain is a number of salinas, or salt-ponds, from which the headland takes its name. These ponds are visited occasionally by people from Huacho.

Off the south part of Salinas, in a south-west direction, lie the Huara Islands, the largest of which is called Mazorque. It is two hundred feet in height, three-quarters of a mile long, and quite white; sealers occasionally frequent this island; there is landing on its north side.

The next in size is called Pelado; it lies S. 49° W. six miles and a half from Mazorque, is about one hundred and fifty feet high, and apparently quite round; between these two islands a safe passage exists, and may be used without fear in working up to Callao. Between Mazorque and Salinas are several smaller islands, all of which, from their appearance, may be approached without danger; but as no advantage could be gained, it would not be prudent to risk going between them. Vessels, in working up, sometimes go between the inner one and the point; but what they gain by so doing does not appear, for when the current sets to the southward, it runs equally as strong between Mazorque and Pelado as it does nearer the shore.

Round the northern point of Salinas Head is the bay of that name, of large dimensions, and affording anchorage. From this bay the coast is moderately high and cliffy, without any break, until you reach the Bay of Huacho. This bay lies round a bluff head, is small; but the anchorage is good in five fathoms, just within the two rocks that run off the northern part of the head. The town is built about a mile from the coast, in the midst of a fertile plain, and in coming from seaward has a pleasant appearance; it is not a place of much trade, but whale-ships find it useful for watering and refreshing their crews. Fresh provisions, vegetables, and fruit, are abundant and on reasonable terms; wood is also plentiful, and a stream of fresh water

runs down the side of the cliff into the sea. Landing is tolerably good: rafting seems to be the best method of watering.

In coming from seaward, the best distinguishing marks for this place, are the BEAGLE MOUNTAINS, three in number, in the near range, each of which has two separate peaks on it; these lie directly over the bay, and on closing the land, the round hill on Salinas Point and the Island of San Martin to the northward, will be seen; about midway between them is the Bay of Huacho, under a light brown cliff, the top of which is covered with brushwood: to the southward the coast is a dark, rocky cliff.

N. 29° W., three miles and two-thirds from Huacho, are the Head and BAY OF CARQUIN, scarcely as large as Huacho, and apparently shoal and useless to shipping; off the Head, which is a steep cliff, with a sharp-topped hill on it, are some rocks above water, and an islet about three-quarters of a mile distant. N. 31° W. three miles from this islet is the island of San Martin, and round to the northward of the point abreast of it, is the Bay of Bequeta.

This is no place for a vessel, being full of rocks and breakers, and having nothing to induce one to go there. From this bay the coast is moderately high, with sandy outline, until you reach Point Atahuanqui. This is a steep point, with two mounds on it, and is partly white on its south side: there is a small bay on its north side, fit only for boats. Between this point and the south part of Point Thomas the coast forms a sandy bay, low and shrubby; with the town of Supé about a mile from the sea.

Point Thomas is similar in appearance to Atahuanqui, without the white on the south side. To the northward of this Point is a snug little bay, capable of containing four or five sail; it is called the Bay of Supé, and is the port of that place and Barranca.

There is a fishing village at the south part of it, which is used by the inhabitants of Barranca during the bathing-season. Hitherto it had been a forbidden port by the government: in consequence of which it is little known, and has had few opportunities of exchanging its produce for the goods of other countries. When we were there, little information could be gained as to the size of the neighbouring towns, and number of inhabitants they contain; but from their appearance we thought they might be of considerable extent. These places produce chiefly sugar and corn, cargoes of which are taken in the various little vessels that trade along the coast. Refreshments may

be obtained; but water is scarce, the greater part of which is brought from Supé, for the use of the inhabitants of the village.

The best anchorage is in four fathoms, with Point Thomas shut in by the inner point, about a cable's length from the rocks running off that point, and rather more than a quarter of a mile from the village. There is good anchorage further out, in six or seven fathoms, but little sheltered from the swell. In entering, there is no danger; Point Thomas is bold, with regular soundings, from ten to fifteen fathoms three-quarters of a mile off it. Off Inner Point there are a few rocks to a short distance; but there is no necessity for hugging the shore so close, as you can always fetch the anchorage, by keeping at a moderate distance in standing in.

To distinguish this port, the best guide at a distance is the Bell Mountain, the highest and most remarkable mountain in the second range; it bears from the anchorage E. 39° N.; may be distinguished by its shape like a bell, and has three distinct rises on its summit—the highest at the north end; on that side it shews very distinctly, there being no other hills near it for a considerable distance. On approaching the coast, the island of San Martin to the southward, and Mount Darwin and Cerro Horca (a small round hill on the beach, with a steep, cliffy side to it, facing the sea, with apparently an islet off it), will be seen, nearly four leagues to the northward. The harbour itself has a white rock at its north extreme, and cannot be mistaken, for there is no other like it near this part of the coast.

From Supé the coast is a clay cliff, about a hundred feet in height, to the distance of a league and a half; it then becomes low and covered with brushwood, until you reach Cerro Horca already mentioned; here it again becomes hilly near the sea, with alternate rocky points and small sandy bays, which continue to the distance of six leagues; where is the bay called Gramadel.

This is a wild-looking place, with a heavy swell rolling in; it is visited occasionally for the hair seal, with which it abounds: there is anchorage in six or seven fathoms, sandy bottom, with the bluff that forms the bay bearing S.S.E. about half a mile from the shore; but landing is scarcely practicable.

The coast maintains its rocky character, with deep water off it, as far as the Buffadero, a high, steep cliff, with a hill having two paps on it, a little in-shore. From this bluff is a rocky cliff, from two hundred to three hundred feet high, and more level country, as far as Point Leganto, round which is the Port of Guarmey.

This is a tolerable harbour, with good anchorage any where in from three and a half to ten fathoms, over a fine sandy bottom.

Fire-wood is the principal commodity, for which it is the best and cheapest place on the whole coast. Vessels of considerable burthen touch here for that article, which they carry up to Callao, and derive great profit from its sale. There are also some saltpetre works, established by a Frenchman, but little business is done in that line. The town lies in a north-easterly direction, about two miles from the anchorage, but is hid by the surrounding trees, which grow to the height of thirty feet. It has only one street, and cannot contain more than five or six hundred inhabitants. At the anchorage there is a small house, used to transact business, but no other building, which is unusual, as at most of these places there is a small village near the sea. Large stacks of wood are piled up on the beach, ready for embarking.

Fresh provisions, vegetables, and fruit, are plentiful and moderate; but water is not to be depended on. It is true, there is a river, and for several months after March there is a plentiful supply; but in the summer season there is sometimes great drought. At the time we were there, a whale-ship put in to supply her wants, and had to remain several days, waiting for the water to come down from the mountains.

Legarto Head is a steep cliff, with the land falling immediately inside it and rising again to about the same height. In sailing in, after having passed the head, a small, white islet will be seen in the middle of the bay; steer for it, that you may not border on the southern shore, for there are many straggling rocks running off the points; and when sufficiently far to the northward to shape a mid-channel course between the white islet and the point opposite it, to the southward, do so, and it will lead to the anchorage. In standing in, in this direction, the water shoals gradually to the beach; but the southern shore must on no account be approached nearer than a quarter of a mile.

The best anchorage is in four fathoms, with Harbour Islet bearing N. 26° W., and the ruins of a fort on a hill in-shore E. 5° N. about a quarter of a mile from the landing-place on the beach. This landing-place does not seem to be so good a one as a steep rock on the outer side of the bluff, where the sand beach commences; but probably it is the most convenient for loading boats.

The rise and fall of tide is irregular, and the time of high water

uncertain; but, generally speaking, three feet may be considered about the extent to which it ranges. The sea breeze sets in so strongly occasionally, that it is difficult for boats to pull against it; this is particularly the case under the high land, whence it comes in sudden gusts and squalls.

In coming from seaward, the best way to make this port is to stand in on a parallel of 10° 06′, and when within a few leagues of the coast, a sharp-peaked hill, with a large white mark on it, will be seen standing alone a little north of the port: the break in the hills through which the river runs, is high and cliffy on each side. The land is also much lower to the northward of Legarto Head; and there is a large white islet at the north end of Guarmey Bay.

N. 34° W., seven miles and a half from the white islet at the north extreme of Guarmey Bay, is Point Culebras, a level projecting point, similar in appearance to Legarto Head, as seen from the northward; the coast between is a mass of broken cliffs and innumerable detached rocks, with moderately high land near the coast.

On the north side of Point Culebras, there is anchorage off the valley of that name. From this point the coast is rocky, with small sandy bays, and some rocks lying off it about three quarters of a mile; there is also a white cliffy islet, five miles to the northward of Culebras; whence the coast takes a bend inwards, forming a bay, and then runs out towards the Colina Redonda; a point with two hummocks on it, and as seen from the southward, appearing like an island. On the north side of this point is the Caleta (only fit for boats); and immediately over it, the Cerro Mongon.

The Cerro Mongon is the highest and most conspicuous object on this part of the coast; when seen from the westward it has the appearance of being round, with rather a sharp summit; but from the southward, it shows as a long hill with a peak at each end. It is said there is a lake of fresh water on its summit, and that its valleys abound with deer; but the truth of this cannot be vouched for, as our examination did not extend so far.

From Mongon there is a range of hills running parallel to the coast (which is high and rocky, with some white islets lying off it) as far as Casma, where they terminate in a steep rocky bluff, that forms the southern head of the port of that name.

The Bay of Casma is a snug anchorage, something in the form of a horse-shoe; at its entrance it is a mile and three quarters in a

N.W. and S.E. direction, and a mile and a half deep from the outer part of the cheek, with regular soundings from fifteen to ten, and three fathoms near the beach.

The best anchorage is with the inner part of the south cheek, bearing about S.S.E. a quarter of a mile off shore, in seven fathoms water; by not going farther in you escape, in a great measure, the sudden gusts of wind that at times come down the valley with great violence. Captain Ferguson, of H.M.S. Mersey, mentions a rock with nine feet water on it, on the south side, half a mile from the shore, that sometimes breaks: we saw nothing of it while we were there, but doubtless it exists.

This place seemed quite deserted; the only things that indicated its ever having been visited, were a few stacks of wood piled up on the beach.

The best distinguishing mark for Casma, is the sandy beach in the bay, with the sand hills in-shore of it contrasting strongly with the hard dark rocks, of which the heads at the entrance are formed; there is also a small black islet lying a little to the westward of it.

From Casma the coast takes rather a more westerly direction, but continues bold and rocky.

N. 44° W., five leagues from Casma, is the Harbour of SAMANCO, or HUAMBACHO; midway between them is a bay, almost hidden by two islands that lie across the entrance: this bay is four miles long and two miles deep; but as the Bay of Samanco is so near at hand, it was not examined by us as to its capabilities.

The Bay of Samanco is the most extensive on the coast to the northward of Callao; it is two leagues in length, in a N.W. and S.E. direction, and a league and a half wide: at its entrance it is two miles wide, formed by Point Samanco on the south, and Seal Island on the north, and has regular soundings all over it.

At the S.E. corner, in a sandy bay, is a small village (the residence of some fishermen), situated at the termination of the River Nepeña. This river, like most on the coast, has not sufficient strength to force a passage for itself through the beach, but terminates in a lagoon within a few yards of the sea.

The town of Huambacho is the nearest place to this bay; it lies about a league distant, at the east extreme of the valley. Nepeña, which is the principal town, lies to the north-east about five leagues off. There is very little trade at this place; small coasting vessels

from Payta sometimes call here with a mixed cargo, and they get in exchange sugar and a little grain,

Refreshment may be obtained from the neighbouring towns, but wood is scarce. The water of the river is brackish and unfit for use; but there are wells on the left bank, a short distance from the huts. When taken on board, this water is not good; but, contrary to the general rule, after it has been some time confined on board, it becomes wholesome and pleasant tasted.

When at a distance, the best mark to distinguish this bay, is Mount Division, a hill with three sharp peaks, situated on the peninsula between Samanco and the Bay of Ferrol. There is also a bell-shaped hill on the south side of the bay that shows very distinctly.

Mount Tortuga, a short distance inland to the N.N.E., will also be seen: it is higher, and similar in appearance to the Bell Mount. The south entrance point is a steep bluff, with some rocks lying off it to a cable's length; on opening the bay, Leading Bluff will be seen, a large lump of rock on the sandy beach at the N.E. side, that looks like an island. In going in, give Samanco Head a berth in passing; you may then stand in as close as convenient to the weather shore, and anchor off the village in four, five, or six fathoms, sandy bottom: when rounding the inner points, take care of your small spars; for the wind comes off the Bell Mount in sudden and variable puffs.

N. 43° W., three leagues from Samanco, is the entrance to the Bay of Ferrol, nearly equal in size to Samanco, and separated from it by a low sandy isthmus; it is an excellent place for a vessel to careen, being entirely free from the swell that sets into most of the ports. On its N.E. side is the Indian village of Chimbote, where, we were told, refreshment of any kind might be had, but no water. The entrance is clear; but there is a reef of rocks off Blanca Island, half a mile to the northward, which must be avoided.

N. 40° W., two leagues from the entrance of Ferrol, is Santa Island: about a mile and a half in length; lying N.N.E. and S.S.W., and of a very white colour; just without it are two sharp-pointed rocks, twenty feet above the sea. Two miles N.N.E. from the island is Santa Head, on the north side of which is the harbour of that name. This, although small, is a tolerable harbour; the best anchorage is in four or five fathoms, with the extreme of the head bearing S.W. Fresh provisions and vegetables may be obtained on moderate terms. It is also a tolerable place for watering.

The town lies west from the anchorage, about two miles distant; and the mouth of the river is a mile and a half along the beach. This is the largest and most rapid river on the coast of Peru: from Santa Head it is seen to wind its way down the valley, with several islets interrupting its course; but at its termination it branches off and becomes shallow, with only sufficient strength to make a narrow outlet for itself, through the sandy beach that forms the coast line; a heavy and dangerous surf lies off it; so that no boat could approach with any degree of safety.

This part of the coast may be known by the wide spreading valley down which the river runs, bounded on each side by ranges of sharp-topped hills; and as you approach, Santa Island will be plainly seen; with the Head of the same name; there is also a small but remarkable white island, called Corcovado, to the N.W. of the harbour. There is no danger in entering; the soundings are regular for some distance outside; and you may anchor any where between the islands in a moderate depth of water, but of course exposed to the swell.

N. 39° W., five leagues from Santa, lie the Chao Islands, one mile and three quarters off the point and hill of that name. The largest is a mile in circumference, about one hundred and twenty feet high, and, like most of these islands, quite white; there are regular soundings from ten to twenty fathoms, at the distance of a mile off shore.

Between Santa and Chao the coast is a low sandy beach, which continues and forms a shallow bay, as far as the hill of Guañape, with moderately high land a few miles in-shore.

The hill of Guañape is about three hundred feet high; rather sharp at its summit, and when seen from the southward, appears like an island; on the north side of it is a small cove, with tolerable landing just inside the rock that lies off the point.

S. 8° W. from this point, between six and seven miles from the coast, lie the GUANAPE ISLANDS, with a safe passage between them and the shore; they may be said to be two, with some islets and rocks lying about them; the southern is the highest and most conspicuous.

From the hill of Guañape the coast continues a sandy beach, with regular soundings; and ranges of high sharp-topped hills, about two leagues from the sea, until you near the little hill of Carretas, which is on the beach, and has Morro Garita de Mocha overlooking it. Here commences the valley of Chimu, about the middle of which

is situated the city of Truxillo, and at the northern extreme, the village and road of HUANCHACO. This is a bad place for shipping, and seems to have been badly chosen: the north side of the hill of Carretas is a much better place for landing and embarking goods; and might be farther improved by sinking some small craft laden with stones, plenty of which the hill would afford.

The road of Huanchaco is on the north side of a few rocks that run out from a cliffy projection; sheltering the land in a slight degree, but affording no protection to shipping. The village is under the cliff, and not distinguishable till to the northward of the point; but the church, which is on the rising ground, shows very distinctly, and is a good guide when near the coast.

The usual anchorage is with the church and a tree that stands in the village in one, bearing about east, a mile and a quarter from the shore, in seven fathoms dark sand and mud. Vessels often have to weigh or slip and stand off, owing to the heavy swell that sets in: it is also customary to sight your anchor once in the twenty-four hours, to prevent its being imbedded so firmly as to require much time to weigh it when required.

Landing cannot be effected in ship's boats; there are launches constructed for the purpose, manned by Indians of the village, who are skilful in the management of them: they come off on your arrival, and will land you safely, for which they charge six dollars, equal to one pound four shillings sterling: it is to be remembered that no more is charged for a cargo of goods; their having to risk the surf being that for which you pay.

Fresh provisions may be had from Truxillo, but watering is out of the question. The city is said to contain 4,000 inhabitants. Rice is the principal production of the valley; for that article and specie it is that vessels call here.

If bound for this road, you should stand in on a parallel of 8°, (which is a mile to windward), and you will see Mount Campana, a bell-shaped mount, standing alone, about two leagues to the northward: and Huanchaco Peak, which is very sharp, and the first hill in the range on the north side of the valley. Shortly after the church will come in sight, and the shipping in the road.

The coast is cliffy for a few miles to the northward of Huanchaco; the low sandy soil with bushes on it then commences, with regular soundings off it, and continues as far as Malabrigo Road. This bay

although bad, is considerably preferable to Huanchaco; it is formed by a cluster of hills, projecting beyond the general trend of the coast, which at a distance appear like an island; there is a fishing village at the S.E. side, but no trade is carried on. The town of Paysan lies some leagues to the S.E., and, by the account they gave of it at Malabrigo, must be of considerable extent.

The best anchorage here is with the village bearing about E.S.E., three-quarters of a mile from the shore, in four fathoms sandy bottom: landing is bad, but the fishermen have what they call 'caballitos,' bunches of reed fastened together, turned up at the bow like a balsa of Chile, but much higher. These are so light that they are thrown on the top of the surf to the beach, when they jump off and carry them on their shoulders to the huts. It seems that each different bay or road has its peculiarly-constructed vessel, adapted to the surf which it has to go through. The small island of Macabi, lies S. by E. two leagues from Malabrigo, with a safe channel of ten fathoms between it and the main land.

N. 35° W., six leagues and a half from Malabrigo, is the road of Pacasmayo; between the two the coast is low and cliffy, with a sandy beach at the foot of the cliff, and soundings of nine and ten fathoms two miles off shore. Pacasmayo is a sufficiently good roadstead, under a projecting sandy point, with a flat running off it to the distance of a quarter of a mile. The best anchorage is with the point bearing about S. by E., and the village east; you will there have five fathoms, sand and mud: there is no danger in standing in; the soundings are regular, shoaling gradually towards the shore. Landing is difficult: launches are used as at Huanchaco. The principal export is rice, which is brought from the town of San Pedro de Yoco, two leagues inland. Fresh provisions may also be obtained from the same place; wood and water may be had at the village on the beach, which is principally inhabited by Indians, employed by the merchants of San Pedro.

To distinguish this road from seaward, the best guide is to stand in on a parallel of 7° 25′ to 30′, and when within six leagues, the hill of Malabrigo will be seen, which appears like an island sloping gradually on each side; and a little to the northward, Arcana Hill, rugged with sharp peaks. As you approach, the low yellow cliffs will appear (those north of the road the highest), on the summit of which, on the north side of the point, is a dark square building that

shews very distinctly. The best mark for the anchorage is the shipping, when any are there. From this road the coast continues low, with broken cliff, until you reach Point Eten, which is a double hill (the southern one the highest), with a steep cliff facing the sea. The north side of this cliff is white, and shews conspicuously.

N. 43° W., a little more than four leagues, is the road of LAMBAYEQUE, the worst anchorage on the coast of Peru. There is a small village on the rising ground, with a church that shews white towards the sea; off which vessels anchor in five fathoms, a mile and a quarter from the shore. The bottom is a hard sand, and bad holding ground, it is always necessary to have two anchors ready, for the heavy swell that sets on this beach renders it almost impossible to bring up with one, particularly after the sea breeze sets in.

Rice is the chief commodity for which vessels touch here: the only method of discharging or taking in a cargo (or in fact landing at all), is by means of the balsa. This is a raft of nine logs of the cabbage palm, secured together by lashings, with a platform raised about two feet, on which the goods are placed. They have a large lug sail which is used in landing, the wind being along the shore enables them to run through the surf and on the beach with ease and safety; and it seldom happens that any damage is sustained by this peculiar mode of proceeding. Supplies of fresh provisions, fruit, and vegetables may be obtained, but neither wood nor water.

The coast continues low and sandy, similar in appearance to that of Lambayeque, to the distance of twenty-five leagues: an extensive range of table-land of considerable height, with broken rocky points, then commences, and continues to Point Aguja or the Needle. Fifteen leagues from Lambayeque in an E.S.E. direction, lies a small group of islands called LOBOS DE AFUERA. These islands are a league in length north and south, and a mile and a half broad; are about a hundred feet high, of a mixed brown and white colour, and may be seen several leagues off; they are quite barren, affording neither wood nor water. There is a cove on the north side formed by the two principal islands, but with deep water and rocky bottom; within this cove are several nooks, in which a small vessel might careen, without being interrupted by the swell.

These islands are resorted to by fishermen from Lambayeque on their balsas; they carry all their necessaries with them, and remain

about a month salting fish, which fetch a high price at Lambayeque. There is no danger round these islands, at the distance of a mile; regular soundings will be found between them and the shore, from fifty fathoms abreast of the islands.

N. 26° W., ten leagues from Lobos de Afuera, lies the Island of Lobos de Tierra, nearly two leagues in length, north and south, and little more than two miles wide; when seen from seaward it has a similar appearance to the former islands, and many rocks and blind breakers lie round it, particularly on the west side. There is tolerable anchorage on the N.E. side, in eleven or twelve fathoms, sand and broken shells. A safe passage is said to exist between this island and the main, which is distant ten miles, but as no advantage could be gained by going between, it was not thoroughly examined by us.

Point Aguja is long and level, terminating in a steep bluff 150 feet high, and has a finger rock a short distance off it, with several detached rocks round the point.

Three miles and a half N.N.E. of this is Point Nonura, and five miles farther in the same direction is Point Pisura, the south point of the Bay of Sechura; between Aguja and Point Pisura are two small bays, where anchorage may be obtained, if required. The land about this part is much higher, and has deeper water off it, than on either side, and may be readily known by its regularity and table-top. The bay of Sechura is twelve leagues in length, formed by the little Lobos Island of Payta and Point Pisura, and is six leagues deep; on the S.E. side the coast shows low sand hills, but as you go northward it becomes cliffy and considerably higher.

Near the centre of the bay is the entrance to the River Piura, and the town of Sechura situated on the banks of it. This town is inhabited chiefly by Indians, who carry on a considerable trade in salt, which they take to Payta on their balsas, and sell to the shipping. The river is small, but of sufficient size to admit the balsas when laden. There is anchorage any where off the town, in from twelve to five fathoms, coarse sand; in the latter depth you will be better than a mile from the shore. This place may easily be distinguished by the church, which has two high steeples on it, and shows conspicuously above the surrounding sand hills; one of these steeples has a considerable inclination to the northward, which at a distance gives it more the appearance of a cocoa-nut tree than a stone building.

From Lobos Island Point the coast is cliffy, about 120 feet high, and continues so as far as Payta Point, which is three leagues distant; between these two, a mile and a half from the coast, is a cluster of hills called the saddle of Payta; accurately described by Captain Basil Hall. The SILLA or SADDLE OF PAYTA is sufficiently remarkable, it is high and peaked, forming three clusters of peaks joined together at the base, the middle being the highest; the two northern ones are of a dark brown colour; the southern is the lowest, and of a lighter brown. These peaks rise out of a level plain, and are an excellent guide to vessels bound for the Port of Payta from the southward.

A few leagues to the northward, as already mentioned, is PAYTA POINT, round which is the port of that name. This is without exception the best harbour on the coast, and considerable trade is carried on. Vessels of all nations touch here for cargoes, principally cotton, bark, hides, and drugs, in return for which they bring the manufactures of their several countries. In the year 1835 upwards of forty thousand tons of shipping anchored in this port. Communication with Europe (viâ Panama) is more expeditious than at any of the other ports.

The town is built on the slope and at the foot of the hill, on the south-east side of the bay; at a distance it is scarcely visible, the houses being of the same colour with the surrounding cliff. It is said to contain 5,000 inhabitants, and is the sea port of the province of Piura, the population of which is estimated at 75,000 souls.

The City of SAN MIGUEL DE PIURA is situated on the banks of the River Piura, in an easterly direction from Payta, between nine and ten leagues distant. Fresh provisions may be had at Payta on reasonable terms, but neither wood nor water, except at a high price, the latter being brought from Colan (a distance of four miles) for the inhabitants of the place. When we were there hopes were entertained of a supply of water from the west side of the bay; an American having commenced boring with an apparatus proper for the purpose.

There is no danger in entering this excellent harbour: after rounding the point which has a signal station on it, you will open False Bay: this must be passed, as the true bay is round Inner Point. That point ought not to be hugged closely, for there are some rocks to the distance of a cable's length, and the wind baffles off it.

After rounding Inner Point you may anchor where convenient, in quiet still water, with from four to seven fathoms, over a muddy bottom. The landing place is at the mole about the centre of the town.

N. 41°. W., nine leagues and a half from the town of Payta, is POINT PARINA, a bluff, about eighty feet high, with a reef to the distance of half a mile on its west side; between this point and Payta the coast is low and sandy, with table land of a moderate height, a short distance from the beach; and the mountain of Amatape five leagues in the interior.

After rounding Point Pariña (which is the western extreme of South America), the coast trends abruptly to the northward, and becomes higher and more cliffy, until you reach Point Talara. This is a double point, the southern part of which is cliffy; about eighty feet high, with a small black rock lying off it; the northern part is much lower, and has few breakers near. On the north side of this point is a shallow bay, in the depth of which the high cliffy coast again commences, and runs in a line towards Cape Blanco.

CAPE BLANCO is high and bold (apparently the corner of a long range of table-land), sloping gradually toward the sea; near the extreme of the cape there are two sharp-topped hillocks; and midway between them and the commencement of the table land, is another rise with a sharp top. There are some rocks that shew themselves about a quarter of a mile off, but no danger exists without that distance. From Cape Blanco the general trend of the coast is more easterly, in nearly a direct line to Point Malpelo, which is twenty-one leagues distant.

N. 34° E., seven leagues and a half from the former is POINT SAL, a brown cliff, one hundred and twenty feet high; along the coast is a sandy beach, with high cliff as far as the valley of Mancora, where it is low with brush wood near the sea; the hills being at a distance inland.

Northward of Point Sal the coast is cliffy, to about midway between it and Point Picos; it then becomes lower, and similar to Mancora.

POINT PICOS is a sloping bluff, with a sandy beach outside it, and another point, exactly similar, a little to the northward: at the back of it is a cluster of hills with sharp peaks, hence arises, probably, the name given by the Spaniards to this point. From Point Picos the coast is a sandy beach, with a mixture of hill and cliff of a

light brown colour and well wooded. There are several small bays between it and Point Malpelo, which bears N. 41° E., seven and a half leagues distant.

Point Malpelo, the southern point of the entrance of Guayaquil River, may be readily known by the marked difference between it and the coast to the southward: it is very low and covered with bushes to its extreme; a short distance in-shore, is a clump of bushes higher and more conspicuous than the rest, which shews plainly on approaching. At the extremity of the point is the River Tumbes off which a reef extends, to the distance of a quarter of a mile. This place is much frequented by whalers, for fresh-water, which is found about a mile from the entrance, where they fill their boats from alongside; great care is necessary in crossing the bar, as a heavy and dangerous surf beats on it, rendering it at all times difficult to cross.

The entrance to the river may be distinguished by a hut on the port hand going in, which is perceived immediately you round the point. About two leagues up the river stood the old town of Tumbes, now scarcely more than a few huts, barely sufficient to supply the whalers with fruit and vegetables. This is the boundary line, between Peru and the State of the Equator. You may anchor any where off the point in six or seven fathoms.

Winds.

The prevailing winds on the coast of Peru blow from S.S.E. to S.W.; seldom stronger than a fresh breeze, and often in particular parts scarcely sufficient to enable shipping to make their passages from one port to another. This is especially the case on the south and south-western coast, between Cobija and Callao.

Sometimes during the summer, for three or four successive days, there is not a breath of wind; the sky is beautifully clear, with a nearly vertical sun.

On the days that the sea-breeze sets in, it generally commences about ten in the morning; then light and variable, but gradually increasing till one or two in the afternoon. From that time, a steady breeze prevails till near sunset, when it begins to die away; and soon after the sun is down there is a calm. About eight or nine

in the evening light winds come off the land, and continue till sunrise; when it again becomes calm until the sea-breeze sets in as before.

During winter (from April to August) light northerly winds may be frequently expected, accompanied by thick fogs, or dark lowering weather; but this seldom occurs in the summer months, although even then the tops of hills are frequently enveloped in mist.

To the northward of Callao, the winds are more to be depended on; the sea-breeze sets in with greater regularity, and fresher than on the southern parts; and near the limit of the Peruvian territory (about Payta and off Cape Blanco), a double-reefed topsail breeze is not uncommon.

It is to be remarked, and may be laid down as a general rule, that although such moderate winds blow on the coast of Peru, yet sudden and heavy gusts come over high land after the sea-breeze sets in, which, from the smallness of the ports, may be attended with some inconvenience, if precautions are not taken in shortening sail previous to entering them.

The only difference between winter and summer, as far as regards the winds, is the frequency of light northerly airs during the former months; but in the state of the weather, the difference is far greater than one would imagine in so low a latitude. In the summer the weather is delightfully fine, with the thermometer (Fahrenheit's) seldom below 70°, and often as high as 80°, in a vessel's cabin; but during winter the air is raw and damp, with thick fogs and a cloudy overcast sky. Cloth clothing is then necessary for the security of health; whereas in summer the lighter you are clad, the more conducive to comfort and health.

The general set of the CURRENT on the coast of Peru is along the shore to the northward, from half a knot to one knot an hour; but occasionally it sets to the southward, with equal or even greater strength.

The period at which these southerly sets take place cannot be ascertained with any degree of certainty. Neither seasons, the state of the moon, nor other causes common on almost every coast, seem to have an influence here. The oldest navigators, and men accustomed to the coasting trade, can assign no reason for these changes—they only know that they do take place, and endeavour to profit by them accordingly.

During our stay on the coast, we frequently experienced these southerly sets, immediately preceding and during northerly winds; but as this was not always the case, no general rule can be laid down, although it certainly appears a natural inference to draw. We also remarked, that at times the current was setting to the southward, when a fresh wind was, and for days previous, had been blowing from that quarter. And as no inequalities or irregularities in the coast line could have occasioned this, it only served to heighten our curiosity, without affording any clue to discover how the peculiarity was caused.

On Passages.

With regard to making passages on this coast—little difficulty is found in going northward; a fair offing is all that is requisite to ensure your making a certain port in a given number of days; but in working to windward, some degree of skill, and constant attention are necessary.

Much difference of opinion exists as to whether the in-shore or off-shore route should be preferred; but from the experience we had ourselves, and from information gained from those who were said to understand the coast, we were led to suppose the following the best line to follow.

On leaving Guayaquil or Payta, if bound to Callao, work close in-shore to about the island of Lobos de Afuera. All agree in this. Endeavour always to be in with the land soon after the sun has set, that advantage may be taken of the land wind, which begins about that time; this will frequently enable a ship to make her way nearly along shore throughout the night, and place her in a good situation for the first of the sea-breeze.

After having passed the before-named islands, it would be advisable to work up on their meridian, until you approach the latitude of Callao; then stand in, and if it is not fetched, work up along shore, as above directed.

Some people have attempted to make this passage, by standing off for several days, hoping to fetch in on the other tack, but have invariably found it a fruitless effort, owing to the northerly set that is experienced on approaching the equator.

If from Callao and bound to Valparaiso, there is no question but

that by running off with a full sail the passage will be made in much less time than by working in-shore, for you run quite through the trade-wind, and fall in with the westerly winds which are always found beyond the trades. But for the intermediate ports (excepting Coquimbo) the case is different, as they lie considerably within the trade-wind, and must be worked for by that alone.* It may, however, be recommended to work along shore as before stated, to about the island of San Gallan. Whence the coast trends more to the eastward, so that a long leg and a short one may be made (with the land just in sight) as far as Arica, or to any of the ports between Pisco and that place.

From Arica, the coast being nearly north and south, vessels bound to the southward should make an offing of about fifteen or twenty leagues (to ensure keeping the sea-breeze), and work up on that meridian till in the parallel of the place to which they are bound. On no account is it advisable to make a long stretch off; for as you approach the limit of the trade-wind it gradually hauls to the eastward, and great difficulty will be found in even fetching the port from which you started.

The average passage in a well-conditioned merchant-vessel from Guayaquil to Callao is from fifteen to twenty days; and from Callao to Valparaiso about three weeks; fast-sailing schooners have made these passages in much less time; and there is an instance of two men-of-war, in company, having gone from Callao to Valparaiso, remained there two days, and re-anchored at Callao on the twenty-first day. But these are rare occurrences, and only to be done under most favourable circumstances, such as taking a "norther" soon after leaving Callao.

N.B. These remarks and notices, relating to Peru, are the work of Mr. Usborne. Those referring to Northern Chile are by Lieut. Sulivan. Mr. Stokes and I have added a few words.

* A dull sailer might do better by running through the trade, making easting with westerly winds, and then steering northward along the coast, than by attempting to work to windward against a trade-wind, which varies but a few points.

No. 42.

Al Sñr. Comandante de la barca de S.M.B. Beagle, Dn. R. FITZ ROY.

Buenos Ayres, Nov. 8 de 1832.
Año 22 de la Libertad, y 17 de la Yndependencia.

El Ministro de Relaciones Esteriores que subscribe ha recibido con la mayor satisfaccion la Carta del Puerto de Bahia Blanca, que se ha servido remitirle el Sñr. Fitz Roy, Comandante de la Barca Beagle de S.M.B.

El Ministro agradece al Sñr. Fitz Roy este presente que considera de mucha importancia, y en su consecuencia tiene el placer de incluirle las ordenes que por el Ministerio de la Guerra se libran à los Comandantes politicos y militares de los Puertos de la Republica, para que no le pongan impedimento en sus operaciones facultativas sobre la Costa y si le faciliten los auxilios que puedan serle precisos para este desempeño.

Dios guarde muchos Años al Sñr. Comd. Dn. Roberto Fitz Roy.

MANUEL V. E. MAZA.

No. 43.

SIR, Lima, 21st June 1836.

We, the undersigned British merchants, residing in this capital, have just learned with much satisfaction from his Majesty's Consul-General, Mr. Wilson, that the survey of the sea-coast from Cape Horn to Guayaquil has been completed. This important work executed by you and under your orders, will, doubtless, prove of great value to British commerce in the Pacific; and we should be wanting in gratitude if we did not avail ourselves of the earliest opportunity of returning you our sincere thanks, not only for the skill and zeal you displayed in this arduous undertaking, but for the pecuniary sacrifices you made to insure its complete and speedy accomplishment. To Mr. Usborne we also feel much indebted, for the energy and perseverance manifested by him in the fulfilment of his duty, under circumstances not a little embarrassing and difficult; and we hope that his conduct, being made known in the proper quarter, will meet the reward it deserves. That you may long live to serve your

country, and establish fresh claims to the gratitude of your countrymen, is the sincere wish of,

Sir,

Your obliged and faithful servants,

For DICKSON, PRICE, and Co.—W. HODGSON.
NAYLOR, KENDALL, and Co.
For LAYLEM, READ, and Co. —VALENTINE SMITH.
SWAYN, REID, and Co.
LANG, PEARCE, and Co.
FREDK. HUTH, GRUNING, and Co.
For GIBBS, CRAWLEY, and Co.—H. WITT.
J. W. LEADLEY.
For HEGAN, HALL, and Co.—J. FARMER.
JOHN MACKIE.
J. SUTHERLAND.
For CHRISTOPHER BRIGGS. — H. N. BRIGGS.
TEMPLEMAN and BERGMAN.
FREDERICK PFEIFFER.

No. 44.

DESCRIPTION of a QUADRANT, the power of which is increased by means of an additional Horizon Glass.

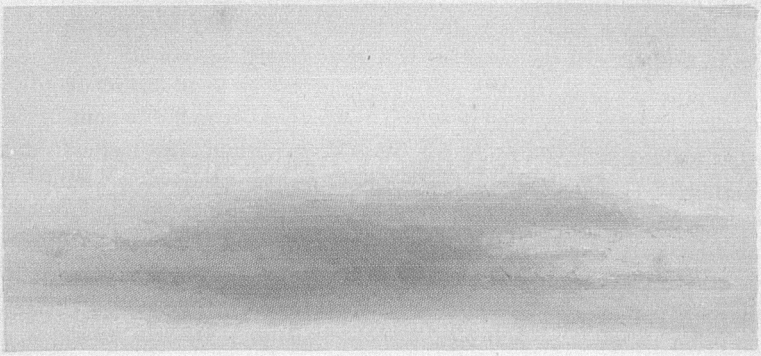
Let C A B, in the figure, represent a common quadrant, having the angle A C B equal to forty-five degrees: let C be the index-glass; C A the zero line, or the plane of the glass produced; D the horizon-glass, and E the sight-vane.

Suppose C and D to be parallel, and that a ray coming from an object H, is reflected from C, along the line C D, and from D along the line D E to the eye.

A ray of light from h may be supposed to come from H, if the two, H h, are more than half a mile from the instrument, and the object H will be seen directly, as well as by reflection, in the line D E.

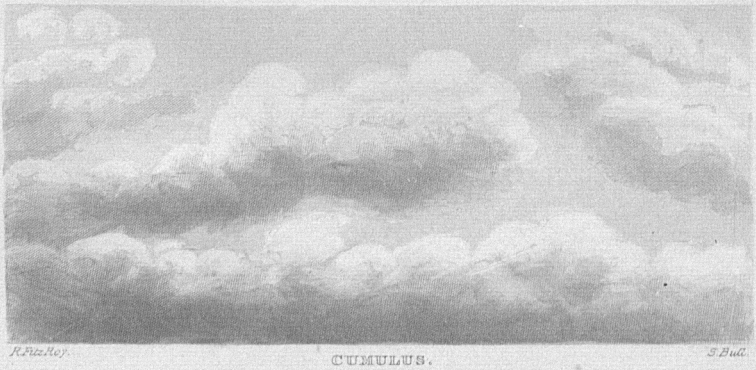
The angle D C E being equal to the angle D E C, D C is equal to D E. With the centre D describe the circle C E F. Place a glass at F, similar to that at D, but making an angle with C B, which will reflect a ray passing along C F, in the line F E, to E.

CIRRUS.



STRATUS.

NIMBUS.



R. Fitz Roy. CUMULUS. S. Bull.

Published by Henry Colburn, 13 Great Marlborough Street. 1839.

C F E is an angle at the circumference of a circle, and therefore half C D E, at the centre; and equal to D E F, or forty-five degrees.

An object at H being reflected from F along the line F E, will appear in contact with an object at K, which we may here suppose to be the horizon of the sea. But, by looking through the glass F, and bringing an object into contact with the horizon, which is really forty-five degrees above it, the index of the quadrant will be at zero; and by looking through F, and bringing an object into contact with K, or the horizon, which is really one hundred and thirty-five degrees from it, the index of the quadrant will be at ninety degrees.

The principle being thus shown, it is unnecessary to go farther in this place; either in explaining how it applies equally well to a quintant or sextant, or in describing Mr. Worthington's ingenious method of taking advantage of it, in the sextants he has lately made with power to measure 160°.

In adjusting or verifying the adjustment of the additional glass, I found that by measuring the angular distance of two fixed stars more than forty degrees apart—first carefully by the ordinary method, and then using the extra or additional glass—it was practicable to ascertain its exact error: the only difficulty I had foreseen in the efficient use of this auxiliary.

I may add, that the telescope moves parallel to the plane of the instrument, and that there are two sets of numbers referring to one graduation.

No. 45.

On Clouds.

Clouds may be divided into four classes, called—

Cirrus, Stratus, Nimbus, Cumulus.

Cirrus is the first light cloud that forms in the sky after fine clear weather. It is very light and delicate in its appearance; and generally curling or waving, like feathers, hair, or horses' tails. It may also be called the 'Curl Cloud.'

Stratus is the shapeless smoke-like cloud that is most common, and of all sizes: sometimes it is small, and at a distance, like spots of inky or dirty water; its edges appearing faint or ill-defined; sometimes it rises in fog-banks from water, or land; sometimes it overspreads and hides the sky. Rain does not fall from it. Its exact

resemblance cannot be traced upon paper, because the edges are so ill-defined. It may also be called the 'Flat Cloud.'

Nimbus is the heavy-looking, soft, shapeless cloud, from which rain is falling. Whatever shape a cloud may have retained previous to rain falling from it—at the moment of its change from vapour to water, it softens in appearance, and becomes the 'Nimbus,' or 'Rain Cloud.'

Cumulus is the hard-edged cloud, or cloud with well-defined edges; whose resemblance can be accurately traced on paper. This cloud is not, generally speaking, so large as the Stratus or Nimbus, aud appears to be a compact mass of either the former or latter, or of both. It may also be called the 'Heap Cloud.'

These four classifications of clouds will not, however, suffice to describe exactly the appearance of the sky at all times. More minute distinctions are required, for which the following may be used:—

Cirro-stratus—signifying a mixture of Cirrus and Stratus.

Cirro-cumulus—Cirrus and Cumulus.

Cumulo-stratus—signifying a mixture of Cumulus and Stratus.

Which terms may be rendered more explanatory of the precise kind of cloud, by using the augmentative termination onus, or the diminutive, itus. Thus:—Cirronus, Cirritus; Cirrono-stratus; Cirrito-stratus; Cirrono-cumulus, Cirrito-cumulus; Stratonus, Stratitus; Cumulonus, Cumulitus; Cumulono-stratus, Cumulito-stratus. Should these be found insufficient to convey distinct ideas of every variety of clouds, the second word may be augmented or diminished, thus: Cirrono-stratitus, &c.

These terms may be abbreviated for common use by writing only the first letters of each word; allowing one letter to represent the diminutive, two letters the ordinary, or middle degree, and three letters the augmentative. As Cirrus and Cumulus begin with the same letter, it will be necessary to make a distinction between them by taking two, three, and four letters, respectively, of Cumulus: thus, C., Ci., Cir.; S., St., Str.; N., Ni, Nim.: Cu., Cum., Cumu. Suppose it were desired to express Cumulito-stratoni, C.-Str. would be sufficient, &c.

CUMULONUS.

CUMULITUS.

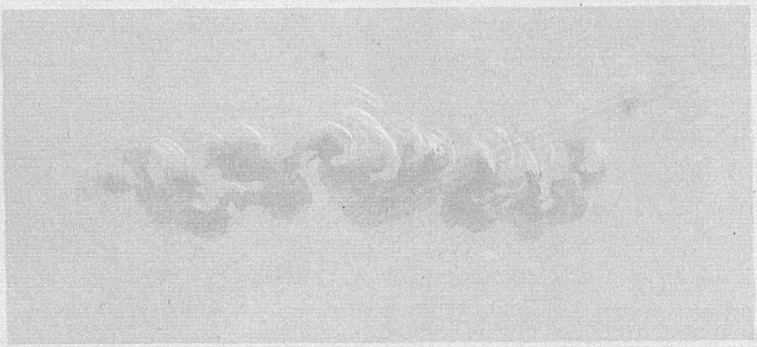
CUMULONO-STRATUS.

R. Pds. Rey. S. Bull.

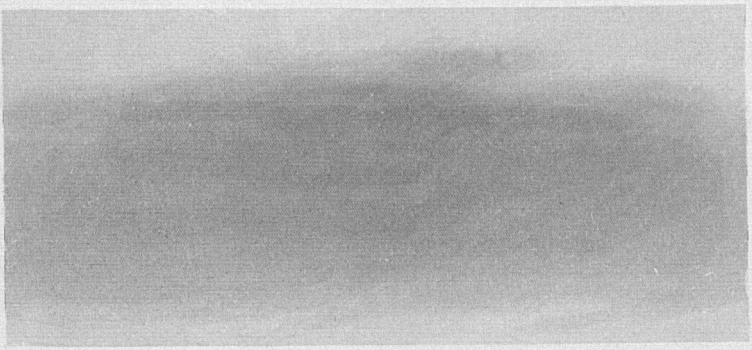
CUMULITO-STRATUS.

Published by Henry Colburn 13 Great Marlborough Street 1839.

CIRRONO-CUMULUS.



CIRRITO-CUMULUS.



STRATONUS.

R. Fitz Roy. S. Bull.

STRATITUS.

Published by Henry Colburn 13 Great Marlborough Street 1839.

CIRRONUS.

CIRRITUS.

CIRRONO-STRATUS.

R. Fitz Roy. S. Bull.

CIRRITO-STRATUS.

Published by Henry Colburn, 13, Great Marlborough Street. 1839.

No. 46.

Winds.

Much notice has lately been taken of the theory respecting storms, suggested by Colonel Capper in 1801, discussed by Mr. Redfield in 1831, and carried out in much detail by Colonel Reid. I have neither ability, nor at present space, to make more than a few brief remarks on this subject.

Are not storms exceptions to the general winds, or atmospheric currents; not the causes of them?* Variable winds are almost continual, except during short intervals of calm; but hurricanes, or even ordinary storms, are rare. May not opposing or passing currents cause eddies, or whirls, on an immense scale in the air, not only horizontal, but inclined to the horizon, or vertical?

In laying a ship to, during a storm, there are other points to consider besides the veering of the wind; such as the direction of the sea, with or against a current, &c. I cannot agree with Colonel Reid, in his remarks (page 425) about the "problem to be solved," or in his "Rule for laying ships to in hurricanes."

I never myself witnessed a storm that blew from more than fifteen points of the compass, either successively, or by sudden changes.

In most, if not all of the storms to which I can bear any testimony, currents of air arriving from different directions appeared to succeed each other, or combine together. One usually brought 'the dirt,' to use a sailor's phrase, and another cleared it away, after driving much of it back again, often with redoubled fury. One of these currents was warm and moist—another cold and dry, comparatively speaking. While one lasted, the barometer fell, or was stationary; with another it rose. At all places I have visited, or of which I have obtained notices on the subject, the barometer stands high with easterly, and comparatively low with westerly winds, on an average. Northerly winds in the northern hemisphere affect the barometer, like southerly winds in the southern hemisphere.

No. 47.

Tides.

At the end of the year 1833, I received from Mr. Whewell a copy of a work for which seamen in general are deeply indebted to him. It

* Reid's Law of Storms, p. 120, &c.

bore the unpretending title of an "Essay towards a first approximation to a Map of Cotidal Lines;" but however lightly the author might esteem it, there can be no doubt that it tended to remove a cloud which hung over numerous difficulties; and to enable us not only to take a general view of them, but to see how we should direct our course in order to attain some knowledge of their intricacies.

In 1831 Mr. Lubbock called the attention of mathematicians, as well as of practical seamen, to the subject of Tides: but it was Mr. Whewell who aroused general interest; and, assisted by the Admiralty, engaged the co-operation of observers in all quarters of the globe.

At the first perusal of Mr. Whewell's essay, I was particularly struck by the following passages: "But in the meantime no one appears to have attempted to trace the nature of the connexion among the tides of the different parts of the world. We are, perhaps, not even yet able to answer decisively the inquiry which Bacon suggests to the philosophers of his time, whether the high water extends across the Atlantic so as to affect, contemporaneously, the shores of America and Africa? or, whether it is high on one side of this ocean when it is low on the other? at any rate, such observations have not been extended and generalized." * Also: †

"If the time of high water at Plymouth be five, and at the Eddystone eight (as formerly stated), the water must be falling for three hours on the shore, while it is rising at the same time at ten or twelve miles distance; and this through a height of several feet. We can hardly imagine that any elevation in one of the situations, should not be transferred to the other in a much shorter time than this.

"There is, in fact, no doubt that most, or all the statements of such discrepancies, are founded in a mistake arising from the comparison of two different phenomena; namely, the time of high-water, and the time of the change from the flow to the ebb current. In some cases the one, and in some the other of these times, has been observed as the time of the tide; and in this manner have arisen such anomalies as have been mentioned." And again: ‡

"The persuasion that, in waters affected by tides, the water rises while it runs one way, and falls while it runs the opposite way, though wholly erroneous, is very general."

These, and other valuable remarks, showed me what indistinct or erroneous ideas I had entertained; and that many other seamen had

* Philosophical Transactions, 1833, p. 148. † Ibid. 157. ‡ Ibid.

been similarly perplexed, I could have little doubt, having often talked to experienced practical men on the subject. Probably the expressions 'tide and half-tide,' 'tide and quarter-tide,' &c., conveyed more distinct ideas to their minds, than to mine: for to me they were unsatisfactory, and although quite aware of their meaning, I never liked them. From 1833, I and my companions on board the Beagle paid more attention to the subject, and made observations in the manner suggested by Mr. Whewell, as often as our other avocations allowed. It was, however, impossible to take interest in the subject, and discover difficulties, facts irreconcileable to theory, without trying to think how to account for them—unqualified even as I knew myself to be for such a task.* Perhaps I was encouraged to meditate by Mr. Whewell's concluding paragraph; † and, separated from assistance, I tried to reason my way out of the dilemma, by the help of such few data as I could dwell upon with certainty.

* Among the points which I could not establish in my own mind, by appeal to facts, were—"the tides of the Atlantic are, at least in their main features, of a derivative kind, and are propagated from south to north." (p. 164.) "That the tide-wave travels from the Cape of Good Hope to the bottom of the Gulf of Guinea, in something less than four hours." (p. 167.) "That the tide-wave travels along this coast (American) from north to south, employing about twelve hours in its motion from Acapulco to the Strait of Magalhaens." (p. 194.) "From the comparative narrowness of the passage to the north (of Australia), it is almost certain that these tides must come from the southern side of the continent." (p. 200.) "The derivative tide which enters such oceans (North and South Pacific) from the south-east, is diffused over so wide a space, that its amount is also greatly reduced." (p. 217.) &c.

† "I cannot conclude this memoir without again expressing my entire conviction of its very imperfect character. I should regret its publication, if I supposed it likely that any intelligent person could consider it otherwise than as an attempt to combine such information as we have, and to point out the want and the use of more. I shall neither be surprised nor mortified, if the lines which I have drawn shall turn out to be, in many instances, widely erroneous: I offer them only as the simplest mode which I can now discover of grouping the facts which we possess. The lines which occupy the Atlantic, and those which are near the coasts of Europe, appear to have the greatest degree of probability. The tides on the coasts of New Zealand and New Holland, have also a consistency which makes them very probable. The Indian Ocean is less certain; though it is not easy to see how the course of the lines can be very widely different

Some of the facts which seem to stand most in opposition to the theory that deduces tides in the northern Atlantic from the movement of a tide-wave originated in the great southern ocean are: —the comparative narrowness of the space between Africa and America; with the certainty that the sea is neither uniformly nor excessively deep in that space,* and the trifling rise of tide; not only upon either nearest shore (where it does not exceed four or five feet at the utmost), but at Ascension Island, where the highest rise is not two feet.† Secondly, the absence of any regular tide about the wide estuary of the river Plata, the situation and shape of which seems so well disposed for receiving an immense tide.‡ Thirdly, the flood-tide moving towards the west and south along the coast of Brazil,

rent from that which we have taken. The course of these lines in the Pacific appears to be altogether problematical; and though those which are drawn in the neighbourhood of the west coast of America connect most of the best observations, they can hardly be considered as more than conjecture: in the middle of the Pacific I have not even ventured to conjecture. It only remains to add, that I shall be most glad to profit by every opportunity of improving this map, and will endeavour to employ for this purpose any information with which I may be supplied."—pp. 234-5.

* Besides the 'Roccas', Fernando de Noronha, and St. Paul rocks, various accounts have been received, from time to time, of shoals near the equator, between the meridians of fifteen and twenty-four degrees west. There can be no doubt, from the descriptions, that many alarms have been caused in that neighbourhood by earthquakes; which are, to my apprehension, indications of no very great depth of water. In 1761, a small sandy island was said to have been seen by Captain Bouvet, of Le Vaillant. This, if seen, has probably sunk down since. Krusenstern saw a volcanic eruption thereabouts in 1806. In 1816, Captain Proudfoot, in the ship Triton, from Calcutta to Gibraltar, passed over a bank, in latitude 0° 32′ S. and longitude 17° 46′ W. It appeared to extend in an east and west direction three miles, and in a north and south direction one mile. They sounded in twenty-three fathoms, brown sand; but saw no appearance of breakers.

† At St. Helena it is not three feet: while at Tristan d'Acunha there is a rise of eight or nine feet under ordinary circumstances.

‡ I have passed months in that river without being able to detect any periodical rise of water, which I could attribute to tide; though it is said, that when the weather is very settled, some indications of a tide may be perceived.

from near Pernambuco to the vicinity of the river Plata; and lastly, the almost uniformity of the time of high water along that extent of the coast of Africa which reaches from near the Cape of Good Hope to the neighbourhood of the Congo.

Against the supposition that a tide-wave travels along the west coast of America, from north to south, are the facts—that the flood-tide impinges upon Chilóe and the adjacent outer coast, from the southward of west; that it is high water at Cape Pillar and at Chilóe, including the intermediate coast, almost at one time;* that from Valdivia to the Bay of Mexillones (differing eighteen degrees in latitude), there is not an hour's difference in the time of high-water; that from Arica to Payta the times vary gradually as the coast trends westward; that from Panama to California, the times also change gradually as the coast trends westward; and that from forty to sixty north, high water takes place at one time.

Having thus stated a few of the difficulties to be encountered by a theory which supposes such important tide-waves to move in the direction of a meridian, rather than in that of a parallel, I will venture to bring forward the results of much anxious meditation on the subject, trusting that they will be received by the reader—not as assertions—not as conclusions to which assent is asked without a reason for acquiescence being given—but as the very fallible opinion of one individual, who is anxious to contribute a mite, however small, towards the information of those for whom this work is more particularly written—namely, seafaring men; and who, if his ideas are fallacious, will rejoice at their refutation by the voice of truth.

Resting in confidence upon the Newtonian theory—which assigns as the primary causes of tides the attractions of the moon and sun—I will make a few remarks, and then state some facts from which to reason.

Some persons seem to view the tidal phenomena more in connection with what would have happened had the globe been covered with water, than with reference to what actually happens, now that the oceans are nearly separated by tracts of land. They appear to consider that the effects of the moon's attraction (leaving the sun's out of the question at present, as it is similar though smaller) are felt only in vertical lines; and they do not allow for the lateral action of

* Within about half an hour; an irregularity easily accounted for, and to which any one place is subject.

the moon upon a body of water, by which any portion is attracted towards her before she is vertically over it, as well as after she has passed to the westward of the meridian of that portion.

But little attention appears to have been paid to a consideration of the momentum acquired by any great body of water moved from the position it would occupy if undisturbed, and to the consequences of that momentum, when the water returns from a temporary displacement. And there seems to be a difficulty in altogether reconciling the statement that "tides are diminished by diffusion,* with the manner in which the great tides of the Northern Atlantic are supposed to be caused—a supposition which is mainly dependent upon the principle of "forced vibrations or oscillations."†

In consequence of similar ideas, excited by the facts previously mentioned, the following questions were inserted in the Geographical Journal for 1836:—

"It may appear presumption in a plain sailor attempting to offer an idea or two on the difficult subject of 'Tides;' yet, with the utmost deference to those who are competent to reason upon the subject, I will venture to ask whether the supposition of Atlantic tides being principally caused by a great tide-wave coming from the Southern Ocean, is not a little difficult to reconcile with the facts that there is very little tide upon the coasts of Brazil, Ascension, and Guinea, and that in the mouth of the great river Plata there is little or no tide?

"Can each ocean have its own tides, though affecting, and being affected by the neighbouring waters?

"Can the mass of an ocean have a tendency to move westward as well as upward, after and towards the moon as she passes? If so, after the moon has passed, will not the mass of that ocean have an easterly inclination to regain that equilibrium (with respect to the earth alone) from which the moon disturbed it (sun's action not here considered)?

"In regaining its equilibrium, would not its own momentum carry it too far eastward; and would not the moon's action be again approaching?

"Can one part of an ocean have a westward tendency, while another part, which is wider or narrower, from east to west, has an eastward

* Whewell's Essay, p. 217.

† Herschel's Astronomy, Cab. Cyc. p. 334.

movement? If so, many difficulties would vanish; among them those which were first mentioned, and those perplexing anomalies on the south coast of New Holland."—(Jour. R. Geog. Soc. vol. vi. part II. p. 336.)

It might have been concluded that these questions had scarcely been noticed, as I heard nothing on the subject, had I not lately read the following remarks in a work published in 1837. Whether their author ever saw the questions, I do not know; but as his observations bear strongly upon the subject, and are those of an eminent mathematician, I quote them verbatim:—

"Suppose several high, narrow strips of land were now to encircle the globe, passing through the opposite poles, and dividing the earth's surface into several great, unequal oceans; a separate tide would be raised in each. When the tidal wave had reached the farthest shore of one of them, conceive the causes that produced it to cease; then the wave thus raised would recede to the opposite shore, and continue to oscillate until destroyed by the friction of its bed. But if instead of ceasing to act, the causes which produced the tide were to re-appear at the opposite shore of the ocean, at the very moment when the reflected tide had returned to the place of its origin, then the second tide would act in augmentation of the first; and if this continued, tides of great height might be produced for ages. The result might be, that the narrow ridge dividing the adjacent oceans would be broken through, and the tidal wave traverse a broader tract than in the former ocean. Let us imagine the new ocean to be just so much broader than the old, that the reflected tide would return to the origin of the tidal movement half a tide later than before; then instead of those two super-imposed tides, we should have a tide arising from the subtraction of one from the other. The alterations of the height of the tides on shores so circumstanced might be very small, and this might again continue for ages, thus causing beaches to be raised at very different elevations, without any real alteration in the level, either of the sea or land."—(Babbage's Ninth Bridgewater Treatise, pp. 248, 249.)

Additional data, and leisure to reflect upon them, have tended to confirm the view taken previously to asking those questions in the Geographical Journal; but before stating this view more explicitly, it is necessary to lay facts before my readers, from which they may judge for themselves.

In the greatest expanse of ocean, that which meets with only partial interruption to free tidal movements—the zone, if it may be so called, near fifty-five degrees of south latitude—there is high water at opposite sides, and low water at opposite sides of the globe nearly at the same time.

At the eastern part of the Falkland Islands, exposed to the tide of this zone, it is high water, or full sea, at about nine o'clock on the day of new, or full moon, by Greenwich time;* and on the southern shore of Van Diemen's Land it is high-water at about ten. This is not a point exactly opposite, it is true, but it is the nearest so at which we have yet observed.

At each of these places the tide rises six hours and falls six hours, alternately; therefore when it is low water at one, it is also low water at the other. There is no intermediate place in this zone, rather distant from these points, at which I know of a tide observation deserving confidence; but those above-mentioned are certain, and corroborate the Newtonian theory in a satisfactory manner.

This is, however, the only zone of ocean, which is at all able to follow the law which would govern its undulations if the globe were covered with water. In other zones (taking about ten degrees in latitude as a zone) it is high water, generally speaking, at one side of an ocean near the time that it is low on the other.

In oceans about ninety degrees wide, this happens very nearly; but as the width diminishes, so do the times of high water at each side approach; and as the width increases beyond ninety degrees, as in the case of zones of the Pacific, the times of high water still approach (in consequence of the tendency to high water at opposite points), and farther confirm the Newtonian theory.

For examples (on the day of full moon):—In the Pacific, at Port Henry, in 50° S. it is high water at 5h. at which time it is near low water at Auckland Island, where the time of high tide is 12h. 30m. In this case, the interval between one high water, and the other on the opposite side of the ocean, is 7h. 30m. or 4.30; and the width of that ocean is nearly eight hours (measured in time.)

At Valdivia, in lat. 40° S. it is high water at 3h. 30m. and at New Zealand, on that parallel, at 9h. 50m. The space of ocean between is seven hours nearly: the differences are 6.20 and 5.40.

* To which all the times are here reduced for easy comparison.

In 30° S. at Coquimbo, it is high water at 2h. and at Norfolk Island it is high at about 9h. The intermediate space of ocean is nearly eight hours wide.*

In 20° S., at Iquique, it is high water at 1h. 30m., and at New Caledonia, in the same parallel, it is high water at 9h. 15m. The space between is about eight hours wide: the least difference 4.15.

Near 10°, or 12°, at Callao, it is high water at about ten; but as on this parallel a multitude of islands spread across half the Pacific, no comparison of times can be trusted.

On the equator—at the Galapagos Islands—it is high water at 8h. 20m.; and at New Ireland it is high water at 3h. 00m.—a difference of seven hours nearly. The ocean is here eight hours wide; but at New Ireland there is only one tide in twenty-four hours—an anomaly to be considered presently.

The parallel of 10° N. is similar to that of the equator—however, we may as well examine it. At the little Isle of Cocos, and at Nicoya, on the main, it is high water at about 8h.; and at the Philippine Islands, in the same latitude, at 4h.; the difference, eight hours, is not far from the meridian distance, which is about ten hours; but the Philippines also feel the effects of causes which influence the tides at New Ireland, and, generally, those of the Indian Archipelago.

In 20° N. at San Blas, it is high water at 3h; and at Loo-choo, the nearest known point of comparison at the other sid o fthe ocean, at 10h. The difference, 7 hours, is about an hour less than the meridian distance. In 30° N. on the Coast of California, it is high water at 4h., and at Nangasaky, in Japan, in lat. 32° 44′, at 11.12. The difference, 7.12, is nearly half an hour less than the meridian distance. In 40° N. it is high water at about 8h. on the American coast, but for the opposite shore I have no data. In 50° N. it is high water on Vancouver Island at 9h., and at the south extreme of Kamschatka it is said to be high water at about 6h.; the difference, 9 or 3 hours, is anomalous—made so probably by a derivative tide.

Having examined the Pacific, let us proceed in a similar manner with the Atlantic, and the Indian Ocean:—

In 40° S. off Blanco Bay, the time of high water is 9h.; the same as at the Falklands.

At Amsterdam Island, one authority says 6h., another 12h, for the

* A derivative tide (p. 289) may act here.

time of high water. Both cannot be right: but thinking the latter correct, I have preferred it. In Bass Strait it is high water at about ten. Between the two extremes there are thirteen hours, and between the times of tide there are eleven, or thirteen hours. At Amsterdam Island, high water is taken as two hours after that of Bass Strait, but the difference of meridians is about four hours. The difference between the high water of Amsterdam, and Blanco Bay, is nine hours, and their difference of meridians is about nine hours.

In 30° S. it is high water on the African coast at two, and on the American coast at six. There are about four hours difference of meridian between them in that parallel.

In 20° S. it is high water at 3h. on the African shore, and 6h. on the Brazilian; the meridian distance is about three hours and three quarters.

In 10° S. at 3h. 15m. on the east side and 7h. on the west: the distance is about three hours and a quarter.

On the equator we have 4h. 30m. at the eastern limit, and nearly 8h. at the western; the distance being about three hours and a half.

In 10° N. 7h. and 10h. the distance being three hours.

In 20° N. at Cape Blanco, at about 1h.; and on the north coast of San Domingo, nearly at 11h. The interval is about 3.40: but there are interfering derivative tides, probably, as well as local peculiarities, among the West-India Islands.

In 30° N. about 4h. on the east and 1h. 30m. on the west. The distance is nearly five hours. This seems anomalous.

In 40° N. 3h. on the coast of Spain, and at about 1h. on the coast of America. This is another anomaly: but easy of explanation.

In 50° N. it is high water at 4h. 36m., in the mouth of the channel; and at 10h. 45m. on the coast of Newfoundland. Their meridian distance is about 3.20.

On the west coasts of Ireland and Scotland, from 5h. to 6h. is the hour of high water; on the coast of Labrador, it is from 10h. to 11h., in the same parallels. The meridian distances are from three to four hours: but as we approach the parallel of 60° N. the North Sea and Davis Strait open, which probably affect the tide between Ireland and Labrador.

The Indian Ocean appears to have high water on all sides at once, though not in the central parts at the same time. Thus, it is high water at the north-west extremity of Australia; on the coast of

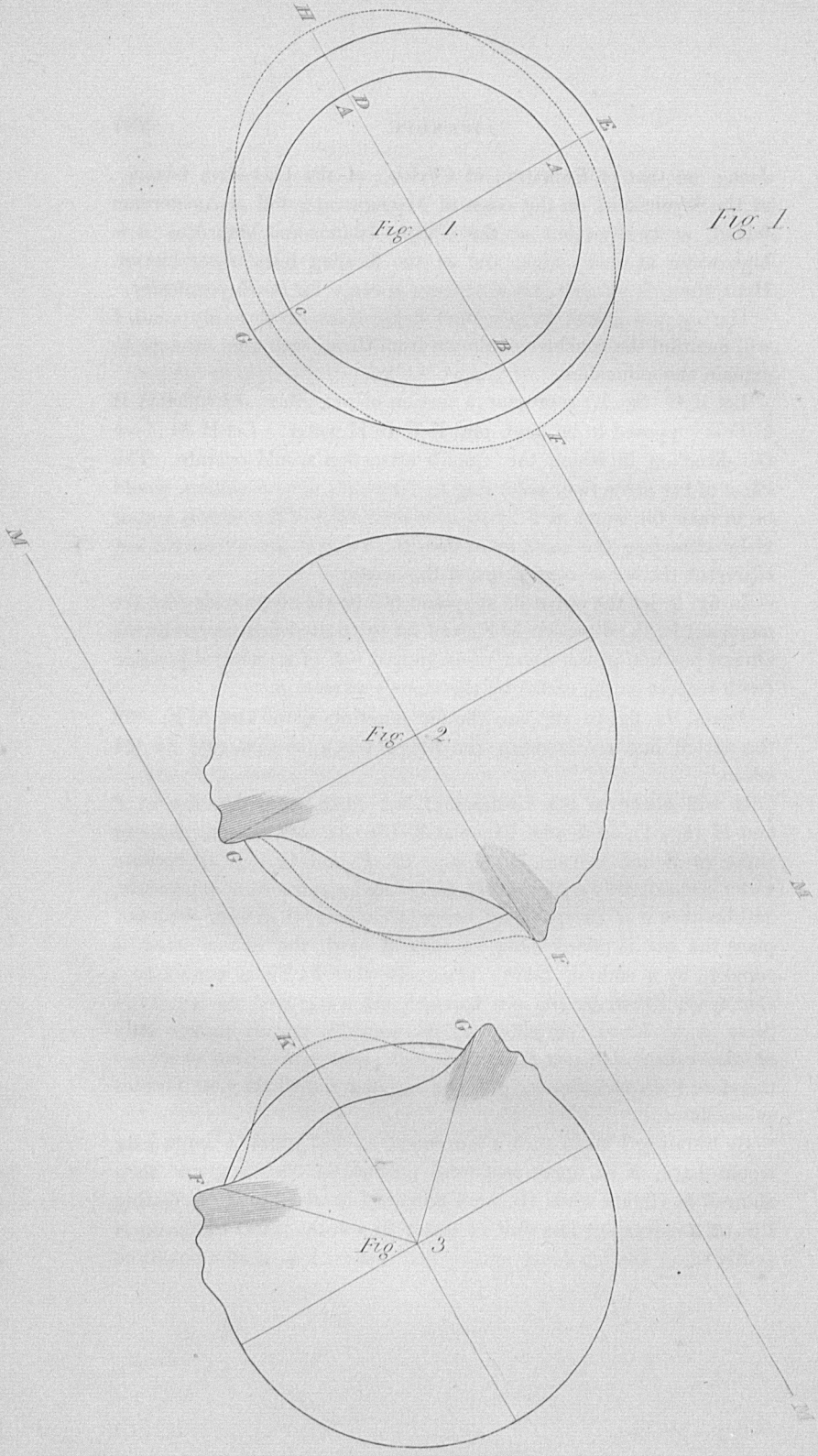


Fig. 1.

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Java; on that of Sumatra; at Ceylon; at the Laccadiva Islands; at the Seychelles; on the coast of Madagascar; and at Amsterdam Island, at twelve: but at the Chagos Islands and Mauritius it is high water at about nine, and at the Keeling Isles about eleven. Here, then, it would seem that there is cause for much perplexity.

Having now stated the principal facts which occur to my mind, I will mention the conclusions drawn from them, and then attempt to explain the anomalies.

Let E G (fig. 1.) represent a section of our globe, of which A B C D is supposed to be land, and E F G H water. Let H M show the direction in which the moon's attraction would operate. The effect of her attraction, according to Newton's demonstration, would be to raise the water at F by positive attraction of the water, and at H by attracting the earth more than the water:—let the dotted line represent the consequent figure of the ocean.

In fig. 2, let the ocean be supposed 90° or six hours wide; let the moon act in the direction M F; and let the dotted line represent the altered position of the water when moved out of its natural position (with respect to the earth) by the moon's attraction.

Again, in fig. 3, suppose the moon acting in the line M K, and the dotted line representing the figure taken in that case by the ocean.

It will occur to the reader that but little water can rise at F and H (fig. 1), at F (fig. 2), or at K (fig. 3), unless water falls or sinks, at E and G (fig. 1), G (fig. 2), F and G (fig. 3); because water is but slightly compressible, except under extraordinary pressure, and because it is incapable of being stretched; therefore, if at any place the sea is raised above its natural level, the excess must be supplied by a sinking taking place elsewhere. There cannot be a void space left under the sea between the water and its bed; and there is no lateral movement of the particles at the surface only of the ocean sufficient to cause high tides on either shore:—therefore the conclusion may be drawn, that the whole mass librates or oscillates.

By librating I mean such a movement as that which a large jelly would have, if its upper part were pushed on one side, and then allowed to vibrate while the base remained fixed: and by oscillating I mean a movement like that of water in a basin, after the basin is gently tilted and let down again: and that such a motion would be

imperceptible, except by its effects, there can be little doubt after reflecting how small a lateral movement of an ocean would cause immense commotion at its boundary, in consequence of the slight elasticity of water, when free to move.

Now let the moon be supposed to move from M in fig. 2 to M in fig. 3. The highest point of the water would then be transferred from F to K, during which transfer the water must fall at F and rise at G: and so of other points. In this manner when the moon causes a tide by her direct attraction, a wave or swelling, whose crest is above the natural level of the sea, moves westward, until it is stopped by a barrier of land. But when it recedes from that barrier, how is the excess of the wave above the height of the sea (when uninfluenced by the moon) transferred to the other side of the same ocean? There is no return wave: if there were, islands intermediate would have an ebb, and a flood tide, every six hours; four floods in twenty-four hours; but they have, on the contrary, six hour tides, alternate ebb and flow, twice in twenty-four hours, like those of the shores of continents, though generally smaller in amount. Water cannot rise in one place unless it falls in another —it does fall on one side of an ocean, while it rises on the other —how then is the fluid transferred? There is only one way—which is by the mass oscillating. In the former case when the moon passed over, it was a libratory movement, in this latter it is an oscillation.

If it is shown, as I believe, that the ocean oscillates, we see that there are two principal causes of tides—one the direct raising of water by the moon: and the other, oscillation excited by that temporary derangement of the natural level of the sea.

From the preceding facts and deductions combined with the commonly received laws of fluids and gravitation, the following conclusions may be drawn:—

1. Every large body of water is affected by the attraction of the moon, and sun, and has tides caused by their action.

2. Bodies of water are not only raised, or accumulated, vertically, by the attraction of the moon and sun; but they are also drawn laterally by them.

3. When a large body of water is prevented from continuing a horizontal movement, it rises until whatever momentum it had acquired ceases; and then it sinks gradually.

4. The momentum acquired by a body of water in thus sinking back to the position it should occupy, with reference to the earth's attraction only, carries it beyond that position to one from which it has a tendency to recoil again—and so to keep up an oscillation until brought to rest by the friction of its bed. (Attraction of the moon and sun not considered.)

5. The recurring influences of the moon and sun are checks on these oscillations, and prevent their taking place more than once between each separate raising of the water in consequence of their attractions.

6. Different zones (or widths measured by latitude) of an ocean, may move differently, each having waves and oscillations at times differing from those of an adjoining zone, in consequence of one having more or less longitude, depth, or freedom from obstacles than another.

7. Original waves and oscillations combine with, and modify one another, according to their relative magnitude, momentum, and direction.

8. The natural tendency of tide-waves, and oceanic librations, is from east to west; and of oscillations, from west to east, and east to west also: but derivative waves or oscillations move in various directions according to primary impulse, and local configuration of the bed of an ocean.

Conformably to these conclusions, I will now try to explain a few of the more remarkable anomalies of tides, in various parts of the world: taking it for granted that the reader is acquainted with existing works on the subject, especially those of Mr. Whewell,* and the brief but comprehensive and explanatory view taken by Sir J. Herschel in his treatise on astronomy.†

I mentioned that between Callao and the western shores of the Pacific, in the parallel of about 12° south, no comparison of times can be trusted? Why not? may be asked. Four or five hours west of Callao, there is a multitude of islands which checks the libration of the ocean. Another tide wave forms westward of them, on a small scale, and it is by this second tide, altered by derivative tides

* Published in the Philosophical Transactions.

† Cabinet Cyclopædia. A Treatise on Astronomy, chap. xi., pp. 334, 5, 6, 7, 8, 9.

from each side, that the western portion of this zone is affected. Otaheite is thus at the edge, or limit, of four tides—one east, another west, a third to the north, and a fourth to the south, and as these tides are moving with different impulses, and at different times, it is not at all surprising that they should almost neutralize each other at Otaheite. As we go west or east of that island, we find the tides augmenting gradually in height. At the Friendly Islands they rise five feet, and at the Gambier Islands three feet.

Respecting the twelve hour tide at New Ireland, and at other places in the Indian archipelago—appeal to facts, so far as we can trace the tides at present, tends to confirm the explanation of Sir Isaac Newton, which consisted in supposing that such tides are compounded of two tides, which arrive by different paths, one six hours later than the other. "When the moon is in the equator, the morning and evening tides of each component tide are equal, and the tides obliterate each other by interference, which takes place about the equinoxes. At other periods the higher tides of each component daily pair, are compounded into a tide which takes place at the intermediate time, that is, once a day; and this time will be after noon or before, according to the time of year."—Whewell, in Phil. Trans. 1833, p. 224.

At New Ireland, the time of high water is about 3; but at New Caledonia it is 9. Again, at the north-west coast of Australia, it is 12; and at the eastern approach to Torres Strait, 10: at the Philippine Islands it is 4; and at Loo Choo, 10. Now here are various times of tide, and different impulses, crowded together into a comparatively small space, sufficient to perplex any theorist of the present day. Owing to local configurations, and a variety of incidental circumstances, we find every kind of tide in this region, in a space sixty degrees square. Although tidal impulses, waves, and resulting currents are checked and altered by the broken land of the Indian archipelago, they cannot be suddenly destroyed, or prevented from influencing each other, while communications, more or less open, exist in so many directions.

At the Sandwich Islands there is said to be very little tide. As it is high water in 40° N., on the American coast, at 8; at which time it is also high water at the Galapagos, it appears that the two zones of the ocean—one about the equator, and the other near 40° N.—have high water, in the meridian of the Sandwich Islands, at two

very different times; and that the high water of the northern zone will have passed that meridian about three hours before the equatorial wave. Impulses derived from them might succeed one another at an intermediate point, such as the Sandwich Islands. Besides which, there is the tide of their own zone to be considered; in consequence of which alone it might be high water at about 6: thus these islands are so situated as to receive at least three tides—one primary and two derivative—whose respective times of high water are 1, 6, and 10, a succession which may well be supposed to neutralise any ebb, and maintain the water thereabout above its natural level, independent of tide.

About the Strait of Magalhaens, and along the eastern coast of Patagonia, there are very high tides; apparently complicated, but perhaps less so than is usually believed.

A powerful tide arrives at the Falklands, and at the east end of Staten Land, at about 9; which is opposed by another powerful tide arriving from the west. The union of these two accumulates the water between Tierra del Fuego and the Falklands, and on the east coast of Patagonia.

Within the Strait of Magalhaens, westward of the Second Narrow, it is high water at about 4.40, and the tide rises six feet: but eastward of the First Narrow it is high at 1.30, and the tide rises forty feet.

Now, as in one case the sea only rises three feet, and in the other twenty, above its mean level, every one would expect to find a rush of water through the Narrows, from the high sea to the low, and such is the fact. From ten to four the water runs westward with great velocity, and from four till ten it rushes eastward. During the first interval, from ten to four, the eastern body of water, between Tierra del Fuego and the Falklands, is above the mean level; and during the latter interval, from four till ten, it is below the mean level—that which it would have if there were no tides.

From 50° S. to near Blanco Bay in 40° S. the tide-wave certainly travels along the coast to the north; but this is a derivative from the meeting of tides above-mentioned, combined with the primary tides on the coast traversed. In this way principally may we account for a high tide in one place on this coast, and a low one on another (similarly situated, though differing in latitude); and, again, a high tide at another place. During the twenty-four hours that the deri-

vative wave occupies in moving from Cape Virgins to the Colorado, it alternately augments or diminishes two floods and two ebbs of the great ocean. Perhaps, indeed, it reaches farther and affects the water about the Plata.

The extraordinary 'races' about the Peninsula of San José, and the apparent absence of currents about the straight coast extending eastward from Blanco Bay, may be attributed to conflicting tidal impulses.

Why there should be no tide in the River Plata, situated and shaped as it is, seems extraordinary; but as it is high water at 6h. on the coast of Brazil, and at 9h. about Blanco Bay; and as a derivative wave from this neighbourhood must move eastward and northward, there is a filling up, from the southward, as an ebbing takes place in consequence of a regular six-hour tide; and vice versâ.

Tristan d'Acunha has a considerable rise of tide, about eight feet, though Ascension and St. Helena have only about two feet. The former place is affected by a great southern tide; the two latter are influenced by the comparatively small tide which traverses the space between Africa and Brazil.

In the West Indies there are varieties of tides, caused by primary and derivative impulses, exceedingly modified by local circumstances: none however are large, while some are as small as those of Otaheite—scarcely a foot at the utmost. There are places also in that archipelago where there is only one tide in twenty-four hours. In considering the West-India tides, those of the east coast of North America, and the exceedingly high ones of Fundy Bay, the gulf stream ought not to be overlooked, as it may affect the tides on the coasts it traverses even more than those on the Patagonian coast are altered by the current driven along it from near Tierra del Fuego.

I may here remark that Mr. Whewell was misled by inaccurate data respecting several times of high water, of material consequence to his cotidal lines. At the Western Islands he had $1\frac{1}{2}$ and $2\frac{1}{4}$, where there ought to have been $4\frac{1}{4}$, according to Mendoza Rios' tables, confirmed by the Beagle's observations; at Madeira he used $1\frac{1}{2}$, the time of the stream changing, instead of 4, the time of high water; at the Cape Verde Islands he took the time of low tide, instead of that of high water; his 5h. line is near Ascension, where the time of high water is 6.20; and his 2h. line is close to St. Helena, where the time is about five. The deficiency of data is so great, owing to mistaking

the turn of stream for the time of high water, and registering or calculating observations erroneously, that little dependence can be placed in at least one-third of those hitherto recorded. On this account chiefly, though partly to simplify the question, I have not hoped to be much nearer the mark than half an hour in this discussion, discarding fractions as much as possible, and attempting only to avoid errors of material consequence.

Looking at the Atlantic, as represented on a globe, we see that Newfoundland and the adjacent coasts are so placed as to receive tidal impulses from the Arctic Sea, North Atlantic Ocean, the tropical part of the North Atlantic and the gulf stream: besides which, no doubt, a derivative from the equatorial zone is felt there.

It is high water at the east side of the Atlantic, from the Canary Islands to Scotland, within an hour or two of the same time, on the salient points of the coast, namely, at about 4h.; and if the opposite coast were straight, like that of Chile, and uninfluenced by derivative tides or by currents, we might expect that it would be high water there at about 7h., allowing that the tide-wave moved as it is found to do generally. But it is high water at about 1h., from 30° to 40,° the times increasing northward from 40° N. to the Bay of Fundy, and also increasing southward from 50° N. to that bay, where, as every sailor knows, the tides rise higher than in any other part of the world. This sequence of times, each ending in about 43° N., the adjacent gulf stream, (an immense river in the ocean), and an accumulation of water in that corner higher than is known any where else, show that we cannot there expect to find data for tidal rules. In that quarter is evidently a marked exception, caused by the conflux of at least two primary tides, two derivatives, and a powerful current, aided by the peculiar configuration of the land.

In the Mediterranean it is supposed by many persons that there is no ebb and flow; but Captain Smyth, who surveyed so much of its shores, informs me that he found a tide, small certainly and apparently not governed by the moon, but regular. I have myself noticed a small rise and fall there; and the current, caused by tide, in the Faro of Messina, is well known.

As the moon passes over the Indian Ocean, the natural effect of her attraction must be to accumulate the waters, and draw the wave so caused after her, as in other places: but while that ocean is obey-

ing her power, and the wave is travelling toward the west, another wave is approaching from the Pacific—a wave which has been retarded in its passage—and its crest passes through the Indian archipelago, while the water would otherwise be falling at the western part of Torres Strait. At the same time, a derivative* wave moving northward along the west Australian coast, combines with the Pacific wave to raise a high tide about the north-west coast of Australia, where, if it were not for these auxiliaries, there would be low water at that time. Six hours afterwards, one body has ebbed toward the Pacific—the other southward, toward the then comparatively low ocean, south of Australia, and what—if Torres Straits were blocked up; and the water prevented from falling away toward the south—would be a high tide, is, in fact, low water. The tides in the two northern bays are derivatives, and move northward.

High water taking place at one time—within an hour—all along the east coast of Africa, shows that the rise of sea, or tide-wave, there moves westward or eastward, and the times of high water at the islands are farther confirmations; for the wave is at Chagos and at the Mauritius three or four hours before it is high water on the African coast. The Keeling time shows that there the water rises longer, in consequence of that part of the ocean being affected by the advancing swell of the Pacific.

The only remaining particular case which I now recollect is that of the south coast of Australia—from King George Sound to Spencer Gulf—a large space of sea, in which there is very little rise of tide—and even that little very irregular.

As the high water moves westward from the meridians of that great bay, a tide moves southward from the Indian archipelago, where it is high water just as it should be low in the bay mentioned: hence there is a filling, or flowing, from one wave, while another is retreating. In this wide expanse, affected by derivative tides from three adjoining oceans, we cannot but expect irregularities; either very high tides, caused by combination—or little or no tide, in consequence of mutual destruction—one tide ebbing from, while another is flowing toward the same place.

Throughout these remarks I have intentionally omitted to say much of the sun's action, because, though very inferior, it is simi-

* Derived from a great southern wave passing westward.

lar to that of the moon. Perhaps the Otaheite tide may be purely solar; this, however, is not at all certain.

It appears to me probable, that many important currents are caused by the tidal libration or oscillation of the sea. As the earth turns only one way, the moon is continually pulling, as it were, in one direction, and to this cause, I think, most of the greater currents may be traced. Wind, evaporation, and the variable weight of the atmosphere may each have a share in moving the waters horizontally; but there are many facts which lead to a conclusion that the moon and sun are principal agents in causing currents.*

Having alluded to the effect of atmospheric pressure on the ocean, I will take this opportunity of mentioning that the chief cause of water rising on the shore before hurricanes, or gales of wind, may be the lightened pressure on the surface of the sea, indicated by the mercury being low in a barometer. This is very remarkable at the Mauritius and in the river Plata, at both which places the water rises unusually before a storm, while at the same time the mercury falls. As the column rises, so the water falls again. I have instanced those places as being well known, and affected very little by tide: but the fact has been observed by me in many places during the Beagle's voyage, and I have besides collected the testimony of others respecting it.

These causes may materially affect the height of tides and the strength of currents. In the wide but shallow Plata, the depth of water and nature of current varies in extraordinary accordance with the barometer.

Another cause of the water rising before a high wind, or storm, as well as of a ground swell, of rollers, or of that disturbed tumultuous heaving of the sea, sometimes observed while there is little or no wind at the place, may be the action of wind on a remote part of that sea; an action, or pressure, which is rapidly transmitted, through a fluid but slightly elastic, to regions at a distance.

I have collected many instances of rollers, or a heavy swell, or a confused ground swell being felt at places, where not only there was no wind at the time, but to which the wind that caused the move-

* A continued stream may be produced by a succession of impulses, as a rotatory system of waves may "be kept in constant circulation by impulses received from the adjacent tides."—See Whewell in Phil. Trans. 1836, p. 299.

ments of water never reached. That they were caused by wind I proved by the logs of ships, which were in the respective gales at the time their effects on the sea were thus felt at a great distance. The places to which I particularly allude are the Cape Verde Islands, Ascension, St. Helena, Tristan d'Acunha, Cape Frio, Tierra del Fuego, Chilóe, the coast of Chile, the Galapagos Islands, Otaheite, the Keeling Islands, Mauritius, and the Cape of Good Hope.

Waves, or rollers, caused by earthquakes, or volcanic eruptions, are, of course, unconnected with wind or atmospheric pressure.

But in accounting for currents, as occasioned in some if not many instances by tidal pressure, or a succession of tidal impulses, we must not overlook the well known power of wind in giving horizontal motion to water, as well as in elevating or depressing it.

Wind blowing almost always in one direction is known to communicate a movement to waters, and it is remarkable that the general movements of the North Pacific as well as the North Atlantic are from west by the north to east, or, as a sailor would say, 'with the sun;' while in the southern oceans, Pacific, Atlantic, and Indian, they are generally 'against the sun,' or from west to east by the south—both corresponding to the general turn of the winds in the respective hemispheres. The Chile current after coasting Peru, preserves a temperature of about 60° up to the Galapagos, and there it meets a warm stream out of the Gulf of Panama, at a temperature of about 80°. The two unite together and turn westward along the equatorial zone. There is a remarkable exception on the east coast of Patagonia, where the current sets northward, owing, probably to tides.

I cannot end this imperfect attempt to sketch out some of the movements of ocean, without reminding young readers to whom the subject may not be so familiar as it is to others, that there may be circulations of water in a vertical direction, or in a plane inclined to the horizon, as well as horizontally: and that bodies of water differing in temperature, as well as in chemical composition, do not hastily blend together. Their reluctance to mix is observable at sea, when we sail out of one current, or body of water, into another—differing perhaps in temperature, chemical composition, and colour. At the meeting, or edge, of such bodies there is usually a well defined line, often considerable ripplings, which indicate some degree of mutual horizontal pressure—as of separate masses.

At the mouths of large rivers it sometimes happens that salt water is actually running up the river, underneath a stream of fresh water which still continues to run down. This I have witnessed in the river Santa Cruz. Of course intermixture takes place gradually, though by slow degrees.

The height of waves may be here mentioned, with reference to rollers or other undulations of water however caused. Large waves are seldom seen except where the sea is deep and extensive. The highest I have ever witnessed myself were not less than sixty feet in height, reckoning from the hollow between, perpendicularly to the level of two adjacent waves: but from twenty to thirty feet is a common height in the open ocean during a storm.

I am quite aware of, and have long been amused by the assertion of some persons, whose good fortune it has been not to witness really large waves—that the sea never rises above twelve or fifteen feet—or, that no wave exceeds thirty feet in height, reckoning in a vertical line from the level of the hollow to that of the crest.

In H. M. S. Thetis, during an unusually heavy gale of wind in the Atlantic, not far from the Bay of Biscay, while between two waves, her storm try-sails were totally becalmed, the crest of each wave being above the level of the centre of her main-yard, when she was upright between the two seas. Her main-yard was sixty feet from the water-line. I was standing near her taffrail, holding by a rope. I never saw such seas before, and have never seen any equal to them since, either off Cape Horn or the Cape of Good Hope.

Calculations of tides, applicable to the method of following out Newton's general principles, adopted by Mr. Whewell and most persons whose opinions on this subject all men respect—are equally applicable to the view here taken. In either case the time of high water, and rise of tide on a certain day, is ascertained at a given place experimentally: and as the causes of that tide are the moon and the sun; changes in their position with respect to the earth will operate changes in the tides, which, as to time and quantity, will depend upon the above data, and the positions of earth, moon, and sun.

The variation of tide is what we have to deal with in ordinary calculation, not the original movement.

No. 48.

Previous to sailing from England in 1831, the Beagle was fitted with the permanent lightning conductors invented by Mr. Wm. Snow Harris, F.R.S.

During the five years occupied in her voyage she was frequently exposed to lightning, but never received the slightest damage, although supposed to have been struck by it on at least two occasions, when—at the instant of a vivid flash of lightning, accompanied by a crashing peal of thunder—a hissing sound was heard on the masts; and a strange, though very slightly tremulous, motion in the ship indicated that something unusual had happened.

The Beagle's masts so fitted, answered well during the five years' voyage above-mentioned, and are still in use on board the same vessel, on foreign service.

Even in such small spars as her royal masts and flying jib-boom, the plates of copper held their places firmly, and increased rather than diminished their strength.

No objection which appears to me valid, has yet been raised against them; and were I allowed to choose between having masts so fitted and the contrary, I should not have the slightest hesitation in deciding on those with Mr. Harris's conductors.

Whether they might be farther improved, as to position and other details, is for their ingenious inventor to consider and determine. He has already devoted so many years of valuable time and attention to the very important subject of defending ships against the stroke of electricity; and has succeeded so well for the benefit of others—at great inconvenience and expense to himself—that it is earnestly to be hoped that the Government, on behalf of this great maritime country, will, at the least, indemnify him for time employed and private funds expended in a public service of so useful and necessary a character.

No. 49.

MEMORANDUM OF SOME OF THE FRESH PROVISIONS, PROCURED FOR THE BEAGLE'S CREW, BETWEEN 1831 AND 1835.

Many other animals and birds were shot at various places (besides those enumerated in this list), by which every one on board

profited in turn. Fish were caught frequently, either with nets or lines, sometimes with both; so that, except in long passages, the crew of the Beagle were seldom many weeks without a supply of fresh and wholesome food; while the provisions carried on board were always of the best quality that could be procured.

Number and Weight of the Animals killed with two Rifles only.

Date.		Animals.	By whom Shot.	Weight.
		Blanco Bay, Eastern Patagonia.		
1832.				
Sept.	11	One cavia ..	H. Fuller	*22 lbs.
—	12	Three deer ..	Ditto	122
—	15	One cavia ..	A. B. Bute ..	*19
—	17	Two deer ..	Mr. Stokes ..	81
Oct.	16	Four deer ..	H. Fuller	167
1833.				
August	25	Two deer ..	H. Fuller	96
—	—	One deer ..	Mr. Stokes ..	*62
—	30	Two deer ..	H. Fuller	79
—	—	Two cavias ..	Ditto	35
—	—	One deer ..	A. B. Bute ..	43
—	31	Ditto ..	Mr. Bynoe ..	45
Sept.	1	Ditto ..	Mr. Stokes ..	39
—	—	Ditto ..	H. Fuller	46
—	—	One fawn ..	Ditto	12
—	—	Four cavias ..	Ditto	73
—	3	One cavia ..	Capt. FitzRoy ..	21
—	—	One deer ..	Mr. Stokes ..	48
—	4	Three cavias .	H. Fuller	52
		Port Desire, Eastern Patagonia.		
Dec.	28	One guanaco ..	H. Fuller	164
		Santa Cruz, Eastern Patagonia.		
1834.				
April	24	One guanaco .	H. Fuller	130
—	30	Two guanacoes	Ditto	220
May	8	One guanaco .	Mr. Bynoe ..	150
—	—	Ditto ..	H. Fuller	143
—	9	Ditto ..	Mr. Bynoe ..	166
—	11	Ditto ..	Ditto	139
				2,174 lbs.

* The weight of the whole animal. The rest are as served out to the ship's company.

Fresh Provisions purchased in the Pacific and Indian Oceans, for the use of the Crew of H.M.S. Beagle.

CHARLES ISLAND, GALAPAGOS.

DATE.		ARTICLES.	DLRS.	RLS.
1835.				
Sept.	25	1 Pig } 269 lbs.	4	0
—	26	1 Pig } 269 lbs.	4	0
—	—	1 Pig } 269 lbs.	4	0
—	—	3 Pigs } 269 lbs.	7	4
—	—	13 Barrels Potatoes	26	0
—	—	8 Pumpkins	1	6
		TOTAL	47	2

OTAHEITE.

16th to 28th November 1835:—

	Dlrs.	Rls.	Mds.
706 lb. Fresh Beef	35	0	1
4 Barrels Potatoes, 3 dlrs. each	12	0	0
3 Pigs, 5 dlrs. each	15	0	0
25 Heads of Taro Root	2	4	0
Dlrs.	64	4	1

25th November 1835:—

Fresh Beef	20 lb. 1 dlr.
Ditto Pork	15 lb. 1 dlr.

Sweet Potatoes, 3 dollars per barrel.

NEW ZEALAND.

22d Dec. 1835 to 1st Jan. 1836:—

10 Pigs, weighing 840 lbs., at 2½*d.* per lb. ..	£8	15	0
8 cwt. Potatoes, at 3*s.* per cwt	1	4	0
	£9	19	0

£9 19*s.* equal to 49 dlrs. 6 rls.

22d December 1835:—In the Bay of Islands.

Current Prices:—Pork, 2½*d.* per lb.
Potatoes, 3*s.* per cwt.
Corned Pork, 4½*d.* per lb.
Beef, when procured, 2½*d.* per lb.

KEELING ISLANDS.

12th April 1836:—

26 Turtle, at 4*s.* 4*d.* each	£5	12	8
2 large Pigs	2	0	0
	£7	12	8

In payment—500 lbs. Bread at 2½*d.* ..	£5	4	2			
Cash	2	8	6			
				7	12	8

No. 50.

A few Observations on the Temperature of the Sea in latitude 27° 30′ S. and longitude 41° E.; on the 15th May 1836.—(Six's self-registering Thermometer, Fahrenheit's Scale, used.)

At the surface	..		75°,6
At 5 fathoms below			74,5
8	..	..	74,2
18	..	..	74,0
20	..	..	74,0
28	..	..	73,0
40	..	..	72,5
48	..	..	71,0
50	..	..	70,0
75	..	..	68,0
100	..	..	64,5
At 200 fathoms below			58°,5
300	..	..	55,5
400	..	..	52,5
420	..	..	52,0
A few repeated:—			
At 5 fathoms below			74,4
20	..	..	74,0
48	..	..	71,0
50	..	..	70,0
100	..	..	64,5

In April 1836, at the Keeling Islands in the Indian Ocean (lat. 12° S.), the temperature at the bottom, in 363 fathoms, was 45° (very carefully observed).

No. 51.

TABLE OF REMARKABLE HEIGHTS VISIBLE FROM A SHIP.

The heights given in this table were ascertained by angular measurement: they are on the coasts of South America, the Falkland Islands, and the Galapagos.

Summits.	Feet.	Summits.	Feet.
Abingdon Island	1,950	Animas Las, Height south of	1,800
Acari Mount	1,650	Aymond Mount	1,000
Aconcagua.....	23,200		
Ahuja Point, Height near ..	1,000	Banks Hill, Good Success Bay	1,400
Albemarle Island, S.W. summit	4,700	Bell Mount (Tierra del Fuego)	2,600
Albemarle Island, S.E. ditto	3,720	Benson Mount	1,780
Albemarle Island, Middle ditto	3,780	Boqueron Mount	3,000
Albemarle Island, North ditto	3,500	Bufadero Hill.....	1,620
Albemarle Island, over Cape Berkeley.....	2,360	Burney Mount	5,800
Alexander Mount.....	1,960	Callao, Height near	3,000
Amatape Mountain	3,270	Campana Mount	3,450

Summits.	Feet.
Carreta Mount	1,430
Carr Hill	2,500
Carrasco Mount	5,520
Carrasco Heights	3,000
Carrisal, Herradura de, Height near	3,050
Castro Hill (Peru)	1,160
Chala Mount	3,740
Chañeral, Height north of	1,100
Charles Island, Saddle Hill	1,780
Chatham Island, west summit	1,550
Chatham Island, middle summit	1,210
Chatham Island, south summit	1,550
Chilca, Port, height over	1,320
Chileno Point	1,640
Cliff Cove Hill	1,550
Cobija Range	3,330
Cocotue Head	1,500
Coles Point, height near	2,970
Cone, Port San Andres	1,600
Corcovado, Rio de Janeiro	2,340
Corcovado (Chilóe)	7,510
Cruz, Mount	2,260
Cucao Heights	1,800
Culibras Cove, height near	2,390
Curauma Head	1,830
Dark Hill	2,150
Darwin Mount (Tierra del Fuego)	6,800
Darwin Mount (Peru)	5,800
Davis Mount	1,420
Division Mount	1,830
Dripstone (Galapagos)	1,500
Duende Summit	2,580
Eten, Height inshore, near	2,450
Galera Range, over Point Falsa	1,550
Gallan, San, Island	1,130
Garita Hill	3,720
Gobernador Hill	1,020
Gorda Point	2,520
Grande Point	1,570
Graves Mount	1,438
Haddington Mount	3,130
Herradura Hill (Coquimbo)	1,000
Herradura, South distant hill	2,450
Huacho, Peak	4,220
Huanaquero Hill	1,850
Huanchaco Mount	3,450
Huayteca Grande	1,000
Islay Mount	3,340
Isquiliac Mount	3,000
James Island (Galapagos), summit	1,700
Jaron Mountain	3,990
Juan Fernandes, Yungue	3,000
Juan Soldado	3,900
Kater Peak	1,750
Lechuza Mount	1,300
Limari Range	2,150
Lobo Height, south of Victor	3,380
Lobo Point, Height over	3,090
Lomas Range, over San Antonio	2,960
Lorenzo, San	1,050
Luis, San, range near Cape Quedal	2,400
Main Mount	2,060
Malacuen	3,000
Mamilla Height	4,020
Manzano Hill	1,550
Maria, Doña, Table of	2,160
Matalqui Heights	1,500
Mutamores, Height near	2,450
Maule, Heights near	1,300
Maytencillo Range	3,900
Mellersh Height	3,560
Mexillones Height	2,650
Midhurst Island	1,760

Summits.	Feet.
Milagro, east height	2,400
Milagro, south height	3,150
Minchinmadom	8,000
Mitford Head	1,220
Mocha Island	1,240
Mollendo Peak	3,090
Mongon Mount	3,900
Monument Peak	2,850
Moore's Monument	3,400
Moreno Mount	4,160
Narborough Island (Galapagos)	3,720
Nasca Point	1,020
Neuke Mount	1,800
Obispo, Height near	2,850
Oyarvide Mount	5,800
Osorno Mountain	7,550
Pabellon, Pico	1,040
Payta, Silla de	1,300
Paul, St., Dome of	2,280
Paz Islet	1,180
Pedro, San	3,200
Peje Peumo, Point	1,900
Philip Mount (Chonos)	2,760
Philip, St., Mount	1,310
Pisagua, Height north of	3,220
Plata Point	1,670
Pond Mount	2,500
Pyramid Hill	2,500
Quilan Ridge	1,180
Quillota Bell	6,200
Quemado Mount	2,070
Raper Cape	2,000
Rees Point, range near	3,500
Refuge Peak (Chonos)	3,460
Rugged Peak	2,840
Sama Hill	3,890
Sarmiento Mount	6,910
Serena Hill	1,660
Silla Hill (Pichidanque)	2,000
Simon Mount	1,600
Skyring Mount	2,200
Skyring Peak (Chonos)	2,620
Solar, Height near	3,420
Sulivan Mount (Peru)	5,000
Sulivan Peaks (Chonos)	4,350
Stokes Mount (Peru)	4,000
Sugar Loaf, (Rio de Janeiro)	1,270
Sugar Loaf (Galapagos)	1,200
Sugar Loaf (Chonos)	1,840
Talinay Mount	2,300
Tarn Mount	2,850
Tarapaca Mount	5,780
Tres Montes, Cape	2,000
Tres Puntas, Cape	2,000
Twenty-six degree Range	2,200
Usborne Mountains (Peru)	4,000
Usborne Mount (Falklands)	1,630
Valparaiso, Heights over	1,480
Valparaiso, Signal Post hill	1,070
Ventana Mountain	3,350
Villarica Mountain	16,000
Weddell Mount	1,160
Wickham Heights (in the Falklands)	1,700
Wickham Mount (Peru)	4,010
Williams Island	2,530
Wilson Mount	8,060
Yanteles Mount	8,030

Note.—The heights are given only to the nearest ten feet above the mean level of the sea; but they were calculated to the utmost degree of accuracy that was attainable.

No. 52.

In pp. 228-9 of vol. ii, it is stated, "In 1501-2 Americus Vespucius, then employed by the King of Portugal, sailed six hundred leagues south, and one hundred and fifty leagues west, from Cape San Agostinho (lat. 8° 20′ S.) along the coast of a country then named Terra Sanctæ Crucis. His account of longitude may be very erroneous, but how could his latitude have erred thirteen degrees in this his southernmost voyage?"

Since those pages were printed, I have obtained a perfect copy of the four voyages of Americus Vespucius, written in Latin; and I now hasten to correct any erroneous impression which might arise out of my having asserted that Vespucius "could not have explored farther south than the right bank of La Plata."

By the subjoined extracts from the third voyage of Vespucius, it appears that he sailed to about fifty-two degrees of south latitude; and near that latitude discovered land:—which I have no doubt whatever was Georgia.

These extracts are not only verbally but literally copied from the original: every passage which can throw even the slightest light upon dates, times, courses, distances or positions, is here given; the portions of the narrative which are omitted relate solely to what Vespucius saw on the land. According to his narrative, he went to the Canaries, thence to the coast of Africa near Cape Verde; from which place he sailed to the coast of Brazil, near, but to the westward of Cape St. Roque; thence he worked to windward against the current, till he reached Cape San Agostinho; and from that point he coasted to about the River Grande, in thirty-two south. From this port, whether the River Grande or a place near it, Vespucius steered to the south-east (per Seroccum) five hundred leagues; found the south pole elevated fifty-two degrees, the night fifteen hours long, the cold excessive, a high sea, a succession of tempestuous weather, and land precisely like Georgia, but not at all resembling any part of the Falklands. Georgia lies somewhat farther south than the latitude mentioned (being in 54°—55°); but we should take into consideration the instruments used at sea in 1502; the all but utter ignorance of southern stars; and the succession of bad weather encountered by Vespucius about the time of his seeing land near 52° S.

From this latitude he sailed thirteen hundred leagues towards the north and north-east, and arrived at Sierra Leone; whence he went to the Azores and to Lisbon.

The internal evidence contained in the narrative of this voyage affords satisfactory proof of its authenticity. Whether the design of Vespucius was to seek for southern land, or endeavour to sail to 'Cathay' by the shortest line (the arc of a great circle), does not appear: but as we know he was skilled in mathematics and of an enterprising character, such a conjecture as the latter may be not totally improbable.

Navigatio tertia Americi Vesputii.

"Igitur ab hoc Lisbonæ portu cum tribus conservantiæ navibus die Maii decima MDI abeuntes, cursum nostrum versus magnæ Canariæ insulas arripuimus, secundum quas et ad earum prospectum instanter enavigantes, idem navigium nostrum collateraliter secundùm Aphricam occidentem versus sequuti fuimus."

* * * * * * *

"Exinde autem ad partem illam Æthiopiæ, quæ Besilicca dicitur, devenimus: quæ quidem sub torrida zona posita est, et superquam quatuordecim gradibus se septentrionalis erigit polus in climate primo: ubi diebus undecim nobis de lignis et aqua provisionem parantes restitimus, propter id quod Austrum versus per Atlanticum pelagus navigandi mihi inesset affectus. Itaque portum Æthiopiæ illum post hæc relinquentes, tunc per Lebèccium ventum in tantum navigavimus, ut sexaginta et septem infra dies insulæ cuidam applicuerimus, quæ insula septingentis à portu eodem leucis ad Lebeccii partem distaret. In quibus quidem diebus pejus perpessi tempus fuimus, quàm unquam in mari quispiam antea pertulerit, propter ventorum nimborumve impetus, qui quamplurimum nobis intulere gravamina, ex eo quod navigium nostrum lineæ præsertim æquinoctiali continue junctum fuit. Inibique in mense Junio hyems extat, ac dies noctibus æquales sunt, atque ipsæ umbræ nostræ continue versus meridiem erant. Tandem verò omninotanti placuit novam unam nobis ostendere plagam, decima septima, scilicet, Augusti, juxta quam, leuca sepositi ab eadem cum media, restitimus, et postea assumptis cymbis nonnullis in ipsam visuri si inhabitata esset, profecti fuimus."

* * * * * * *

"De qua quidem ora pro ipso serenissimo Castiliæ rege possessorium cepimus, invenimusque illam multum amænam ac viridem esse, et apparentiæ bonæ. Est autem extra lineam æquinoctialem Austrum versus quinque gradibus: et ita eadem die, ad naves nostras repedavimus."

* * * * * * *

"Postquam autem terram illam reliquimus, mox inter Levantem et Seroccum ventum, secundum quos se continet terra, navigare occepimus, plurimos ambitus, plurimosque gyros interdum sectantes: quibus durantibus gentes non vidimus, quæ nobiscum practicare, aut ad nos appropinquare voluerint. In tantum vero navigavimus ut tellurem unam novam quæ secundum Lebeccium se porrigeret, invenerimus. In qua quum campum unum circuivissemus, cui sancti Vincentij campo nomen indidimus, secundum Lebeccium ventum post hæc navigare occœpimus: distatque idem sancti Vincentij campus a priore terra illa, centum quinquaginta leucis ad partem levantis: qui et quidem campus octo gradibus extra lineam æquinoctialem versus Austrum est."

* * * * * * *

"nos portum illum linquentes, per Lebeccium ventum, et in visu terræ semper transcurrimus, plures continue faciendo scalas pluresque ambitus, ac interdum cum multis populis loquendo, donec tandé versus austrum extra Capricorni tropicum fuimus. Ubi super horizonta illum meridionalis polus triginta duobus sese extollebat gradibus, atque minorem jam perdideramus ursam, ipsaque major ursa multum in fima videbatur, fere in fine horizontis se ostentans, et tunc per stellas alterius meridionalis poli nosmetipsos dirigebamus, quæ multo plures, multoque majores ac lucidiores quam nostri poli stellæ existunt: propter quod plurimarum illarum figuras confinxi, et præsertim earum quæ prioris ac majoris magnitudinis erant, unà cum declinatione diametrorum, quas circa polum austri efficiunt, et unà cum denotatione earundem diametrorum, et semidiametrorum earum, prout in meis quatuor diætis, sive navigationibus inspici facile poterit. Hocce vero navigio nostro, a campo sancti Augustini incepto, septingentas percurrimus laucas (leucas?) videlicet, versus Ponentem centum, et versus Lebeccium sexingentas: quas quidem dum peragraremus, si quis quæ vidimus enumerare vellet, non totidem ei papyreæ chartæ sufficerent."

* * * * * * *

"Et in hac quidem peragratione decem fere mensibus extitimus."

* * * * * * *

"edixi, mandavique ubique, ut de lignis et aqua pro sex mensibus munitionem omnes sibi pararent: nam per navium magistros nos cum navibus nostris adhuc tantundem navigare posse judicatum est. Qua quidem, quam edixeram, facta provisione, nos oram illam linquentes, et inde navigationem nostram per Seroccum ventum initiantes, Februarii decima tertia, videlicet, quum sol æquinoctio jam appropinquaret, et ad hoc Septentrionis hemisphærium nostrum vergeret, in tantam pervagati fuimus, ut meridianum polum super horizonta illum quinquaginta duobus gradibus sublimatum invenerimus, ita ut nec minoris ursæ: nec majoris stellæ amodo inspici valerent. Nam tunc a portu illo, à quo per Seroccum abieramus, quingentis leucis longe jam facti eramus, tertia, videlicet, Aprilis. Qua die tempestas ac procella in mari tam vehemens exorta est, ut vela nostra omnia colligere, et cum solo nudo que malo remigare compelleremur, perflante vehementissime Lebeccio, ac mari intumescente, et aëre turbulentissimo extante. Propter quem turbinis violentissimum impetum nostrates omnes non modico affecti fuerunt stupore. Noctes quoque tunc inibi quam-maximæ erant. Etenim Aprilis septima, sole circa Arietis finem extante, ipsæ eædem noctes horarum quindecim repertæ sunt: hyemsque etiam tunc inibi erat, ut vestra satis perpendere potest majestas. Nobis autem sub hac navigantibus turbulentia, terram unam Aprilis secunda vidimus, penes quam viginti circiter leucas navigantes appropiavimus: verum illum omnimodo brutalem et extraneam esse comperimus, in qua quidem nec portum quempiam, nec gentes aliquas fore conspeximus, ob id, ut arbitror, quod tam asperum in ea frigus algeret, ut tam acerbum vix quisquam perpeti posset. Porrò in tanto periculo, in tantaque tempestatis importunitate nosmet tum reperimus, ut vix alteri alteros prægrandi turbine nos videremus. Quamobrem demum cum navium prætore pariter concordavimus, ut connavitis nostris omnibus, terram illam linquendi, seque ab ea elongandi, et in Portugallia remeandi signa faceremus. Quod consilium sanum quidem et utile fuit, quum si inibi nocte solum adhuc illa perstitissemus, disperditi omnes eramus: nempe quum hinc abiissemus, tam grandis die sequenti tempestas in mari excitata est, ut penitus obrui perdite metueremus. Propter quod plurima peregrinationum vota, necnon alias quamplures cæremonias, prout nautis mos esse solet, tunc feci-

mus. Sub quo tempestatis infortunio quinque navigavimus diebus, demissis omnino velis. In quibus quidem quinque diebus ducentas et quinquaginta in mari penetravimus leucas, lineæ interdum equinoctiali, necnon mari et auræ temperatiori semper appropinquando, per quod nos à præmissis eripere periculis altissimo Deo placuit. Eratque hujuscemodi nostra navigatio ad transmontanum ventum et Græcum, ob id quòd ad Æthiopiæ latus pertingere cupiebamus, à quo per maris Atlantici fauces eundo, mille tercentum distabamus leucis. Ad illam autem per summi tonantis gratiam Maij bis quinta pertigimus die. Ubi in plaga una ad latus Austri, quæ Serraliona dicitur, quindecim diebus nos ipsos refrigerando fuimus. Et post hæc cursum nostrum versus insulas Lyazori dictas arripuimus: quæ quidem insulæ à Serraliona ipsa septingentis et quinquaginta leucis distabant, ad quas sub Julii finem pervenimus, et pariter quindecim inibi nos reficiendo perstitimus diebus. Post quos inde exivimus, et ad Lisbonæ nostræ recursum nos accinximus, à qua ad occidentis partem tercentum sepositi leucis eramus, et cujus tandem deinde portum MDII cum prospera salvatione et cunctipotentis nutu rursum subivimus cum duabus duntaxa navibus, ob id quod tertiam in Serraliona, quoniam amplius navigare non posset, igni combusseramus. In hac autem nostra tertiò cursa navigatione, sexdecim circiter menses permansimus: è quibus undecim absque transmontaneæ stellæ, necnon et majoris ursæ minorisve aspectu navigavimus, quo tempore nosmetipsos per aliam meridionalis poli stellam regebamus: quæ superius commemorata sunt, quæ in eadem nostra tertiò facta navigatione, relatu magis digna conspexi."

The above is a literal extract from pp. 116—126 of the Novus Orbis, id est, Navigationes primæ in Americam. Roterodami, apud Johannes Leonardi Berewout. Anno 1616.—an exceedingly scarce work.

No. 53.

BAROMETRIC OBSERVATIONS IN THE RIVER SANTA CRUZ.

Before leaving the Beagle, to explore part of the river, two mountain barometers, afterwards carried in the boats, were suspended on shore, close to the sea, and compared with a barometer on board the ship, the cistern of which instrument was at the level of the sea.

After returning from exploring part of the river, both mountain barometers were again similarly compared, and the difference between the best instrument and that fixed on board was found to be the same as before, namely, 0,19 inch. At sunrise on the 5th of May, at the westernmost station reached by the boats, the mountain barometer which was preferred showed 29,81 (β'); the thermometers, attached, and detached, 44° Fahrenheit; and the cistern of the instrument was one foot above the level of the river. At the same time (allowing the difference of longitude) the barometer on board the Beagle showed 30,07 (β); while the attached thermometer showed 44°, and the detached 43°.

The rise of tide that morning at the ship was twenty-one feet, and it was high water at thirty minutes past seven, A.M.

By Baily's rule—*

$$B = 0{,}00000 \qquad \text{(subtract 0,19 from 29,81)}$$
$$\log.\ \beta' = 1{,}47159$$
$$1{,}47159$$
$$\log.\ \beta = 1{,}47813$$
$$D = 0{,}00654 \text{ - - - } \log = \overline{7}{,}81558$$
$$c = \overline{9}{,}99980$$
$$A = 4{,}79207$$
$$405 = \overline{2{,}60745}$$
$$+\ 7$$
$$412 \text{ feet.}$$

Half-tide 10,5 feet.

$$-\ 2{,}5$$
$$8$$
$$-\ 1$$
$$7$$

Hence the western station appears to be about four hundred and twelve feet above the level of the eastern—that of the Beagle:—but other pairs of observations were made during the previous and following days (May 4th and 6th) of which the results, similarly deduced, were 464, 501, 527, 487, 497, 434, and 436;—each considerably above 400 feet: and as that part of the river (the western station) is about two hundred miles from the sea, the fall, on an average, cannot be less than two feet in each mile.

* Pp. 183 and 263 of Astronomical Tables and Formulæ, by Francis Baily, Esq. F.R.S. Pres. A.S. &c. &c.

No. 54.

A FEW NAUTICAL REMARKS.

Without extending this work to an unwieldy size, it would be impossible to give particular descriptions of, or sailing directions for, half the anchorages surveyed by the Beagle and her consorts. I can here only allude to some which are least easy of access; and for details concerning the rest, I must ask the reader to refer to Captain King's Sailing Directions, published by the Admiralty in 1832; and, hereafter, to a similar work, which I am compiling.

In approaching or entering any port between the southern coast of Brazil and Tierra del Fuego,* both leads and charts must be closely attended to, tides and currents must be well considered, and the colour, as well as rippling of the water, narrowly watched. Generally speaking, much of this extent of coast is comparatively shallow, and beset with insidious dangers in the shape of banks and currents. Where rocks occur they are less to be feared, because their position is, in most cases,† pointed out by kelp.‡ Some of the banks are particularly dangerous, being exceedingly steep-sided and hard. Where there is a strong stream or great rise of tide, or where both are found, the risk of approaching such banks is proportionably increased.

Of the River Plata I have spoken briefly in Chapter IV., and of Blanco Bay there is a slight description in Chapter V. of the second volume.

Before entering Port Belgrano (within Blanco Bay), or any similar port, such as False Bay, Green Bay, Brightman Inlet, Union Bay, &c. I should advise anchoring, and ascertaining the ship's position exactly, sending a boat to find the middle of the principal entrance, and there dropping a buoy with a good anchor. If the weather is at all hazy, no marks on the distant low land will be made out by a stranger, until he has had time to take a few angles, look round from the masthead, and examine the chart leisurely. These things cannot be so well done while the ship is sailing fast; she may, however, be brought to for a time.

* Except at the Falklands.

† That in the entrance of Port Desire is a notable exception to the general rule

‡ Seaweed growing in rocky places.

The Falkland Islands, Tierra del Fuego,* the west part of Patagonia, the shores of the Chonos Archipelago, and Chilóe,† those of Chile and Peru, and the Galapagos Islands, have bold coasts, with deep water near them ;—in such places the lead is of less importance. Most lurking dangers are buoyed by kelp; but where they are not so distinguished, the lead would hardly warn the seaman of them, because rocks usually rise so abruptly. A careful and experienced eye at the masthead, another perhaps on the fore-yard or at the jib-boom end, a manageable quantity of sail, under which the vessel may be instantly brought to the wind or hove in stays, and a good estimation of distances by the commanding officer will be of more consequence in frequenting these coasts, than either lead or directions. San Carlos and the Narrow of Chacao are remarkable exceptions. Both banks and rocks are there to be guarded against—by chart, eye, and lead, however, rather than by lengthy directions, which sometimes perplex more than they assist. Of these a particular plan is given iu the map which accompanies the first volume of this work.

Remarks upon the winds, weather, and climate of each of the southern portions of the South American coast have already been given in various pages of this work; but I will add some more, referring particularly to the outer coast of Tierra del Fuego, previous to saying a few words on the passage round Cape Horn.

Some Observations upon the Appearance and Character of the Sea Coast of Tierra del Fuego; a brief Description of the Anchorages; and a few Remarks upon the Seasons, Wind, and Weather.

From Cape Pillar to Cape Horn the coast of Tierra del Fuego is very irregular and much broken; being, in fact, composed of an immense number of islands. It is generally high, bold, and free from shoals or banks; but there are many rocks nearly level with the surface of the water, distant two and even three miles from the nearest shore, which make it very unsafe for a vessel to approach nearer than five miles, excepting in daylight and clear weather. The coast varies in height from eight to fifteen hundred feet above the sea.

* Except the northernmost and the eastern shores.

† Except San Carlos de Chilóe.

Farther inshore are ranges of mountains always covered with snow, whose height is from two to four thousand feet, and in a few instances about six or seven thousand.

With daylight and clear weather a vessel may close the shore without risk, because the water is invariably deep, and no rock is found, which is not so marked by sea-weed (or kelp as it is generally called), that by a good look-out at the mast-head, its situation is as clearly seen as if it were buoyed. By avoiding kelp you are sure of having sufficient water for the largest ships on any part of this coast. At the same time, it must be remembered that kelp grows in some places from a depth of thirty fathoms, and that on many parts of this coast you may pass through thick beds of sea-weed without having less than six fathoms water; still it is always a sign of danger, and until the spot where it grows has been carefully sounded, it is not safe to pass over it with a ship. As an instance;—after sounding a large bed of this weed in one of the Beagle's boats, and thinking it might be passed safely, a rock was found, not more than four feet in diameter, having only one fathom water over it.

Viewing the coast at a distance, it appears high, rugged, covered with snow, and continuous, as if there were no islands. When near you see many inlets which intersect the land in every direction, and open into large gulfs or sounds, behind the seaward islands: and you then lose sight of the higher land, which is covered with snow throughout the year, and find the heights close to the sea thickly wooded towards the east, though barren on their western sides, owing to the prevailing winds. These heights are seldom covered with snow, because the sea winds and the rain melt it soon after it falls.

Opposite to the eastern valleys, where the land is covered with wood, and water is seen falling down the ravines, good anchorage is generally found. But these valleys are exposed to tremendous squalls which come from the heights. The best of all anchorages on this coast is where you find good ground on the western side of high land, and are protected from the sea by low islands. It never blows near so hard against high land as from it; but the sea on the weather side is of course very formidable, unless stopped, as I mentioned, by islets.

Where the land is chiefly composed of sandstone or slate, anchorages abound; where of granite, it is difficult to strike soundings.

The difference between the granite and slate or sandstone hills, can be distinguished by the former being very barren and rugged,

and of a grey or white appearance; whereas the latter are generally covered with vegetation, are dark-coloured, and have smoother outlines. The slate hills shew some sharp peaks, except which, the only bare places are those exposed to wind or sea.

Soundings extend about thirty miles from the coast. Between ten and twenty miles from the land, the depth of water varies from sixty to two hundred fathoms; the bottom almost every where being white or speckled sand. From ten to five miles distant, the average depth is fifty fathoms; it varies in general from thirty to one hundred, but in some places there is no ground with two hundred fathoms of line. Less than five miles from the shore the soundings are very irregular indeed, generally less than forty fathoms, though in some places deepening suddenly to one hundred or more; while in others a rock rises nearly to, or above the surface of the water.

After carrying fifty, forty, thirty, or twenty fathoms, towards an inlet, which you are desirous of entering, you will perhaps find the water deepen to sixty or one hundred fathoms as soon as you enter the opening: and in the large sounds, behind the seaward islands, the water is often considerably deeper than on the outside.

There is a bank of soundings along the whole coast, extending from twenty to thirty miles from it, which appears to have been formed by the continued action of the sea upon the shore, wearing it away, and forming a bank with its remains.

Between the islands, where there is no swell or surf worth notice, the water is deep, and the bottom very irregular.

A small ship may run among the islands in many places, and find good anchorage; but she will enter a labyrinth, from which her retreat may be difficult, and in thick weather very dangerous.

Fogs are extremely rare on this coast; but thick, rainy weather, and strong winds prevail. The sun shews himself but little; the sky, even in fine weather, being generally overcast and cloudy. A clear day is a rare occurrence.

Gales of wind succeed each other at short intervals, and last several days. At times the weather is comparatively fine and settled for perhaps a fortnight, but those periods of quiet are few.

Westerly winds prevail during the greater part of the year. The easterly wind blows occasionally in the winter months, and at times very hard, but it seldom blows in summer.

Winds from the eastern quarter invariably rise light, with fine

weather; they increase gradually, the weather changes, and at times they end in a determined heavy gale. More frequently they rise to the strength of a treble-reefed topsail breeze, then die away gradually, or shift to another quarter.

From the north the wind always begins to blow moderately, but with thicker weather and more clouds than when from the eastward: it is generally accompanied by small rain. Increasing in strength, it draws to the westward gradually, and blows hard from between north and north-west, with heavy clouds, thick weather, and much rain.

When the fury of the north-wester is expended, which varies from twelve to fifty hours, or even while it is blowing hard, the wind sometimes shifts suddenly into the south-west quarter, blowing harder than before. This wind soon drives away the clouds, and in a few hours causes clear weather, though perhaps with heavy squalls passing occasionally.

In the south-west quarter the wind (generally speaking) hangs several days, blowing strong, but moderating towards the end, and admitting two or three days of fine weather.

Northerly winds then usually begin again, during the summer months; but all manner of shifts and changes are experienced, from north to south by the west, during that season; which would hardly deserve the name of summer, were not the days so much longer, and the weather a little warmer. Rain and wind prevail during the long, much more than in the short days.

It should be remembered that bad weather never comes on suddenly from the eastward, neither does a south-west or southerly gale shift suddenly to the northward. South-west and southerly winds rise suddenly as well as violently, and must be well considered in choosing anchorages, or preparing for shifts of wind at sea.

The most usual weather in these regions is a fresh wind between north-west and south-west, with a cloudy overcast sky.

Much difference of opinion has prevailed as to the utility of a barometer in these latitudes. I may remark, that during some years' careful trial of a barometer and sympiesometer (Adie's), I found their indications of the utmost value. Their variations did not of course correspond to those of middle latitudes, but they corresponded to those of high northern latitudes in a remarkable manner, (changing south for north, east and west remaining the same).

Gales of wind from the southward, and squalls from the south-

west, are preceded, and therefore foretold, by heavy banks of large white clouds rising in those quarters, having hard edges, and appearing very rounded and solid.

Winds from the northward and north-westward are preceded and accompanied by low scud clouds, with a thickly overcast sky, in which other clouds appear to be at a great height. The sun shews dimly through them, and has a reddish appearance. For some hours, or a day before a gale from the north, or west, it is not possible to take an altitude of the sun, although he is visible; the haziness of the atmosphere in the upper regions causing his limbs to be quite indistinct. Sometimes, but very rarely, with the wind light between N.N.W. and N.N.E. there are a few days of beautiful weather: but they are sure to be succeeded by gales from the southward, with much rain.

It may be useful to say a few words regarding the seasons in the neighbourhood of Cape Horn, as much question has arisen respecting the propriety of making a passage round the Cape in winter rather than in summer.

The equinoctial months are the worst in the year, generally speaking, as in most parts of the world. Heavy gales prevail about those times, though not perhaps exactly at the equinoxes. In August, September, and October, there is usually very bad weather; strong winds, snow, hail, and cold, then prevail.

December, January, and February, are the warmest months; the days are long, and there is some fine weather; but westerly winds, at times very strong gales, with much rain, prevail throughout this season, which carries with it less of summer than in almost any part of the globe.

March, as I said, is stormy, and perhaps the worst month in the year, with respect to violent winds, though not so rainy as the summer months.

In April, May, and June, the finest weather is experienced; and though the days are short, it is more like summer than any other time of the year. Easterly winds are frequent, with fine, clear, settled weather. But bad weather occurs during these months, though not so often as at other times. During this period there is some chance of obtaining a few successive and corresponding observations. To try to rate chronometers by equal altitudes would be a fruitless waste of time at other seasons.

June and July are much alike, but easterly gales blow more during July. The days being so short, and the weather cold, make these two months very unpleasant, though they are, perhaps, the best for making a speedy passage to the westward, as the wind is then prevalent from the eastern quarter.

I should say that December and January are the best for making a passage from the Pacific to the Atlantic Ocean, though that passage is so short and easily made, that it hardly requires a choice of time. For going to the westward, I should prefer April, May, or June, and should wait for a wind.

Lightning and thunder are seldom known: violent squalls come from the south or south-west, giving warning of their approach by masses of clouds. They are rendered more formidable by snow and hail of a large size.

There is a continual current setting along the south-west coast of Tierra del Fuego, from the north-west towards the south-east, as far as the Diego Ramirez Islands. From their vicinity the current takes a more easterly direction, setting round Cape Horn towards Staten Island, or off to seaward to the E.S.E.

Much has been said of the strength of this current; some persons supposing that it is a serious obstacle in passing to the westward of Cape Horn, while others almost deny its existence.

We found it run at the average rate of a mile an hour. Its strength is greater during west,—less or insensible during easterly winds. It is strongest near the land, particularly near the projecting capes or detached islands.

This current sets rather from the land, which diminishes the danger of approaching the south-west parts of the coast: but there is, in fact, much less risk in approaching this coast than is generally supposed. Being high and bold, without sandbanks or shoals, its position accurately determined, and a bank of soundings extending twenty or thirty miles from the shore, it need not be much feared. Rocks, it is true, abound near the land, but they are very near to the shore, and out of a ship's way.

A line from point to point along the coast (beginning from the outermost Apostle), will clear all danger, excepting the Tower Rocks, which are steep to, and high above water.

The preceding notices were written by me in 1830, and I have not found it necessary to alter them materially. Taken in connection with

Capt. King's, Chapt. 24, in Vol. 1, and the following brief remarks, I hope they may prove useful to a stranger to the passage round Cape Horn: but he will doubtless avail himself also of what has been written on this subject by other persons, especially Weddell.

In going westward, Captain King recommends keeping near the eastern coast of Patagonia, and "after passing Staten Island, if the wind be westerly, the ship should be kept upon the starboard tack, unless it veer to the southward of S.S.W. until she reaches the latitude of 60° S."—(vol. i. pp. 464-5.) I do not think keeping near the eastern coast of Patagonia of importance to a large or strong vessel; smoother water is found near that coast, it is true, but currents set to the northward alongshore more strongly than in the open sea. Icebergs, however, are never found in sight of that land, though they have been met farther eastward, to the north of forty degrees south latitude. Instead of going into sixty, south latitude, I should prefer working to windward, near the shore of Tierra del Fuego;—through Nassau Bay; where anchorages are numerous, and easy of access.

In Orange Bay, or farther south, a ship may await a favourable time for making a long stretch to the westward: if foiled in one effort, she may return, or seek for anchorage under Noir Island, in Euston Bay, or elsewhere, until a better opportunity occurs. To make westing ought to be the principal object, in my humble opinion, till the meridian of about 82° is reached.* Icebergs are not found near the land of Tierra del Fuego, but they are frequently met with at a distance from it.

By adopting this plan of passing through Nassau Bay, or near Cape Horn, much labour and damage may be avoided, because a ship may lie quietly at anchor during the worst weather, and be ready to profit by any advantageous change.

* Eighty degrees will be far enough west for a fast-sailing ship; but eighty-five degrees will not be too westerly for a dull sailer.

No. 55.

REMARKS on the Chronometrical Observations made during the Surveying Voyages of H. M. Ships Adventure and Beagle, between the years 1826 and 1836.

Before I proceed to notice the chronometrical observations made during the Beagle's latter voyages, from 1831 to 1836, it appears to me necessary to give a copy of Captain King's Report of those made under his direction between 1826 and 1830.

Copy of a Report of the Chronometrical Observations made during a Voyage for the purpose of surveying the southern extremity of America, in H.M. Ships Adventure and Beagle, between the years 1826 and 1830, under the orders of Captain P. P. King, by direction of the Right Honourable the Lords Commissioners of the Admiralty.

Among the important objects to which my attention was directed by the Lord Commissioners of the Admiralty, upon my appointment to the command of the Expedition for the survey of the southern part of South America, was that of measuring the differences of certain meridians in the north and south Atlantic Oceans by means of chronometers; and for this purpose I was supplied from the Royal Observatory at Greenwich with nine chronometers; eight of which, at the suggestion of the Astronomer Royal, were suspended in gimbals, and divided into two boxes; and the ninth, an eight-day box-watch, was fitted in the usual manner. The whole were fixed in a chest that was firmly secured to the deck as low down as possible, and as near to the middle part of the ship as could be managed, in order to diminish the effect of the ship's motion, and to counteract that of the ship's local attraction, which, whatever it might have been, always remained the same, as the chronometers were never moved from their positions.

These nine chronometers were made by Mr. French. Their description and number were as follows:—

Eight-day box chronometer,	No.	3233	designated	Z
Two-day	.....	3296	.....	A
Two-day	.....	3295	.....	B
Two-day	.....	3271	.....	C
Two-day	.....	3227	.....	D

in one box.

One-day box chronometer,	No. 3290	designated	E		
One-day	.....	3291	.....	F	in
One-day	.....	3292	.....	G	one box.
One-day	.....	3293	.....	H	

Z had been going at the Observatory for many months, and had preserved a very regular rate, but all the others were quite new, and had scarcely settled to a steady rate when I received them.

In addition to the above I was furnished with a pocket chronometer, No. 553, by Mr. Murray, This watch had been at the Observatory for several months, and had performed remarkably well: and before I sailed Messrs. Parkinson and Frodsham intrusted to my care for trial a pocket chronometer, No.1048, that was only completed in time to be sent to me two days before the Expedition sailed from Plymouth. Mr. French also lent me a pocket-watch to use for observing with, in order that the rest might not be unnecessarily moved.

In the Beagle were three excellent box chronometers. Two by Messrs. Parkinson and Frodsham, Nos. 254 and 228, which had been used in the Polar Voyages; and the third, No. 134, made by Mr. M'Cabe.

The means, therefore, that were placed at my command to effect this most interesting object were tolerably ample: and the result will prove how admirably these machines are adapted to measure such differences when a great number are employed; because the irregularities and errors of individual watches are compensated for by employing the mean of the whole.

In the observations for the determination of time, a sextant by Troughton, No. 1140, and an artificial horizon, were the instruments used: and the mode, whenever it could be adopted, was that of corresponding altitudes. Occasionally, however, absolute altitudes were used, but only in those places where the latitude was correctly ascertained;—and in some instances the chronometers were rated by a transit instrument.

The chronometers were always compared with the 'journeyman watch before and after the observations, and when corresponding altitudes were observed all the watches were compared at noon. Their rates were carefully observed before sailing from one port, as well as after the arrival at another; and in calculating the acceleration or retardation of their rate of going, the correction was obtained by interpolation, upon the supposition of their having changed gradually. Whenever it appeared, by comparing the watches with each other,

that any one had suddenly varied from its rate, its result was omitted in the determination.

The method of interpolating for the alteration of the rates which I have adopted, is one that was successfully employed by Captain Flinders in his survey of New Holland; and one that I have been for many years in the habit of using with most satisfactory results. In cases where chronometers alter their rates suddenly, the rule cannot be applied; but, in general, the alterations are caused by changes of temperature; and as these changes are gradual, so the rates alter in the same progressive manner.

The correction has, therefore, been obtained by an arithmetical progression; in which the first term, the number of terms, and the common difference, are given to find the sum of the terms.

The difference between the two rates divided by the number of days that have intervened, called the daily variation of rate, is the first term F; as well as the common difference D: the interval between the determination of the errors of the watches, in mean time, of the place left and arrived at, is the number of terms N: and the sum of the terms is the correction required, S. The formula, when reduced to its simplest form, is $F\,(N+1)\,\frac{N}{2}=S$.

The places which I was instructed to visit for the purpose of measuring their respective meridional differences were Madeira, Santa Cruz in the island of Teneriffe, the north-east end of San Antonio, and Port Praya in the island of St. Jago, in the North Atlantic; and the island of Trinidada, Rio de Janeiro, and Monte Video, in the South Atlantic Ocean.

After the chronometers had been carefully rated at the Observatory, they were embarked on board H.M.S. Adventure, on the 23rd April, 1826; but as the ship was detained at Deptford and Northfleet until the 4th May, an opportunity was offered of ascertaining what change had been produced by the alteration of the place; and it turned out to be by no means inconsiderable. Five of the watches had accelerated, and the remaining four had retarded rates. It would be difficult to assign any other reason for this change than the effect of the ship's local attraction.

With this newly found rate we sailed for Plymouth; and, after five days' passage, arrived in the Sound; and, on the 9th May, obtained a set of corresponding altitudes upon the Breakwater, upon a stone marked $\frac{430}{1}$; which, by the Ordnance map, is $0'\,31''{\cdot}5$ in longi-

tude to the eastward of the flag-staff of Drake's Island; 10″ 2 to the westward of Plymouth old church, and 0′ 25″·1 to the westward of the new church. The longitude, therefore, of the station, by the Ordnance survey, would be 4° 7′ 41″·7, but by applying a proportion of the error detected by Dr. Tiarks, in his chronometrical observations between Greenwich and Falmouth, viz., 4″·09 or 1′ 11″·3, the corrected longitude of the station will be 4° 8′ 43″. Our chronometers made it 0′ 40″·2 to the eastward of the corrected longitude, and 0′ 19″·6 to the westward of the original determination by the Ordnance survey.

The Breakwater being the point from whence all my differences are measured, I have considered its longitude west of Greenwich to be as above stated, namely, 4° 8′ 43″.

It now remains to record the results, the details of which are given in another form.*

MADEIRA.—The observations were made at Mr. Veitch's garden-house, that being the spot used by Dr. Tiarks with ten chronometers. The difference between it and the Breakwater is 12°45′45″ west: the longitude will therefore be .....16° 54′ 28″ W. which is 0′17″·4 to the eastward of Dr. Tiarks's determination.

TENERIFFE (Fort San Pedro)—by eleven chronometers is 0° 40′ 6″ to the eastward of Madeira, and will therefore be ...16°14′22″ W.

ST. JAGO (landing place at Port Praya)—by ten chronometers it was found to be 7° 15′ 55″ west of Teneriffe, and therefore.....23° 30′ 17″

RIO DE JANEIRO (Villegagnon Island)—by fourteen chronometers the difference was found between it and Port Praya to be 19° 34′ 46″ which will make its longitude.....43° 05′ 03″

ST. ANTONIO (Terrafal Bay at the south-west end).—In consequence of unfavourable weather we were unable to land at the north-east end, and, therefore, made our observations at Terrafal Bay; the longitude of which was found by eleven chronometers to be 9° 05′ 39″ to the westward of Teneriffe which makes it .....25° 20′ 01″

TRINIDADA.—On account of the south-east trade being scant, we were prevented from making this island.

MONTE VIDEO (Rat Island).—The difference of longitude between this place and Rio de Janeiro was measured, on various occasions,

* These details are lodged in the Hydrographical Office. R. F.

between the years 1826 and 1830; and in the whole 62 different results were obtained, the mean of which makes it 13° 4′ 27″ west of Villegagnon Island, or.....56° 9′ 30″

GORRITI (well at the north-east end) is 1 15′ 51″, by twenty-four chronometrical results, to the eastward of Rat Island, Monte Video, or.....54° 53′ 38″

CAPE ST. MARY is.....54° 5′ 58″

BUENOS AYRES (Cathedral).—By three chronometers is 2° 8′ 24″ west of Rat Island, Monte Video, or.....58° 17′ 53″

PORT FAMINE (Observatory at the west side of the bay).—The meridional difference between this place and Rat Island at Monte Video was also found on the several occasions of the ships passing to and fro. In all, 54 chronometrical results were obtained, the mean of which makes the Observatory 14° 44′ 31″ to the westward, or.....70° 54′ 01″

PORT DESIRE (Ruins of the Spanish colony).—Fifteen chronometrical results make it 9° 42′ 15″ to the west of Rat Island, Monte Video, or..... 65° 51′ 45″

SEA BEAR BAY (Sandy beach on the south side of the bay)—is 7′44″ east of Port Desire, and therefore .....65° 44′ 01″

ST. MARTIN COVE, NEAR CAPE HORN (the head of the cove).—Twelve chronometers made its longitude 11° 19′ 33″ west of Rat Island, Monte Video, or.....67° 29′ 03″

VALPARAISO (Cerro Alegre).—This place was found by seven chronometers to be 4° 3′ 48″ to the westward of St. Martin Cove, or 71° 32′ 51″ west of Greenwich, but between it and Port Famine the difference being by ten chronometers 0° 41′ 8″ or 71° 35′ 9″ west, the mean has been taken, viz.....71° 34′ 12″

JUAN FERNANDEZ (Cumberland Bay, the fort).—This place was found by nine chronometers to be 7° 11′ 52″ west of Valparaiso, which makes it .....78° 46′ 04″

TALCAHUANO BAY (Fort Galvez).—By eleven chronometers the difference between it and Valparaiso is...1° 28′ 53″ or 73° 03′ 05″

SAN CARLOS DE CHILÓE (Sandy Point).—The point which is opposite to the town is, by twenty chronometrical results, 2° 16′ 13″ west of Valparaiso, or.....73° 50′ 25″

The above are the principal chronometrical determinations that were made; the following are dependant on them:—

SANTOS (the Arsenal).—By twelve chronometers this place is 3° 11′ 31″ west of Rio de Janeiro, or .....46° 16′ 33″

ST. CATHERINE (Flag Staff of Stᵃ. Cruz D'Anhatomirim) is, by fifteen chronometrical results, 5° 24′ 38″ to the west of Rio de Janeiro, or.....48° 29′ 41″

PORT STA. ELENA (the spot marked "Observatory" on the plan).—Eleven chronometers made it 10° 23′ 46″ west of the Island of Gorriti, or.....65° 17′ 25″

CAPE VIRGINS (extremity of the cliff).—By ten chronometers is 13° 24′ 8″ to the west of Gorriti, or 68° 17′ 46″ west of Greenwich; but by comparing it with Port Famine, from which ten chronometers make it 2° 36′ 0″ to the eastward, the result is 68° 18′ 01″; the mean of the two determinations makes it..... 68° 17′ 53″

PORT GALLANT (Wigwam Point).—By twenty-one chronometers is 1° 2′ 55″ west of Port Famine, or.....71° 56′ 57″

HARBOUR OF MERCY (Observation Islet) at the western end of the Strait of Magalhaens is 3° 40′ 55″ west of Port Famine, or 74° 34′ 56″ west of Greenwich. By the survey, however, it is laid down in.....74° 35′ 31″

During the voyage various astronomical observations were made for the longitude, the summary of which is as follows:

Period.	Place.	Between the ☾ and	No. of Series. On each side.	No. of Series. In all.	Longitude by Observation.	Longitude by Chronometer.
					° ′ ″	° ′ ″
Sept. 1826	Rio de Janeiro	☉	8	16	43 8 18	43 5 3
Oct. 1828	Gorriti*.....	☉	9	18	54 53 40	54 53 38
Nov. 1829	Chiloe	☉	8	16	73 48 42	73 50 25
Jan. 1830	Valparaiso....	☉	16	32	71 35 10	71 34 12

* The longitude of Gorriti by Captain Stokes's lunars was 54° 57′ W; that of Monte Video (Rat Island) 56° 14′; of Port Famine old observatory (at the west side of the bay) 70° 57′; and of Villegagnon Island, at Rio de Janeiro, 43° 9′ W. (each to the nearest minute only).

Captain Stokes was an excellent observer, and used one of Troughton's best repeating reflecting circles. His lunar observations, which were very

By referring these several observations to Port Famine by chronometrical differences, its longitude by observation will be 70° 54′ 11″ which is nearly identical with that produced by the chronometric chain from Plymouth, viz. 70° 54′ 01″ west. The last has, therefore, been taken for its longitude, and all the meridians of the coast, surveyed by the expedition under my command, depend upon that determination. PHILLIP PARKER KING.

After having perused Captain King's Report of the chronometrical observations made under his direction, I would ask the reader to turn to Dr. Tiarks's Report on Captain Foster's chronometrical observations in H.M.S. Chanticleer, published in the Appendix* to a "Narrative of a Voyage to the Southern Atlantic Ocean, in the years 1828, 29, 30, performed in H.M.S. Chanticleer, under the command of the late Captain Henry Foster, F.R.S.—By W. H. B. Webster, surgeon of the sloop."

It will also be useful to refer to a work on "Chronometers and Longitudes," by Captain Owen; and to the "Pilote du Brésil," by the Baron Roussin; as well as other works, before forming an opi-

very numerous, were chiefly computed by Lieutenant Skyring. During the years 1826 and 1827 Captain King considered the longitude of Villegagnon to be about 43° 9′, but afterwards he thought 43° 5′ more correct.

There is a striking accordance between the results of Captain Stokes's numerous lunar observations, and the late measurements by the Beagle's chronometers.

I was informed by Lieutenant Skyring, and by Mr. John L. Stokes, that the longitude of Villegagnon, by the Beagle's chronometers only, in 1826, was 43° 9′ (to the nearest minute).

In 1829, Mr. L. Stokes, a good observer even at that time, took many sets of lunar observations at San Carlos, in Chilóe; the mean result of which gave 73° 56′ for the longitude of Point Arena.

Now, these results are so close to those lately obtained in the Beagle—being within a mile in each case—that I should hesitate to give them without all their data, did I not know that the officers employed on board the Adventure and Beagle were aware of these determinations, and often discussed them, before the year 1836. Captain King and Lieutenant Stokes are more particularly acquainted with them.

ROBERT FITZROY.

* Vol. II. pp. 233-254.

nion upon the degree of value that may be attached to the following remarks and results.

REMARKS on the Beagle's Chronometrical Measurements between 1831 and 1836; with their principal Results.

On the 14th of Nov., 1831, the following chronometers were embarked on board the Beagle, and placed in their permanent situations:—*

Letters.	Description.	Days.	Maker.	No.	Owner.	Remarks.
A	Box	8	Molyneux ..	1415	Fitz-Roy ..	Good.
†B	Do.	1	Gardner ..	24	Government ..	Bad.
C	Do.	1	Molyneux ..	1081	Molyneux ..	Rather good.
D	Do.	8	Murray ..	542	Murray ..	Do.
E	Do.	1	Eiffe ..	E	Government ..	Do.
F	Do.	2	Arnold & Dent	661	Arnold & Dent	Do.
G	Do.	1	Do. ..	633	Fitz-Roy ..	Do.
H	Pocket	1	Do. ..	261	Do. ..	Do.
K	Do.	1	Parkinson & Frodsham	1042	Government ..	Good.
L	Box	2	Arnold ..	634	Fitz-Roy ..	Rather good.
M	Do.	1	Frodsham ..	2	Government ..	Do.
N	Do.	2	Molyneux ..	1175	Fitz-Roy ..	Do.
O	Do.	1	Earnshaw ..	705	Government ..	Do.
‡P	Do.	1	Frodsham ..	1	Do. ..	Bad.
R	Do.	1	Murray ..	584	Murray ..	Very good.
S	Do.	1	Arnold ..	465	Government ..	Rather good.
T	Pocket	1	Molyneux ..	1326	Fitz-Roy ..	Indifferent.
V	Do.	1	Pennington ..	426	L^d. Ashburnham	Rather good.
W	Box	2	Molyneux ..	971	Government ..	Good.
X	Do.	1	Earnshaw ..	509	Do. ..	Rather good.
Y	Pocket	1	Morrice ..	6144	Do. ..	Do.
Z	Box	8	French ..	4214	Do. ..	Good.

These chronometers being embarked, and permanently fixed, more than a month previous to the Beagle's departure from England, sufficient time elapsed to ascertain their rates satisfactorily.

Suspended in gimbals, as usual, within a wooden box, each was placed in sawdust, divided and retained by partitions, upon one of two wide shelves. The sawdust was about three inches thick below, as well as at the sides of each box, and formed a bed for it which

* The 12 hour mark of each chronometer was invariably kept in one direction with respect to the ship.

† Never used after Feb. 1835. ‡ Never used after Sept. 1835.

rose rather above the centre of gravity of the box and watch; so that they could not be displaced unless the ship were upset. The shelves, on which the sawdust and boxes were thus secured, were between decks, low down, and as near the vessel's centre of motion as could be contrived. Placed in this manner, neither the running of men upon deck, nor firing guns,* nor the running out of chain-cables, caused the slightest vibration in the chronometers, as I often proved by scattering powder upon their glasses and watching it with a magnifying glass, while the vessel herself was vibrating to some jar or shock.

All the watches were in one small cabin, into which no person entered, except to compare or wind them, and in which nothing else was kept. The greater number were never moved from their first places, after being secured there in 1831, until finally landed at Greenwich in 1836.

During eight years' observation of the movements of chronometers, I have become gradually convinced that the ordinary motions of a ship, such as pitching and rolling moderately, do not affect tolerably good timekeepers, which are fixed in one place, and defended from vibration as well as concussion. Frequently employing chronometers in boats, and in very small vessels, has strengthened my conviction that temperature is the chief, if not the only cause (generally speaking) of marked changes of rate. The balances of but few watches are so well compensated as to be proof against a long continuance of higher or lower temperature. It often happens that the air in port, or near the land, is at a temperature very different from that over the open sea—in the vicinity; and hence the difference sometimes found between harbour and sea rates. The changes so frequently noticed to take place in the rates of chronometers moved from the shore to the ship, and the reverse, are well known to be caused partly by change of temperature and partly by change of situation.† In the Beagle we never found the watches go better than when their boxes were bedded in saw-dust, and they themselves were moving freely in good gimbals.

Suspending chronometers, as on board the Chanticleer, not only alters their rate, but makes them go less regularly; and when fixed

* The Beagle's guns were long six and long nine pounders, of brass: they were only fired from the foremost ports.

† This may be connected with magnetism.

to a solid substance, as on board the Adventure, they feel the vibrations caused by people running on the decks, by shocks, or by a chain-cable running out. Cushions, hair, wool, or any such substance, is preferable to a solid bed; but, perhaps, there is nothing better than coarse dry saw-dust.

Some chronometrical measurements have erred, and caused much perplexity, in the following manner. The chronometers were rated in air whose average temperature was—let us suppose, for example, 70. They were then carried through air either considerably hotter, or considerably colder, and again rated in a temperature nearly equal to that specified. The rates were not found to differ much, and it was supposed that the chronometers had been going extremely well; though, in truth, the rates of most of the watches had differed extremely (from those found in port) during the voyage; but they had returned nearly to the old rates upon reaching nearly equal temperature. And this has happened, more or less, to every ship carrying chronometers across the Equator; especially when going to Rio de Janeiro with the sun to the northward of the Line.

How far, or in what manner, magnetism, or electrical influence, may affect chronometers, is hitherto unknown: but there is sufficient reason for suspecting considerable effects, under certain conditions, from one or both of these causes.

The Beagle's chronometers were all wound daily, at nine (except the eight-day watches, which were wound every Sunday morning), and compared at noon. Whatever other comparisons might be made, for equal or corresponding altitudes, sights for time, &c., the noon comparison was regularly made and forthwith examined, in order that any change might be at once detected. Whether at sea, or in harbour, this same method was punctually and accurately executed by one person only, under the inspection of Mr. Stokes and myself. This person, Mr. G. J. Stebbing, of Portsmouth—who was engaged for the purpose, as well as to keep our instruments in repair, take care of our collection of books,* assist in magnetic, and other observations, and write for me—was of invaluable assistance; and, I may well say, contributed largely to whatever was obtained by the Beagle's voyage.

In pages 74 and 75 of the second volume, I have mentioned a few

* Our books, which were not a few, considering the small size of the vessel, were collected in one cabin, under Mr. Stebbing's charge, and lent to the officers, without reserve, under certain regulations.

reasons for preferring to give undivided attention to an unbroken series of chronometrical observations, rather than allot any portion of time to independent astronomical observations; which, to be really valuable, required what I could not command, namely—time; a well-placed and good transit instrument; skill in its use; and habits of observing, which are neither readily nor easily acquired. Besides which, there is always a degree of uncertainty involving the deductions from observations of any celestial phenomena, at a great distance from well-known observatories; even when the observer and his means are unexceptionable. The causes of this uncertainty are familiar to many, but, as these pages may meet the eye of a reader who is not aware of them, I will mention that the figure of the earth is not yet quite accurately known, that parallax and refraction cannot be allowed for with absolute certainty, that levels and plumb-lines are not everywhere exactly at right angles to, or coincident with, a line drawn from them to the earth's centre; and that tables, however excellent, are not perfect.

That able and indefatigable astronomer, Mr. Fallows, was a long time at the Cape of Good Hope before he could determine its longitude; and, after all his exertions, his successors have adopted a result differing from it half a mile.* There is reason to doubt whether Paramatta Observatory is well determined in longitude. To fix that of St. Helena, and that of the Mauritius, occupied much time and talent, aided by excellent instruments in well-built observatories. A great deal of time and pains, and ability, have been employed at Madras; yet, as far as chronometers can tell, there is a great discordance between the hitherto published longitudes of Madras, the Mauritius, and Paramatta, when viewed in connection with their respective meridian distances; such, at least, as have yet been measured.

Even on the coast of the Baltic, what differences were found by Lieutenant-General Schubert, in 1833, between the received positions of various observatories, and those which he deduced from the results of fifty-six chronometers;—placed at his disposal, with a steam-boat, by the Emperor of Russia.†

But, to return from this digression:—In the Beagle's measure-

* Mr. Fallows considered the longitude of the Cape observatory to be 1h. 13m. 53s. E. Mr. Henderson 1h. 13m. 55s. E.

† Journal of the Royal Geographical Society. Vol. VI. Part II. 1836, pp. 413-6.

ments of meridian distances, time was invariably obtained by series of equal, or corresponding altitudes of the sun; observed by one and the same person with the same sextant, and the same artificial horizon, placed in the same manner, both before and after noon.

A very good pocket chronometer, carried by hand, in a box, was always used for taking time. In every instance, it was compared with the standard chronometers (the two supposed to be the best) immediately before the morning observation, and again immediately afterwards. It was also compared at noon, and before, as well as after the afternoon, observations. This watch* was so well constructed, that the intervals shown by it between morning and afternoon observations always agreed with those shown by the standards, (allowing for their respective rates).

Generally speaking, seven altitudes of one limb of the sun were taken, and then the same seven altitudes of the other limb, for one set of sights, or observations. Three such sets were usually taken, at short intervals, and the mean result used, unless any marked difference occurred, in which case the result of each separate pair of equal altitudes (morning and afternoon) was computed, and the erroneous ones were rejected. Those were considered erroneous which differed much from the majority. Generally, however, there was the closest agreement between the results of single pairs of sights, as well as between those of entire sets.

When clouds intervened the series was unavoidably irregular, but the pairs of equal altitudes were always numerous. In a very few instances the chronometers were rated by the results of absolute or independent altitudes, taken with every precaution at similar times of day with the same instruments, and by the same observer. In such cases the rates were obtained by comparing together the times obtained by morning observations, or those deduced from afternoon sights; not by morning and afternoon, or afternoon and morning observations. But the time, considered to be correct, was invariably deduced from equal altitudes, by the method of Professor Inman. At Paramatta, at the Cape of Good Hope, and under the walls of the Royal Observatory at Greenwich, we had opportunities of trying whether there was any difference between our time, thus obtained, and that of the respective astronomers; and I feel gratified in being able

* K. Parkinson and Frodsham. No. 1041

to state, that in no one instance did it differ a quarter of a second from theirs; indeed the figures would bear me out in saying, that it did not differ even a tenth of a second! These facts are well known to Lieut. Stokes, Lieut. Sulivan, and Mr. Usborne.

The sextant used throughout the voyage for this purpose, and this alone, was a particularly good one, made expressly for me by Worthington and Allan. Its index error never varied, nor was it ever the least out of adjustment. Between morning and afternoon observations it was more than usually guarded, and on no account handled, or exposed to a change of temperature.

Latitudes were obtained by other sextants, and by circles. I was always anxious to get many results, not only by one observer, or instrument, but by several observers, and different instruments. It sometimes happened that there were six observers seated on the ground, with as many different instruments and horizons, taking the sun's circum-meridian altitudes, or observing stars at night. Where so many were working against one another, errors were soon detected, either in observation or in computing. I have already mentioned that Dr. Inman's method of calculation was followed; but it remains to be shown what mode of interpolation was adopted when, as was usually the case, most of the watches were found to be going at rates different from those ascertained at the preceding place of rating.

With very few exceptions, the method used by Dr. Tiarks* was practised; and, in the excepted cases, that used by Flinders, Owen, Foster, King, and others, was employed. The following are the principal results upon which all others obtained during the Beagle's last voyage (1831-6) depend. Want of room alone prevents my giving the minutest details upon which they depend; it would be of little use to give computations without comparisons, or comparisons without rates, or rates without the calculations and observations on which they depend; or any part of these without the whole, which constitutes a mass of figures filling several thick folio books. All these, however, will be deposited at the Hydrographical Office, so that any one who will take the trouble may, after obtaining the Hydrographer's permission, examine them to the fullest extent.

Our first station was at the Devonport Baths, exactly in the meri-

* Chanticleer's Voyage—Appendix, p. 226-8.

dian of the centre of Government House. By the published survey of Plymouth and Devonport,* the Government-House at Devonport is 0° 1′ 48″ west of Plymouth old church, the longitude of which is given by Captain King in the preceding copy of his report.

This longitude, however, differs slightly from that obtained by the Beagle's chronometers carried from Devonport to Greenwich; and as the longitude of Falmouth, by her chronometers, agrees with that determined by Dr. Tiarks, I have used in the construction of the table of positions (pp. 65-85) the result obtained directly by these chronometers, because so confirmed.

PRINCIPAL RESULTS of the Beagle's chronometrical measurements between 1831 and 1836; forming a connected chain of meridian distances around the globe, the first that has ever been completed, or even attempted, by means of chronometers alone.

DEVONPORT to PORT PRAYA.

Twenty Chronometers. Twenty-three Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	1 17	21,68			M	1 17	20,47	.....	20,47
B	.....	21,80			N	.....	24,42		
C	.....	20,69	.....	20,69	P	.....	17,73		
D	.....	17,03			R	.....	19,90	.....	19,90
E	.....	20,33	.....	20,33	S	.....	20,52	.....	20,52
F	.....	23,03			V	.....	22,23		
G	.....	21,43	.....	21,43	W	.....	20,93	.....	20,93
H	.....	17,16			X	.....	21,08		
K	.....	23,90			Y	.....	20,58	.....	20,58
L	.....	21,12	.....	21,12	Z	.....	21,43	.....	21,43
					Mean ...		20,87	.....	20,74

Preferred..... 1 h. 17 m. 20,7 s.

Places of observation:

The Baths, in the meridian of Government-house, at Devonport.

The landing-place at the west side of Quail Island, Port Praya, in the Cape Verde Islands.

* In the above-mentioned plan, published by the Admiralty, on a scale of 5,03 inches to a mile, the departure between Devonport Baths and Plymouth Old Church is 5,8 inches; which in latitude 50° 22′ represents 0° 1′ 48″1 of longitude.

Port Praya to Bahia.

Twenty-one Chronometers. Twenty-six Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	1 00	04,67	1 00	04,67	O	0 59	49,87		
B	0 59	59,41			P	1 00	03,58	1 00	03,58
C	1 00	01,85	1 00	01,85	R	1 00	03,48	1 00	03,48
D	0 59	40,68			S	0 59	48,47		
E	0 59	52,21			T	0 59	41,47		
F	1 00	04,06	1 00	04,06	V	1 00	11,17		
G	1 00	06,00			W	1 00	03,91	1 00	03,91
K	1 00	17,99			X	1 00	02,19	1 00	02,19
L	1 00	01,60	1 00	01,60	Y	1 00	02,47	1 00	02,47
M	0 59	59,56	0 59	59,56	Z	1 00	04,69	1 00	04,69
N	1 00	03,95	1 00	03,95					
					Mean ...	1 00	00,16	1 00	03,00

Preferred..... 1h. 00m. 03,0s.

Places of observation :

At Port Praya, as before.

At Bahia, in Fort San Pedro, Gamboa.

Bahia to Rio de Janeiro.

Twenty Chronometers. Twenty-two Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 18	32,50	0 18	32,50	O	0 18	31,35	.....	31,35
C	.....	28,98			P	.....	32,06	0 18	32,06
D	.....	30,47	.....	30,47	R	.....	33,42	.....	33,42
F	.....	35,52			S	.....	27,13		
G	.....	33,90			T	.....	29,43		
H	.....	31,59	.....	31,59	V	.....	26,70		
K	.....	31,25	.....	31,25	W	.....	27,88		
L	.....	29,76			X	.....	30,63	.....	30,63
M	.....	38,23			Y	.....	38,79		
N	.....	30,98	.....	30,98	Z	.....	31,51	.....	31,51
					Mean ...		31,60	.....	31,58

Preferred..... 0h. 18m. 31,6s.

Places of observation :

At Bahia, as before stated.

At Rio de Janeiro, close to the well on Villegagnon Island.

Rio de Janeiro to Bahia.

Twenty Chronometers. Six Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 18	29,58			N	0 18	29,60		
C	.....	31,50	.....	31,50	O	.....	31,17	.....	31,17
D	.....	31,46	.....	31,46	P	.....	31,37	.....	31,37
E	.....	27,79			R	.....	31,61	.....	31,61
F	.....	31,87	.....	31,87	T	.....	31,44	.....	31,44
G	.....	30,89	.....	30,89	V	.....	29,71		
H	.....	29,92			W	.....	33,02		
K	.....	30,09			X	.....	31,83	.....	31,83
L	.....	30,22			Y	.....	32,57		
M	.....	29,68			Z	.....	31,18	.....	31,18
					Mean ...		30,82	.....	31,43

Preferred..... 0h. 18m. 31,4s.

Places of observation, as before stated.

Bahia to Rio de Janeiro.

Twenty Chronometers. Fourteen Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 18	31,17	0 18	31,17	O	0 18	29,49		
B	.....	42,45			P	.....	33,34	.....	33,34
C	.....	28,02			R	.....	33,09	.....	33,09
D	.....	28,65			S	.....	39,47		
E	.....	34,16			T	.....	31,33		
F	.....	31,79	.....	31,79	V	.....	31,21	.....	31,21
G	.....	30,42	.....	30,42	W	.....	32,13	.....	32,13
K	.....	28,02			X	.....	29,96	.....	29,96
L	.....	31,13	.....	31,13	Y	.....	27,55		
N	.....	33,41			Z	.....	30,91	.....	30,91
					Mean ...		31,89	.....	31,52

Preferred..... 0h. 18m. 31,5s.

First	0	18	31,6
Second.....	0	18	31,4
Mean of all	0	18	31,5

Places of observation, as before stated.

Rio de Janeiro to Monte Video.

Twenty Chronometers. Twenty-four Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 52	16,19	.....	16,19	N	0 52	19,79	.....	19,79
B	.....	08,57			O	.....	14,14		
C	.....	09,75			P	.....	13,06		
D	.....	16,11	.....	16,11	R	.....	20,83	.....	20,83
E	.....	14,98	.....	14,98	S	.....	12,35		
F	.....	14,57	.....	14,57	T	.....	09,89		
G	.....	17,57	.....	17,57	W	.....	14,08		
H	.....	11,28			X	.....	14,42	.....	14,42
K	.....	27,36			Y	.....	40,60		
L	.....	22,89	.....	22,89	Z	.....	18,60	.....	18,60
						Mean ...	16,85	.....	17,60

Preferred 0h. 52m. 17,6s.

Places of observation:

At Rio de Janeiro, as before stated.

At Monte Video, on Rat Island.

Monte Video to Port Desire.

Seventeen Chronometers. Nineteen Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 38	46,88	.....	46,88	M	0 38	40,01		
C	.....	44,08			N	.....	42,75		
D	.....	50,17	.....	50,17	R	.....	45,65	.....	45,65
E	.....	50,30	.....	50,30	S	.....	51,49	.....	51,49
F	.....	46,01	.....	46,01	W	.....	45,45	.....	45,45
G	.....	48,37	.....	48,37	X	.....	39,95		
H	.....	43,01			Y	.....	27,14		
K	.....	56,56			Z	.....	47,32	.....	47,32
L	.....	48,04	.....	48,04					
						Mean ...	45,48	.....	47,97

Preferred..... 0h. 38m. 48,0s.

Places of observation:

Monte Video, as before.

Port Desire, at the Spanish Ruins.

Port Desire to Port Famine

Sixteen Chronometers. Sixteen Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 20	10,57	.....	10,57	L	0 20	10,35	.....	10,35
B	0 20	09,39	.....	09,39	M	0 20	15,84		
C	0 20	10,65	.....	10,65	R	0 20	12,20	.....	12,20
D	0 20	09,03	.....	09,03	S	0 19	51,65		
F	0 20	10,70	.....	10,70	T	0 20	39,07		
G	0 20	05,07			W	0 20	14,22	.....	14,22
H	0 20	09,71	.....	09,71	X	0 20	07,31		
K	0 20	02,10			Z	0 20	10,29	.....	10,29
					Mean	0 20	10,51	.....	10,71

Preferred..... 0h. 20m. 10,7s.

Places of observation :

Port Desire, as before.

Port Famine, old Observatory at the west side of the port.

Port Famine to San Carlos.

Twenty Chronometers. Twenty-seven Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S
A	0 12	08,12	0 12	08,12	N	0 12	06,37	0 12	06,37
B	0 12	37,16			P	0 12	18,26		
C	0 11	52,62	0 11	52,62	R	0 12	09,42		
D	0 11	54,60	0 11	54,60	S	0 11	51,87		
E	0 11	57,52	0 11	57,52	T	0 11	51,00		
G	0 12	10,02			V	0 11	42,42		
H	0 11	47,95			W	0 11	55,93	0 11	55,93
K	0 12	10,99			X	0 11	34,26		
L	0 12	03,68	0 12	03,68	Y	0 11	55,13	0 11	55,13
M	0 11	58,40	0 11	58,40	Z	0 12	01,42	0 12	01,42
					Mean	0 12	00,36	0 11	59,38

Preferred..... 0h. 11m. 59,4s.

Places of observation :

This measurement is made from a spot 5,9s. *east* of that used in the measure from Port Desire to Port Famine, this being the new and that the old Observatory.

San Carlos, at Point Arena.

San Carlos to Valparaiso.

Eighteen Chronometers. Twelve Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 08	55,69	0 08	55,69	L	0 09	00,17	0 09	00,17
B	0 08	44,51			N	0 08	59,17	0 08	59,17
C	0 09	02,07	0 09	02,07	P	0 08	47,60		
D	0 09	06,01			R	0 08	55,64	0 08	55,64
E	0 09	06,72			V	0 09	09,05		
F	0 08	42,77			W	0 09	03,39	0 09	03,39
G	0 08	53,90	0 08	53,90	X	0 09	10,39		
H	0 09	08,10			Y	0 09	01,49	0 09	01,49
K	0 09	02,60	0 09	02,60	Z	0 08	58,34	0 08	58,34
					Mean	0 08	59,31	0 08	59,25

Preferred..... 0h. 8m. 59,2s.

Places of observation:

San Carlos, Chilóe, Point Arena. Valparaiso, Fort San Antonio.

Valparaiso to Callao.

Fourteen Chronometers. Twenty-five Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 22	07,74	.....	07,74	O	0 22	08,66	.....	08,66
B	.....	00,51			P	.....	08,97	.....	08,97
C	.....	07,31	.....	07,31	R	.....	11,33	.....	11,33
D	.....	06,86	.....	06,86	S	.....	11,39	.....	11,39
E	.....	04,42			W	.....	12,28	.....	12,28
F	.....	16,60			X	.....	03.30		
G	.....	05,90	.....	05,90	Z	.....	09,36	.....	09,36
					Mean	...	08,19	.....	08,98

Preferred..... 0h. 22m. 09,0s.

Places of observation:

Valparaiso, as before. Callao, the Arsenal.

Callao to the Galapagos Islands (Chatham Island).

Twelve Chronometers. Twelve Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 49	31,80	.....	31,80	O	0 49	33,15	.....	33,15
B	.....	32,30	.....	32,30	R	.....	32,16	.....	32,16
C	.....	33,90	.....	33,90	S	.....	32,56	.....	32,56
D	.....	33,49	.....	33,49	W	.....	35,21	.....	35,21
K	.....	30,39	.....	30,39	X	.....	29,44		
N	.....	36,74			Z	.....	32,90	.....	32,90
					Mean	...	32,84	.....	32,79

Preferred..... 0h. 49m. 32,8s.

Places of observation:

Callao, as before.

Chatham Island, Stephens Bay—landing-place at south-west side.

GALAPAGOS ISLANDS (Chatham) to CHARLES ISLAND.

Fourteen Chronometers. Four Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 03	39,49	.....	39,49	N	0 03	41,69	.....	41,69
B	.....	37,29			O	.....	39,36	.....	39,36
C	.....	39,11	.....	39,11	R	.....	39,40	.....	39,40
D	.....	39,23	.....	39,23	S	.....	39,44	.....	39,44
G	.....	44,81			W	.....	39,19		
K	.....	36,67			X	.....	39,28	.....	39,28
L	.....	38,23	.....	38,23	Z	.....	39,52	.....	39,52
						Mean...	39,48	.....	39,48

Preferred..... 0h. 03m. 39,5s.

Places of observation :

Chatham Island, as before.

Charles Island, landing-place at the south-east part of Post Office Bay.

CHARLES ISLAND (Galapagos) to OTAHEITE.

Thirteen Chronometers. Thirty-one Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	3 56	11,67	.....	11,67	O	3 56	14,19	.....	14,19
B	.....	07,07			R	.....	14,91	.....	14,91
C	.....	07,53	.....	07,53	S	.....	11,35	.....	11,35
D	.....	05,43			W	.....	08,27	.....	08,27
H	.....	14,04	.....	14,04	X	.....	09,35	.....	09,35
L	.....	20,65			Z	.....	16,74	.....	16,74
N	.....	14,57	.....	14,57					
						Mean...	11,98	.....	12,26

Preferred..... 3h. 56m. 12,3s.

Places of observation :

Charles Island, as before. Otaheite, Point Venus.

OTAHEITE to BAY OF ISLANDS, in NEW ZEALAND.

Sixteen Chronometers. Twenty-eight days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	2 25	38,69	.....	38,69	N	2 25	40,78		
B	.....	37,50	.....	37,50	O	.....	34,97	.....	34,97
C	.....	32,87	.....	32,87	R	.....	36,68	.....	36,68
D	.....	35,11	.....	35,11	S	.....	28,83		
G	.....	33,99	.....	33,99	V	.....	27,99		
H	.....	35,66	.....	35,66	W	.....	32,83	.....	32,83
K	.....	38,20	.....	38,20	X	.....	28,89		
L	.....	27,70			Z	.....	40,48		
						Mean...	34,44	.....	35,65

Preferred..... 2h. 25m. 35,6s.

Places of observation :

Otaheite, as before. Bay of Islands, Paihia Islet.

Bay of Islands in New Zealand to Sydney.

Fifteen Chronometers. Nineteen Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	1 31	33,50	.....	33,50	N	1 31	32,52	.....	32,52
B	.....	27,63			O	.....	29,29	.....	29,29
C	.....	33,64	.....	33,64	R	.....	30,69	.....	30,69
D	.....	31,84	.....	31,84	S	.....	30,17	.....	30,17
G	.....	27,41			W	.....	28,52	.....	28,52
H	.....	23,94			X	.....	26,82		
K	.....	44,60			Z	.....	32,36	.....	32,36
L	.....	32,09	.....	32,09					
						Mean ...	31,00	.....	31,46

Preferred..... 1h. 31m. 31,5s.

Places of observation:

New Zealand, as before.

Sydney, Fort Macquarrie.

From Macquarrie Fort to the Observatory at Paramatta, by three Chronometers,* 0h. 00m. 52,0s. (Paramatta west of Fort).

Sydney to Hobart Town.

Fifteen Chronometers. Eleven Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 15	29,40	.....	29,40	O	0 15	29,25	.....	29,25
B	.....	26,30	.....	26,30	R	.....	26,17		
C	.....	34,31			S	.....	32,01	.....	32,01
D	.....	35,28			V	.....	38,84		
G	.....	30,96	.....	30,96	W	.....	25,48		
K	.....	29,86	.....	29,86	X	.....	30,41	.....	30,41
L	.....	30,91	.....	30,91	Z	.....	32,31	.....	32,31
N	.....	30,83	.....	30,83					
						Mean ...	30,82	.....	30,22

Preferred..... 0h. 15m. 30,2s.

Places of observation:

Sydney, as before.

Hobart Town, east side of Sullivan Cove, in a small battery close to the water.

* These three Chronometers were carried by water to and from the Observatory on the same day.

Hobart Town to King George Sound.

Fifteen Chronometers. Twenty days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	1 57	48,75	.....	48,75	N	1 57	57,77	.....	57,77
B	.....	26,50			O	.....	51,26	.....	51,26
C	.....	59,28			R	.....	42,67	.....	42,67
D	.....	63,90			S	.....	52,67	.....	52,67
G	.....	54,15	.....	54,15	W	.....	36,04		
H	.....	54,31	.....	54,31	X	.....	47,47	.....	47,47
K	.....	42,94			Z	.....	50,96	.....	50,96
L	.....	55,21	.....	55,21					
						Mean ...	49,59	.....	51,53

Preferred..... 1h. 57m. 51,5s.

Places of observation :

Hobart Town, as before.

King George Sound, new Government Buildings, at the east side of Princess Royal Harbour, near the water.

King George Sound to the Keeling Islands.

Fifteen Chronometers. Twenty Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	1 24	07,62	.....	07,62	N	1 24	08,64	.....	08,64
B	.....	07,17	.....	07,17	O	.....	07,72	.....	07,72
C	.....	09,15	.....	09,15	R	.....	09,53	.....	09,53
D	.....	09,16	.....	09,16	S	.....	06,55	.....	06,55
G	.....	12,50			W	.....	00,06		
H	.....	05,60	.....	05,60	X	0 23	43,24		
K	.....	03,09			Z	0 24	07,44	.....	07,44
L	.....	23,16							
					Mean	0 24	06,04	.....	07,86

Preferred..... 1h. 24m. 07,9s.

Places of observation :

King George Sound, as before.

Keeling Islands, north-west part of Direction Islet.

Keeling Islands to the Mauritius.

Fifteen Chronometers. Twenty-one Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	2 37	38,96	.....	38,96	O	2 37	32,54	.....	32,54
B	.....	36,30	.....	36,30	R	.....	37,62	.....	37,62
C	.....	35,05	.....	35,05	S	.....	31,94	.....	31,94
D	.....	31,87	.....	31,87	V	.....	25,55		
G	.....	17,34			W	.....	29,81	.....	29,81
K	.....	48,06			X	.....	27,70		
L	.....	43,18			Z	.....	34,42	.....	34,42
N	.....	33,17	.....	33,17					
						Mean ...	33,56	.....	34,17

Preferred..... 2h. 37m. 34,2s.

Places of observation:

Keeling Islands, as before.

Mauritius, Battery on Cooper's Island, Port Louis.

Mauritius to Simon's Bay.

Thirteen Chronometers. Twenty-five Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	2 36	25,12	.....	25,12	O	2 36	23,46	.....	23,46
C	.....	18,23	.....	18,23	R	.....	21,44	.....	21,44
D	.....	28,16			S	.....	18,82	.....	18,82
G	.....	32,50			W	.....	17,74	.....	17,74
K	.....	24,85	.....	24,85	X	.....	12,44		
L	.....	23,62	.....	23,62	Z	.....	19,68	.....	19,68
N	.....	24,93	.....	24,93					
						Mean ...	22,38	.....	21,79

Preferred..... 2h. 36m. 21,8s.

Places of observation:

Mauritius, as before.

Simon's Bay, south-east end of the Dock Yard, near high water mark.

Simon's Bay to the Observatory, by three Chronometers, carried to and from it the same day, 0h. 00m. 10,9s.

Observatory east of Simon's Bay.

SIMON'S BAY to ST. HELENA.

Thirteen Chronometers. Twenty-one Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	1 36	38,39	.....	38,39	O	1 36	32,14	.....	32,14
C	.....	31,03	.....	31,03	R	.....	37,70	.....	37,70
D	.....	29,82	.....	29,82	S	.....	31,00	.....	31,00
G	.....	31,46	.....	31,46	V	.....	29,90		
K	.....	43,37			W	.....	37,24	.....	37,24
L	.....	30,34	.....	30,34	Z	.....	33,96	.....	33,96
N	.....	27,63							
						Mean ...	33.38	.....	33,31

Preferred..... 1h. 36m. 33,3s.

Places of observation :

Simon's Bay, as before.

St. Helena, James Valley, near high water mark, in the meridian of the Observatory on Ladder Hill.

ST. HELENA to ASCENSION.

Fourteen Chronometers. Seven Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 34	45,95	.....	45,95	L	0 34	48,23		
B	.....	44,18			N	.....	46,37		
C	.....	44,96	.....	44,96	O	.....	45,26	.....	45,26
D	.....	45,00	.....	45,00	R	.....	46,37	.....	46,37
G	.....	45,72	.....	45,72	S	.....	45,72	.....	45,72
H	.....	44,15			W	.....	45,93	.....	45,93
K	.....	45,42	.....	45,42	Z	.....	46,22	.....	46,22
						Mean ...	45,68	.....	45,65

Preferred..... 0h. 34m. 45,7s.

Places of observation :

St. Helena, as before.

Ascension, centre of the Barrack Square.

ASCENSION to BAHIA.

Fifteen Chronometers. Ten Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	1 36	27,18	.....	27,18	N	1 36	29,92	.....	29,92
B	.....	20,25			O	.....	23,56		
C	.....	25,75	.....	25,75	R	.....	26,65	.....	26,65
D	.....	28,31	.....	28,31	S	.....	24,71	.....	24,71
G	.....	24,47	.....	24,47	W	.....	26,28	.....	26,28
H	.....	23,48			X	.....	32,50		
K	.....	22,36			Z	.....	26,12	.....	26,12
L	.....	28,76	.....	28,76					
						Mean ...	26,02	.....	26,70

Preferred..... 1h. 36m. 26,7s.

Places of observation :

Ascension, as before. Bahia, as before stated.

Bahia to Pernambuco.

Fifteen Chronometers. Seven Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 14	35,82	.....	35,82	N	0 14	35,02		
B	.....	37,84			O	.....	36,23	.....	36,23
C	.....	36,03	.....	36,03	R	.....	36,19	.....	36,19
D	.....	34,89			S	.....	36,79	.....	36,79
G	.....	36,80	.....	36,80	V	.....	37,80		
H	.....	36,76	.....	36,76	W	.....	35,24	.....	35,24
K	.....	37,41	.....	37,41	* Z	.....	36,97	.....	36,97
L	.....	34,85							
							Mean ... 36,31	.....	36,42

Preferred..... 0h. 14m. 36,4s.

Places of observation:

Bahia, as before.
Pernambuco, the south-west end of the Arsenal.

Pernambuco to Port Praya.

Fourteen Chronometers. Fourteen Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 45	23,77			L	0 45	30,95		
B	.....	28,32	.....	28,32	N	.....	25,03	.....	25,03
C	.....	27,40	.....	27,40	O	.....	28,89	.....	28,89
D	.....	27,29	.....	27,29	S	.....	28,38	.....	28,38
G	.....	28,04	.....	28,04	V	.....	29,40	.....	29,40
H	.....	28,71			W	.....	27,46	.....	27,46
K	.....	22,70			Z	.....	26,24	.....	26,24
							Mean ... 27,33	.....	27,64

Preferred..... 0h. 45m. 27,6s.

Places of observation:

Pernambuco, as before. Port Praya, as before stated.

Port Praya to Angra.

Thirteen Chronometers. Fifteen Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 14	50,08	.....	50,08	L	0 14	51,43	.....	51,43
B	.....	49,39			N	.....	49,26	.....	49,26
C	.....	48,93	.....	48,93	O	.....	49,88	.....	49,88
D	.....	51,46	.....	51,46	S	.....	48,52	.....	48,52
G	.....	52,59	.....	52,59	W	.....	50,43	.....	50,43
H	.....	50,39			Z	.....	50,88	.....	50,88
K	.....	49,20							
							Mean ... 50,09	.....	50,34

Preferred..... .....0h. 14m. 50,3s.

Places of observation:

Port Praya, as before.
Angra (in Terceira), close to the best landing-place.

Angra to Falmouth.

Eleven Chronometers. Eleven Days

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	1 28	38,61	.....	38,61	N	1 28	40,07	.....	40,07
C	.....	39,92	.....	39,92	O	.....	38,64	.....	38,64
D	.....	41,61	.....	41,61	S	.....	41,49	.....	41,49
G	.....	37,11	.....	37,11	V	.....	40,80	.....	40,80
H	.....	42,99			Z	.....	38,15	.....	38,15
L	.....	38,43	.....	38,43					
							Mean ...	39,80	 39,48

Preferred..... 1h. 28m. 39,5s.

Places of observation:

Angra, as before.

Falmouth, Pendennis Castle.

Angra to Devonport.

Eleven Chronometers. Fourteen Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	1 32	09,76	.....	09,76	N	1 32	08,95	.....	08,95
C	.....	08,60	.....	08,60	O	.....	07,35	.....	07,35
D	.....	10,62	.....	10,62	S	.....	10,29	.....	10,29
G	.....	07,15			V	.....	10,33	.....	10,33
H	.....	13,06	.....	13,06	Z	.....	09,52	.....	09,52
L	.....	08,82	.....	08,82					
							Mean ...	09,50	 09,73

Preferred..... 1h. 32m. 09,7s.

Places of observation, as before.

Devonport to the Royal Observatory at Greenwich.

Ten Chronometers. Eleven Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 16	34,9	.....	34,9	N	0 16	42,1	.....	42,1
C	.....	37,8	.....	37,8	O	.....	43,4	.....	43,4
D	.....	42,7	.....	42,7	S	.....	38,1	.....	38,1
G	.....	42,2	.....	42,2	V	.....	45,5	.....	45,5
L	.....	39,7	.....	39,7	Z	.....	36,3	.....	36,3
							Mean ...	40,27	 40,27

Preferred..... 0h. 16m. 40,3s.

Observatory at the R. N. College at Portsmouth to Greenwich.

Eleven Chronometers. Eight Days.

	H. M.	S.	H. M.	S.		H. M.	S.	H. M.	S.
A	0 04	22,35	0 04	22,35	L	0 04	24,07	0 04	24,07
B	.....	24,57	.....	24,57	N	.....	26,63	.....	26,63
C	.....	22,63	.....	22,63	O	.....	29,17	.....	29,17
D	.....	26,73	.....	26,73	S	.....	23,29	.....	23,29
G	.....	26,46	.....	26,46	Z	.....	21,81	.....	21,81
H	.....	29,79							
					Mean	...	25,23	.....	24,77

Preferred..... *0h. 04m. 24.8s.*

	H.	M.	S.
Angra to Devonport	1	32	09,7
Angra to Falmouth	1	28	39,5
Falmouth to Devonport	0	03	30,2
Devonport to Greenwich	0	16	40,3
Falmouth to Greenwich	0	20	10,5
Devonport to Greenwich	0	16	40,3
Portsmouth to Greenwich	0	04	24,8
Devonport to Portsmouth	0	12	15,5
Again	0	04	24,8
	0	12	15.5
	0	03	30,2
Greenwich to Falmouth	0	20	10 5

While looking over the preceding results, enquiry may be made for those of the other chronometers: I should, therefore, mention that the others were useless. Some of the watches stopped; others altered their rates suddenly; and in one case (R) a mainspring broke when the chronometer had been going admirably, till that moment. Four chronometers were left with Mr. Usborne, on the coast of Peru, and in consequence of these diminutions of our original number, there were but eleven watches in tolerably effective condition during the last two principal links of the chain, namely, from Port Praya to the Azores, and from the Azores to Devonport.

Five years is a long time for chronometers to preserve their capability of going steadily, under various changes of climate, without being examined, and perhaps cleaned or fresh oiled, by an experienced chronometer maker.

Having given the principal results—those forming links of the chain of meridian distances carried round the globe—I have to mention that all others of a similar nature, obtained by the Beagle's officers, are based upon them, and that in no one instance do any of the longitudes given in the accompanying tables depend upon absolute or independent astronomical observations.

It ought to be clearly stated, however, that the sum of all the parts which form the chain amounts to more than twenty-four hours, therefore error must exist somewhere; but what has principally caused the error, or where it may be said to exist, I am unable to determine. The whole chain exceeds twenty-four hours, by about thirty-three seconds of time.

It appears very singular, that the more the various links of this chain are examined and compared with other authorities, the more reason there seems to be for believing them correct, at least to within a very small fraction of time; and even allowing that each link were one or two seconds of time wrong, it does not appear probable that all the errors would lie in one direction, unless some hitherto undetected cause affects chronometers when carried westward, which might affect them differently when carried eastward.

It would ill become me to speak of any value which may be attached to these chronometrical measures; even erroneous as they undoubtedly are in some part, if not to a certain degree almost every where. I can only lay the honestly-obtained results before persons who are interested in such matters, and request that they may be compared with those of the best authorities.

Callao, Sydney, and the Cape of Good Hope, are three remote points which might be selected rather than others, because generally supposed to be well determined. If the Beagle's position of Callao be proved incorrect, then must Humboldt's (calculated by Oltmanns), adopted by Daussy,* be also incorrect; and if her position of Sydney (reckoning eastward from Greenwich) be materially wrong, then must the best authorities for the longitude of that place be also in error, for they differ from the Beagle only about eight or ten seconds, which is but a minor part of thirty-three seconds.

The only idea I can dwell on, with respect to the cause of this error of thirty-three seconds, is, that chronometers may be affected by

* Connaissance des Tems.—1836.

magnetic action in consequence of a ship's head being for a considerable time towards the east, or west: yet this is but a conjecture. In the measures between Bahia and Rio de Janeiro, and in those between Rio de Janeiro and Cape Horn, there is no evidence of any permanent cause of error; but the greater part of those measurements were made with the ship's head usually near the meridian.

Were I to select three measurements which I thought less trustworthy than others—I should decide on that from the Galapagos to Otaheite, from Otaheite to New Zealand, and from Hobart Town to King George Sound; but I do not think that either one of these can be five seconds of time in error, according to regular computation, without supposing some unknown cause of error to exist. If each of the three were five seconds wrong, and each error lay in the same direction, still there would only be fifteen seconds out of thirty-two accounted for. Such a supposition as this, however, that each of these three measurements is five seconds, or thereabouts, in error (referring only to error caused by known means) appears to be extremely improbable, I would almost say impossible.

It will naturally occur to the reader, that as error, undetected as to locality, exists, arbitrary correction must be made in order to reduce 24h. 0m. 33s. to 24h.

Otaheite has been selected as a point at which such a correction might be made with the least degree of inconvenience: to that place the longitudes in the accompanying tables are given as measured westward by Cape Horn, and eastward from Greenwich by the Cape of Good Hope; and there, as the two portions of the chain overlap, a mean has been taken between the resulting longitudes.

I will now recapitulate the principal measurements, and confront them with various other determinations. Limited space prevents my quoting many; but I trust that enough will be given to show that some weight may be attached to at least a proportion of the results obtained by the Beagle's officers.

Beagle's Chain of Meridian Distances and Resulting Longitudes in the Atlantic Ocean.

1831—1836.

	H.	M.	S.	H.	M.	S.
Plymouth (Government House, Devonport)		—		0	16	40,3
Plymouth to Port Praya*	1	17	20,0	1	34	00,3
Port Praya to Fernando de Noronha ...	0	35	39,9	2	09	40,2
Fernando de Noronha to Bahia	0	24	23,6		—	
Port Praya to Bahia*	1	00	03,5	2	34	03,8
Bahia to Rio de Janeiro	0	18	31,4	2	52	35,2
Rio de Janeiro to Monte Video	0	52	17,6	3	44	52,8

Other Determinations.

Plymouth (or the Government House at Devonport) taken from the Ordnance Survey and Dr. Tiarks	0	16	41,4
Captain W. F. W. Owen placed Port Praya in	1	34	04,8
Dr. Tiarks's longitude of Madeira and Capt. P. P. King's meridian distance thence to the same spot in Port Praya placed it in	1	34	02,9
Beagle—Plymouth to Port Praya	1	17	20,7
Beagle—Port Praya to Plymouth	1	17	19,4
Beagle—Port Praya to Bahia	1	00	03,0
Beagle—Bahia to Port Praya	1	00	04,1
Beagle—Bahia to Rio de Janeiro	0	18	31,6
Beagle—Rio de Janeiro to Bahia	0	18	31,4
Beagle—Bahia to Rio de Janeiro	0	18	31,5
Captain Foster—Rio de Janeiro to Monte Video	0	52	19,0
Captain King—Rio de Janeiro to Monte Video	0	52	17,8
M. Barral—Rio de Janeiro to Monte Video	0	52	17,4
Beagle in 1830—Monte Video to Rio de Janeiro	0	52	18,0

The longitude of Rio de Janeiro given in this table is very near the latest determinations of the French, and almost identical with that which is stated, in the Ephemerides of Coimbra, to have been deduced from upwards of three thousand observations.

Note.—When more than one measurement is stated between the same two places, it is to be understood that the observations were taken at, or have been reduced to the same points.

* Using the mean of the measurements, outward and homeward.

Beagle's Chain of Meridian Distances and Resulting Longitudes in the Atlantic Ocean.

1831—1836.

	H.	M.	S.	H.	M.	S.
Monte Video to Port Desire	0	38	48,0	4	23	40,8
Port Desire to Port Famine	0	20	10,7	4	43	51,5
Port Famine to Port Louis	0	51	22,0	3	52	29,5
Port Louis to Cape Horn	0	36	35,2	4	29	04,7
Bahia to Ascension	1	36	26,7	0	57	37,1
Ascension to St. Helena	0	34	45,7	0	22	51,4
St. Helena to Simon's Bay	1	36	33,3	1	13	41,9
Simon's Bay to the Observatory at the Cape of Good Hope	0	00	10,9	1	13	52,8

Other Determinations.

Beagle in 1829—Monte Video to Port Desire	0	38	47,7
Beagle in 1830—Port Desire to Monte Video	0	38	45,9
Adventure (tender)—Port Desire to Port Louis	0	31	11,0
Adventure (tender)—Port Louis to Port Famine	0	51	21,9
And, therefore, Port Desire to Port Famine	0	20	10,9
Captain King's published result of all the measures made between 1826 and 1830 places Port Famine west of Monte Video	0	58	58,1
The present result, as above stated, is	0	58	58,7
Beagle in 1830—Cape Horn to Port Desire, by three short steps with intervening rates	0	05	23,7
Which would place Cape Horn in longitude	4	29	04,5
Beagle in 1832—Direct from Monte Video, made	4	29	08
Captain Foster's meridian distance from Monte Video to St. Martin Cove, reduced to Cape Horn, and used with the Beagle's longitude of Monte Video, gives the longitude ...	4	29	04
Coquille, M. Duperrey—St. Helena to Ascension	0	34	46,8
Captain Foster—St. Helena to Ascension	0	34	48,3
Captain Foster—St. Helena to the Cape Observatory ...	1	36	45,7
Nautical Almanac—St. Helena to the Cape Observatory ...	1	36	45,0
Mr. Fallows, 1828—Cape Observatory	1	13	53,2
Mr. Henderson, 1832—Cape Observatory	1	13	55,6
Mr. Maclear, 1836—Cape Observatory	1	13	55,0

When the Beagle went to Rio de Janeiro in 1826, she made the longitude 2h. 52m. 36s. *She stopped at Port Praya, for rates, by the way.* Captain Stokes made the longitude of Rio de Janeiro nearly the same by lunars.

Malaspina and Espinosa made the longitude of Monte Video (Rat Island) nearly 3h. 44m. 58s. Captain Stokes made it 3h. 44m. 56s.

Beagle's Chain of Meridian Distances and Resulting Longitudes in the Pacific Ocean, between Cape Horn and Otaheite.

1834—1835.

	H.	M.	S.	H.	M.	S.
Port Famine to San Carlos, Chiloe	0	11	53,5*	4	55	45,0
San Carlos to Valparaiso	0	08	59,2	4	46	45,8
Valparaiso to Callao	0	22	09,0	5	08	54,8
Callao to Chatham Island in the Galapagos	0	49	32,8	5	58	27,6
Chatham Island to Charles Island	0	03	39,5	6	02	07,1
Charles Island to Otaheite	3	56	12,3	9	58	19,4

Other Determinations.

Beagle 1830—Port Famine to Cape Horn, by true bearing of Sarmiento from Doris Peak	0	14	46,5
Beagle 1829-30—Cape Horn to San Carlos	0	26	39,9
Beagle 1829—Port Famine to San Carlos	0	11	54,0
Beagle 1829—San Carlos to Valparaiso	0	09	00,2
Malaspina and Espinosa had an observatory at San Carlos, whose longitude they considered	4	55	47,5
Their meridian distance † thence to Valparaiso was	0	08	59,8
Malaspina's and Espinosa's observations, calculated by Professor Oltmanns, give for Valparaiso	4	46	47,7
And for Callao Castle	5	08	57,1

Repeated examination of the successive differences of longitude given in these pages, and the data on which they rest, leads me to think that the alterations spoken of by Captain King, in page 493 of Volume I., were unnecessary.

By an unexceptionable true-bearing of Mount Sarmiento, from Doris Peak, I was enabled to connect the longitude of the outer coast with that of Port Famine in a most satisfactory manner.

M. Lartigue, in the French frigate Clorinde (see Connaissance des Tems, for 1836), made the meridian distance between Callao and Valparaiso almost identical with that of Espinosa and Malaspina, as well as the above stated result of the Beagle's measurement.

* 0h. 11m. 59,4s. − 5,9s. = 0h. 11m. 53,5s.

† In Malaspina's expedition there were at least four chronometers, made by Arnold, besides others.

BEAGLE'S CHAIN OF MERIDIAN DISTANCES AND RESULTING LONGITUDES in the Indian and Pacific Oceans, between the Cape of Good Hope and Otaheite.

1835—6.

	H.	M.	S.	H.	M.	S.
Simon's Bay to Mauritius	2	36	21,8	3	50	03,7
Mauritius to Keeling Islands	2	37	34,2	6	27	37,9
Keeling Islands to King George Sound ...	1	24	07,9	7	51	45,8
King George Sound to Hobart Town ...	1	57	51,5	9	49	37,3
Hobart Town to Sydney	0	15	30,2	10	05	07,4
Sydney to Bay of Islands	1	31	31,5	11	36	39,0
Bay of Islands to Otaheite	2	25	35,6	14	02	14,6
				or 9	57	45,4
Otaheite by the west...				9	58	19,4
Mean of the two measures				9	58	02,4
Equal, in space, to ... ... 149° 30′ 36″						

OTHER DETERMINATIONS.

Captain Owen—Simon's Bay to Mauritius	2	36	23,2
Captain Lloyd—Mauritius Observatory	3	50	08
Captain Flinders—Mauritius	3	50	00
Flinders (by lunars) made the difference of meridians between King George Sound and Sydney	2	13	15,3
Beagle's measurement gives	2	13	21,1

Captain Cook and Mr. Wales placed Otaheite (Point Venus) in 149° 35′—but subsequently Mr. Wales considered 149° 30′ more correct.

In Cook's first voyage the longitude of Otaheite was made 149° 32′ 30″; in the second, Mr. Wales made it 149° 34′ 50″; and in the third voyage, Cook and his officers made it 149° 37′ 32″ w. (at Point Venus).

I was informed that M. Duperrey, in the Coquille, made the longitude of the Bay of Islands 174° 01′ 00″ E. Our observations were made at the same point, and, if such is the case, his result agrees with that of the Beagle, taken westward from Greenwich.

SOME of the BEAGLE'S MEASUREMENTS during the years 1829 and 1830, which are here inserted, may serve to shew what accurate determinations may be obtained from even a few good chronometers, when often rated and carefully managed.

		H.	M.	S.	H.	M.	S.
Monte Video to Port Desire		0	38	47,7		—	
Port Desire to Port Famine		0	20	10,7	0	58	58,4
Port Famine to Cascade Harbour		0	02	22,0	1	01	20,4
Cascade Harbour to Port Gallant		0	01	50,2	1	03	10,6
Port Gallant to San Carlos de Chiloe ...		0	07	40,9	1	10	51,5
San Carlos de Chiloe is west of Monte Video by the chain of 1831-6			—		1	10	52,2
San Carlos to Harbour of Mercy ...	W.	0	02	53,6	0	02	53,6
Harbour of Mercy to Dislocation Harbour	E.	0	00	08,4		—	
Dislocation Harbour to Latitude Bay	E.	0	01	25,7		—	
Latitude Bay to the Basin near Cape Gloucester	E.	0	03	47,9		—	
The Basin to North Cove in the Barbara Channel	E.	0	04	02,3		—	
North Cove to Townshend Harbour	E.	0	01	30,6		—	
Townshend Harbour to Stewart Harbour	E.	0	01	45,9		—	
Stewart Harbour to Doris Cove ...	E.	0	01	17,0		—	
Doris Cove to March Harbour ...	E.	0	04	41,0		—	
March Harbour to Orange Bay ...	E.	0	07	37,1		—	
Orange Bay to St. Martin Cove ...	E.	0	02	05,1		—	
St. Martin Cove to Cape Horn ...	E.	0	01	12,1	0	29	33,1
					0	26	39,5
Cape Horn by chain east of San Carlos ...			...	...	0	26	40,3
Cape Horn to Lennox Harbour		0	01	47,7		—	
Lennox Harbour to Good Success Bay ...		0	06	19,9	0	08	07,6
Good Success Bay to Port Desire		0	02	43,9	0	05	23,7
Port Desire by chain is east of Cape Horn ...			...	...	0	05	23,9
Port Desire to Monte Video		0	38	45,9		—	
Monte Video to Sta. Catharina		0	30	35,0		—	
Sta. Catharina to Rio de Janeiro		0	21	43,0	1	31	03,9
Rio de Janeiro by chain is east of Port Desire			...	...	1	31	05,6

The measurements made in 1829-30, here given, may be compared with the charts or other documents deposited in the Hydrographical Office in 1831.

Having thus endeavoured to give a view of the Beagle's principal measurements of meridian distances, with some of the collateral determinations which are at present within my reach, I willingly refrain from their discussion.

It is for those who have access to more extended information, and who are not personally interested in the question, by having assisted in making any of these measures themselves, to discuss and assign values to them.

For this reason, an intention which I entertained of attempting to make some enquiry into the grounds on which the longitudes of Jamaica, the Havannah, Chagres, Panama, &c. are by some persons considered to be well determined, has been relinquished.

I will conclude by remarking, that if so small a vessel as the Beagle, with so few chronometers going well, latterly, could attain, during a tedious and indirect voyage of five years, to within thirty-three seconds of the truth—a much nearer approach to exactness may be anticipated from measurements made in far less time, with a greater number of chronometers.

END OF THE APPENDIX.

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