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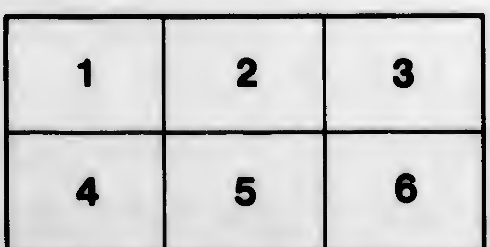
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APPENDIX

TO

CAPTAIN PARRY'S JOURNAL

OF A

SECOND VOYAGE

FOR

THE DISCOVERY OF A NORTH-WEST PASSAGE FROM THE ATLANTIC TO THE PACIFIC,

PERFORMED IN

HIS MAJESTY'S SHIPS FURY AND HECLA,

IN

THE YEARS 1821-22-23.

PUBLISHED BY AUTHORITY OF THE LORDS COMMISSIONERS OF THE ADMIRALTY.

LONDON:

JOHN MURRAY,

PUBLISHER TO THE ADMIRALTY AND BOARD OF LONGITUDE.

MDCCCXXV.

LONDON:
PRINTED BY WILLIAM CLOWES,
Northumberland-court.

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I.

ACCOUNT

OF

THE CHRONOMETERS.

N°. I.

ACCOUNT OF THE CHRONOMETERS.

THIRTEEN chronometers were embarked on board the Fury, *viz.*

Messrs. Parkinson and Frodsham's	No. 259	
" "	" 228	
" "	" 253	
" "	" 254	
" "	" 460	
" "	" 458,	an eight-day chronometer.
Mr. Arnold's	" 369	
"	" 326	
"	" 2109	pocket chronometers.
"	" 14	
"	" 1897	
Messrs. Molyneux and Cope's	" 405	
Messrs. Finer and Nowland's	" 281,	an eight-day chronometer.

Of these, Nos. 228, 253, 254, 369, and 2109, were supplied by government; Nos. 326, 14, and 1897, were the property of Mr. Fisher; No. 259 belonged to Captain Parry, and the rest, *viz.* Nos. 460, 458, 405, and 281, were sent out on trial by their respective makers, and placed in the charge of Captain Parry.

The whole of the chronometers, (with the exception of 2109 and 14), were kept, during the summer, in separate cots of canvas, lined with green baize, and suspended to the beams of the after cabin; this method being considered the most effectual in affording to the watches an easy motion at sea, and also in preventing, in some measure, the effect to be apprehended from the frequent shocks received by the ship, when navigating among the ice. No. 2109 (except in the instances hereafter specified, where it was worn in the pocket), was placed in a vertical position against the ship's side, for the sake of convenient comparison to the officers in making their observations, and to prevent the necessity of taking down any of the watches except for the noon-comparison, an account of which was daily hung up for reference. No. 14 was worn by Mr. Fisher, and constantly used in noting the time of observations.

Soon after the ships were secured in winter-quarters, the chronometers were removed from the cots, and placed on the shelves of a book-case, on each side of the cabin fire-place, in which situation, as will be seen by the register annexed to the proper table, they were subject to no such severe trial, as, from the limited supply of fuel, had been experienced on the former voyage.

The winding-up and comparison of the chronometers was performed daily, at noon, throughout the voyage; by Messrs. Fisher and Hooper in the summer, and during the winter months, (when Mr. Fisher's various avocations required his frequent absence from the ship), by Captain Parry and Mr. Hooper.

The chronometers were embarked on board the Fury, at Deptford, on the 27th of April, 1821, the following errors and rates, (brought up, for the sake of convenience to one day, the 4th of May), accompanying them from their respective makers.

CHRONOMETERS.		DATE.	Errors on Mean Greenwich Time.	RATE.	REMARKS.
Makers.	Nos.		H. M. S.	S.	
Parkinson & Frodsham	259	May 4, 1821	Sl. 0 0 02.86	G 0.43	Gained 13ˢ. 7 in 31 days.
” ”	228	” ”	F. 0 1 19.	G 4.	Rate *about* 4ˢ. per day.
” ”	253	” ”	Sl. 0 0 19.76	G 0.03	Gained 1ˢ. in 37 days—fluctuating about 1-10th of a second, fast and slow.
” ”	254	” ”	Sl. 0 0 47.	L 2.	Lost 10ˢ. in 5 days, having been altered just previous to that time.
” ”	460	” ”	Sl. 0 0 23.5	L 1.	Had been going only 8 days on trial.
” ”	458	” ”	Sl. 0 0 05.5	G 1.5	Had been only 7 days on trial since the final correction.
Arnold	369	” ”	Sl. 0 9 41.4	L 4.5	
”	326	” ”	F. 0 0 08.	G 8.	
”	2109	” ”	Sl. 1 55 18.	G 1.	
”	14	” ”	Sl. 0 0 03.	L 3.	
”	1897	” ”	F. 0 0 01.	G 1.	
Molyneux and Cope	405	” ”	F. 0 1 56.84	G. 2.93	From Mr. Taylor's Mem. Rl. Observatory.
Finer and Nowland	281	” ”	Sl. 0 0 07.3	L 2.5	

A note from Messrs. Parkinson and Frodsham of the 3d of May, 1821, states that " No. 254 having been taken to pieces within ten days, to make some alterations, in consequence of its losing on its rate, it had not been long enough in their possession since, to be positive that they had corrected it." By the same communication, it appeared, that No. 228 was not calculated to resist extreme cold so well as 253, 254, and 460; and the makers, therefore, recommended that it should not be used under circumstances where a very low temperature was to be apprehended.

As the general method of keeping the account of the chronometers has been nearly the same throughout the voyage, and as the accuracy of the longitudes of all the land discovered or surveyed by this Expedition, as laid down in the charts is, in great measure, dependent on this method, it will be proper here, once for all, to explain it. The more detailed account of the watches employed during each particular interval, and of the occasional correction of their rates, will follow in its proper place.

To simplify, as much as possible, the operation of deducing a final result from so many chronometers, some one watch known to have a steady, and what is scarcely less convenient, a small rate, was selected as the standard one; of which a comparison with all the rest was registered daily at noon, and from which the longitudes, for the time being, were deduced, subject, of course, to subsequent correction, both for its own rate, and for a reduction to the mean of the chronometers employed.

By looking down the columns of a table containing these daily comparisons, it was easy to see, at one glance, any sudden irregularities, or other material alteration in the going of the watches; because when such irregularities appeared in any of the columns, there was almost always the evidence of many against one, in detecting that which had erred. If, during any required interval, such irregularities frequently occurred, the watches in which they were noticed were omitted during that period, in the determination of the longitudes.

Having thus selected the chronometers to be employed during any interval, a table (as No. I.) was made out, shewing the actual going of those watches upon each other weekly during that time. A table of this kind must always prove extremely useful in pointing out the time *nearly* at which any alteration may have taken place in the going of the watches; and then by referring to the table of daily comparisons, the day on which it has commenced may frequently be discovered. In such cases, either a special correction has been applied for the time during which the alteration of rate seems to have continued; or, if the alteration appear to have been permanent, a new rate commenced from that day.

The rates of the chronometers received, from time to time, their necessary corrections, while at sea, by obtaining at certain intervals (never exceeding twelve weeks), a considerable number of lunar observations. These being collected into a table, (as Appendix No. III) shewing the error of the standard watch upon Mean Greenwich Time, as deduced from each observation, its mean error was found, by the rules of alligation, for a certain corresponding day, on the supposition that the value of such determination is directly as the number of observations.

Hence, also, the errors of all the other watches on that day; which, as respected the rates of the chronometers, was considered as constituting the end of one interval and the commencement of another: and so on to the next series of observations.

The most favourable opportunities, however, of fixing the meridian of the ships, and thence determining the errors of the chronometers on Mean Greenwich Time, occurred during the continuance of the Expedition in winter quarters, the observations being there made in greater number and variety, and under circumstances as favourable as the rigour of the climate would admit. An opportunity was, also, thus afforded of obtaining the actual daily rates of the chronometers, for a considerable period previous to the sailing of the Expedition. When at the end of any interval, a considerable difference has appeared between the error of a watch upon Mean Greenwich Time, thus found by observation, and that which would have resulted from the rate assigned to it at the beginning of the interval, particular regard has been had to the changes shewn in the weekly table, and pains have been taken to assign such rates as those changes appeared to require. By this means a progressive alteration of rate has usually been detected and allowed, instead of altogether rejecting the former one in favour of that last found. A partial exception to this rule occurs at the first embarkation of some of the chronometers, which evidently took up very different rates almost immediately after their being put on board.

The rates of the chronometers employed being thus fixed, two corrections were applied to the longitudes originally found; *viz.* 1st, for the corrected rate of the standard-watch; and 2dly, for a reduction to the mean of the chronometers with *their* rates also corrected.

The elements of the observations, together with the longitudes thus finally corrected, are collected into tables, according to the order of time in which they were made.

An account of the going of the chronometers *not* employed in the determination of the longitudes, is given in separate tables. The rates there assigned to them are deduced, while at sea, from the Greenwich Time shewn by the means of the chronometers employed; and, while in harbour, from observations obtained on the days therein mentioned.

The temperatures noted in the tables, were obtained by a Six's thermometer, placed as near the chronometers as circumstances would permit, and registered daily at noon.

On leaving England in May 1821, No. 259, was selected as the standard or comparing watch.

The lunar observations obtained during that summer, for determining the errors of the chronometers on Mean Greenwich Time, will be found in Appendix No. III, and the following is an abstract of their results:

1821, June 20th,

By 27 sets, comprehending 258 distances, ☉ east of ☽, No. 259 slow of M.G.T. 0m 08s.89

July 5th and 7th,

By 63 sets, comprehending 628 distances, ☉ west of ☽, No. 259 slow of M.G.T. 6.16

July 20th, 21st, and 24th,

By 54 sets, comprehending 551 distances, ☉ east of ☽, No. 259 fast of M.G.T. 53.73

Aug. 1st, 3d, and 4th,

By 74 sets, comprehending 750 distances, ☉ west of ☽, No. 259 fast of M.G.T. 1 23.20

Total 218 2187 distances.

Mean error of 259 fast of Mean Greenwich Time 0m 38s.67. Corresponding day, July 18, 1821.

The errors of the other chronometers on that day, by comparison with 259, were as follows. The mean rates per lunars and those given by the makers are inserted, in order to shew at one view the alterations that had taken place in that interval.

	Error on Greenwich Time, July 18th. h m s	Mean Rate per Lunars*. s	Maker's Rate. s
No. 228	Fast 0 3 34.67	+ 1.81	+4
„ 253	Slow 0 2 02.83	− 1.37	+0.03
„ 254	Slow 0 58 59.33	−46.56	−2
„ 460	Slow 0 16 45.83	−13.1	−1
„ 458	Slow 0 0 11.33	− 0.08	+1.5
„ 369	Slow 0 18 58.33	− 7.43	−4.5
„ 326	Fast 0 3 53.17	+ 3.00	+8
„ 2109	Slow 2 2 02.41	− 5.39	+1
„ 14	Fast 0 2 45.67	+ 2.21	−3
„ 1897	Slow 0 6 06.33	− 4.89	+1
„ 405	Fast 0 52 20.5	+ 8.21	+2.93
„ 281	Slow 0 6 09.83	− 4.03	−2.5

* Deduced simply by dividing the whole gain or loss, since the 4th of May, by 75, the number of days contained in the interval.

The chronometers selected for the determination of the longitudes up to the 18th of July, were Nos. 259, 228, 253, 405, 326, and 2109. The following corrections were applied to their rates:

No. 259 appears to have increased its rate progressively; but as this is extremely small, the whole interval has been subdivided into three, of 25 days each, and the following rates allowed:

4th to 29th May	- - - -	s +0.5
30th May to 23d June	- -	+0.6
24th June to 18th July	- -	+0.7

No. 228 certainly took up a much smaller gaining rate immediately after its being put on board: about the 18th of May it began to gain still less, by the mean of the other five watches, by about 1ˢ.3 per day. From the 29th June, it again gained more, by nearly the same quantity. The rates allowed are:

26th April till 18th May	- -	s +2.7
19th May ,, 29th of June	-	+1.4
30th June ,, 18th July	- -	+2.62

No. 253 on the 23d of June, began to lose upon the other five watches at the rate of above 4ˢ. per day, and continued thus with tolerable regularity, to the end of the interval. There is reason to believe, therefore, that its rate changed on the 23d of June, though from what cause is not apparent; so that the maker's rate of +0ˢ.03 is allowed till that day, and then −4ˢ.17 to the 18th of July.

No. 405 evidently gained at a rate much greater than that allowed by the makers, soon after it came on board. On the 5th of June it was accidentally let down. Allowance being made for this, its mean rate of going from the 4th of May to the 18th of July was +8ˢ.21 per day; but, by attending to the changes shewn in the weekly table, and also by assigning it an error on mean Greenwich time, by the other five watches, after it was set agoing on the 6th of June, the following rates were allowed:

From 26th April to 3d of June - - +7ˢ.52

(On the 4th and 5th June, it was omitted in determining the mean longitude.)

6th June to 13th	- - - -	s. +8.1
13th June to 18th July	- -	+9.65

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No. 326 seems to have had a considerably smaller gaining rate from the time of its embarkation. About the 18th of May, it began to gain less than before upon the others, by about 1s.88 per day. On the 29th of June it gains more by about 1s.5 per day. A further increase of rate also evidently took place on the 6th and again on the 18th of July. The rates, therefore, allowed are,

		s.
April 27 to 18th May	- - -	+4.
,, 29th June	- - -	+2.1
,, 6th July	- - -	+3.7
,, 18th July	- - -	+4.6

No. 2109 had a losing rate from the time of its embarkation, and it appears to have gone with so much regularity, that one rate of $-5^s.91$ per day was considered sufficient for it.

TABLE shewing the going of the Chronometers *not* used in the determination of the Longitude, upon Mean Greenwich Time, (deduced from the mean of the others) during the undermentioned period.

1821	254		460		458		369		1897		281	
Week ending	Slow.	Rate.	Fast.	Rate.	Slow.	Rate.	Slow.	Rate.	Slow.	Rate.	Slow.	Rate,
	M. s.	s.	M. s.	s.	M. s.	s.	M. s.	s.	M. s.	s.	M. s.	s.
May 11	0 08.55		0 32.3		0 33.3		10 25.3		0 06.5		0 10.8	
		L 3.12		L 15.09		G 1.29		L 7.16.5		L 4.71		L 1.6
,, 18	0 25.42		S1 13.3		0 24.3		11 15.4		0 39.5		0 22.	
		16.45		8.09		3.8		5.69		1.27		1.34
,, 25	2 20.6		2 09.9		F0 02.3		11 55.2		0 48.4		0 31.4	
		43.33		12.71		0.26		8.61		7.		4.5
June 1	7 23.9		3 38.9		0 04.1		12 55.5		1 37.4		1 02.9	
		53.49		13.41		2.16		9.4		6.49		1.99
,, 8	13 38.3		5 12.8		0 10.2		14 01.3		2 22.8		1 16.8	
		52.33		12.69		L 2.54		8.61		12.33		3.83
,, 15	19 44.6		6 41.6		0 01.4		15 01.6		3 49.1		1 43.6	
		73.19		14.04		G 1.53		8.47		6.97		8.9
,, 22	28 16.9		8 19.9		0 12.1		16 00.9		4 37.9		2 31.9	
		69.11		27.19		L 1.19		7.04		2.4		8.9
,, 29	36 20.7		11 30.2		0 08.8		16 50.2		4 54.7		3 31.2	
		70.1		10.17		0.74		6.03		2.31		7.31
July 6	44 31.4		12 41.4		S0 01.4		17 32.4		5 10.9		4 25.4	
		71.37		10.51		0.8		7.51		3.87		8.51
,, 13	52 51.		13 55.		0 07.		18 25.		5 38.		5 25.	
		73.6		34.1		0.8		6.0		6.		8.9
,, 18	58 59.		16 45.5		0 11.		18 58.		6 08.		6 09.5	

No. 11 is omitted, having been constantly worn in the pocket for making Observations.

The second opportunity of determining the errors, and correcting the rates, of the chronometers, occurred at the station in which the Expedition passed the ensuing winter. The longitude of this station, as determined by the mean of twelve observations of Jupiter's Satellites, and nine thousand four hundred and sixty lunar distances, is 83° 09′ 49″.6 west of Greenwich.

The elements of these observations will be found in the Table.

On the 10th October, 1821, the errors of the chronometers upon mean time at Winter Island, were found by observation. From these, and the above longitude, their respective errors on mean Greenwich time on that day, together with their mean rates since the 18th of July preceding, are deduced, as in the following table.

Chronometers.	Error on Mean Time, Winter Island.	Error on Mean Greenwich Time.	Mean Rate since 18th July.	Rate last given.
	H. M. S.	H. M. S.	S.	S.
No. 259	Fast 5 36 03.02	Fast 0 3 23.72	+ 1.9	+ 0.7
,, 228	,, 5 39 10.4	Fast 0 6 31.1	+ 2.1	+ 2.62
,, 253	,, 5 22 07.4	Slow 0 10 31.9	− 6.05	− 4.17
,, 254	,, 2 41 19.9	Slow 2 51 19.4	−80.2	−46.56
,, 460	,, 4 38 58.9	Slow 0 53 40.4	−26.5	−13.1
,, 458	,, 5 29 56.6	Slow 0 2 42.7	− 1.8	− 0.08
,, 369	,, 5 06 47.4	Slow 0 25 51.9	− 4.9	− 7.43
,, 326	,, 5 50 24.9	Fast 0 17 45.6	+ 9.9	+ 4.6
,, 2109	,, 3 02 43.9	Slow 2 29 55.4	−19.9	− 5.91
,, 14	,, 5 34 59	Fast 0 2 19.7	− 0.3	+ 2.21
,, 1897	,, 5 19 39.4	Slow 0 12 59.9	− 4.9	− 4.89
,, 405	,, 6 42 47.9	Fast 1 10 08.6	+12.7	+ 9.65
,, 281	,, 5 18 40.4	Slow 0 13 58.9	− 5.6	− 4.03

The "rates last given," are those deduced from the lunar observations on the 18th of July, and are inserted to shew the alteration which had taken place in the *mean* rates of going, since that day.

The chronometers selected for the determination of the longitudes during this second interval, (*viz.* between the 19th of July and the 10th of October, 1821, inclusive) were Nos. 259, 228, 253, 458, 369, 326, and 405. No. 259 continued to be used as the comparing watch.

The rates applied were as follows, the changes in the mean rates, as shewn in the above table, and the alterations shewn in the weekly one, being carefully attended to, in the manner before explained.

			s.
No. 259	from July 18th to Aug. 16th	- -	+ 1.2
	„ Aug. 17th to Sept. 14th	- -	+ 1.6
	„ Sept. 15th to Oct. 5th	- -	+ 2.8
	„ Oct. 5th to Oct. 10th	- - -	+ 4.
No. 228,	one rate of	- - - - - - - -	+ 2.05
No. 253,	from July 18th to Aug. 15th	- -	− 5.
	„ Aug. 16th to Sept. 12th	-	− 6.
	„ Sept. 13th to Oct. 10th	- -	− 7.32
No. 458,	„ July 18th to Sept. 28th	-	− 1.4
	„ Sept. 29th to Oct. 10th	-	− 4.55
No. 369,	„ July 18th to Sept. 21st	-	− 5.4
	„ Sept. 22d to Oct. 10th	-	− 3.5
No. 326,	„ July 18th to Aug. 10th	-	+ 7.
	„ Aug 11th to Sept. 9th	- -	+10.
	„ Sept. 10th to Oct. 10th	-	+11.85
No. 405,	„ July 18th to Aug. 12th	-	+10.5
	„ Aug. 13th to Sept. 7th	-	+12.5
	„ Sept. 8th to Oct. 10th	- -	+14.45

TABLE shewing the going of the Chronometers *not* used in the determination of the Longitudes, upon Mean Greenwich Time, (deduced from the mean of the others) during the undermentioned period.

1821. Week ending	254		460		2109		1897		281	
	Slow.	Rate.	Slow.	Rate.	Slow.	Rate.	Slow.	Rate.	Slow.	Rate.
	H. M. S.	S.	H. M. S.	S.	H. M. S.	S.	H. M. S.	S.	H. M. S.	S.
July 20	1 01 28.3	L75.6	0 16 45.5	L27.29	2 02 52.3	L 6.41	0 6 16.3	L 7.01	0 6 26.8	L 9.37
„ 27	1 10 17.5	77.37	0 19 56.5	15.94	2 3 37.2	6.19	0 6 51.4	2.03	0 7 32.4	3.53
Aug. 3	1 19 19.1	78.99	0 21 48.1	31.84	2 4 20.5	6.79	0 7 05.6	2.03	0 7 57.1	4.10
„ 10	1 28 32.	79.16	0 25 31.	25.01	2 5 08.	16.73	0 7 19.8	2.76	0 8 25.8	7.61
„ 17	1 37 46.1	79.81	0 28 26.1	25.17	2 7 05.1	25.81	0 7 39.1	1.74	0 9 19.1	7.74
„ 24	1 47 01.8	79.34	0 31 22.3	27.91	2 10 05.8	27.06	0 7 51.3	2.20	0 10 13.3	7.41
„ 31	1 56 20.2	81.1	0 34 17.2	27.64	2 13 15.2	27.53	0 8 06.7	5.89	0 11 05.2	7.17
Sept. 7	2 05 47.9	81.86	0 37 30.7	26.24	2 16 27.9	24.77	0 8 47.9	0.97	0 11 55.4	4.86
„ 14	2 15 20.9	81.71	0 40 34.4	26.14	2 19 21.3	25.09	0 8 54.7	G 1.47	0 12 29.4	5.21
„ 21	2 24 52.9	82.4	0 43 47.4	29.1	2 22 16.9	24.71	0 8 41.4	L13.93	0 13 05.9	2.84
„ 28	2 34 29.7	87.04	0 47 11.1	31.21	2 25 09.9	25.6	0 10 21.9	14.07	0 13 23.8	3.83
Oct. 5	2 44 45.3		0 50 49.6	34.96	2 28 09.1	22.06	0 12 00.4	12.70	0 13 50.6	2.46
„ 10	....	......	0 53 44.4		2 29 59.4		0 13 03.9		0 14 02.9	

No. 14 is omitted, having been constantly worn in the pocket for making Observations.

No. 1897 was much used in boats during the second and third weeks in September and No. 2109 during the whole of that month, and the last half of August.

An account of the going of the chronometers on mean time, at Winter Island, is contained in Table No. III; whence the rates of the chronometers are deduced previously to going to sea. These are contained in Table No. IV.

1822.

In the correction of the rates of the chronometers, for the season of navigation of 1822, the period is divided into two, at the expiration of each of which an opportunity offered of determining their errors on mean time, at the observatory subsequently established at the island of Igloolik No. 228 was used as the comparing watch.

	H.	M.	S.
On the 24th July, by the mean of three observers, 228 was fast of mean time at the Esquimaux Tents, Igloolik - - - - - - - -	5	46	29.5
Observatory at Igloolik, (by subsequent angles), to the westward	+0	0	50.6
228 fast of mean time at the Observatory, Igloolik, 24th July -	5	47	20.1
Difference of meridians between the Observatory at Igloolik, and that at Winter Island - - - - - - - - - - - - - - - -	+0	5	42.1
Error of 228 on mean time at Observatory, Winter Island, July 24, fast	5	53	02.2
Ditto ditto ditto ditto June 29	5	51	29.6
228 gained in the interval, 25 days - - -	0	1	32.6

Mean rate of 228, gaining - - - - 0 0 3s.7

This interval being short, one rate is applied to each watch, and these (computed from the mean time at Winter Island, for the sake of convenience) with the chronometers employed, are as follows.

Chronometers.	Error on Mean Time, Winter Island, July 24th, 1822. H. M. S.	Mean Rates between 29th June, and 24th July. S.	Previous Rates. S.
No. 228, - - -	5 53 02.2	- - gaining 3.7	- - 3.535
,, 259, - - -	6 08 50.2	- - gaining 12.22	- - 11.52
,, 253, - - -	4 46 23.2	- - losing 1.48	- - 6.184
,, 458, - - -	4 39 42.2	- - losing 10.02	- - 11.744
,, 369, - - -	1 18 19.9	- - losing 0.26	- - 1.659
,, 2109, - - -	1 04 41.2	- - losing 23.46	- - 24.459
,, 281, - - -	5 38 18.2	- - gaining 6.1	- - 4.687

For the 2d Interval, 1822.

	H.	M.	S.
On the 25th September, by the mean of three observers, 228 was fast of mean time upon the beach on the south-side of Igloolik -	5	48	45.4
Observatory at Igloolik, (by subsequent angles) to the westward -	+0	0	38.
228 fast of mean time at the Observatory, Igloolik, Sept. 25 - -	5	49	23.4
Difference of meridians of the two Observatories - - - - - - -	+0	5	42.1
Error of 228 on mean time, at Observatory, Winter Island, Sept. 25.	5	55	05.5
Ditto ditto ditto ditto July 24.	5	53	02.2
228 gained in the interval - -	0	2	03.3

Mean rate of 228, gaining - - 0 1s.957

As by the weekly Table, No. V, there appears to have been no material irregularity in the going of the watches upon each other, one rate has been applied to each during the second interval. These (computed as in the first interval), together with the chronometers employed, are as follows:

Chronometers.	Errors on Mean Time, Winter Island, Sept. 25th 1822. H. M S.		Mean Rates between July 24th, and Sept 25th. S.	Previous Rates. S.
No. 228,	- 5 55 05.5	- - - gaining	1.957	- - 3.7
„ 259, -	- 6 19 12.	- - - gaining	9.87	- - 12.22
„ 458, -	- 4 26 46.5	- - - losing	12.31	- - 10.02
„ 369, -	- 1 18 18.8	to 4th Sept. losing	0.19	- - 0.26
„ 2109, -	- 0 39 26.	- - - losing	24.05	- - 23.46
„ 405, -	- 8 42 47.	- - - gaining	24.14	- - 22.38
„ 281, -	- 5 43 49.8	- - - gaining	5.26	- - 6.1

On the 4th September, No. 369, on its being taken down to wind up at noon, was found to have stopped. Mr. Fisher, in Captain Parry's absence, opened the case, and removed a long hair from the balance, after which it was again set agoing; but its Greenwich time was omitted in the mean, during the remainder of this interval. It again stopped on the 1st October, the temperature of the cabin having been from 61° to 50° during the twenty-four hours preceding. It was considered advisable not to open it, and as it could not be set agoing, it remained down from that day.

TABLE shewing the going of the Chronometers *not* used in the determination of the Longitudes, during the Season of Navigation, 1822, upon Mean Greenwich Time, (deduced from the mean of the others.)

1822. Week ending	253		254		460		326		405	
	Slow.	Rate.	Fast.	Rate.	Fast.	Rate.	Fast.	Rate.	Fast.	Rate.
			H. M. S.		H. M. S.		H. M. S.		H. M. S.	
July 6	253 used in determining the Longitudes. Its Error and Rate before given.		2 54 25.4	M. S.	3 49 46.2	S.	0 12 11.9	S.	2 38 04.8	S.
				L1 19.7		L39.3		G 9.5		G23.8
„ 13			2 45 07.8		3 45 11.1		0 13 18.1		2 40 51.1	
				1 18.7		39.5		8.5		21.9
„ 20			2 35 56.8		3 40 34.5		0 14 17.8		2 43 24.3	
				1 21.5		42.8		9.2		20.5
Four Days. „ 24			2 30 30.8		3 37 43.3		0 14 54.8		2 44 46.3	
	H. M. S.			1 19.5		41.3		8.6		
„ 31	0 46 21.7	S.	2 21 14.5		3 32 54.3		0 15 55.1			
		G 2.9		1 19.8		42.6		11.2		
Aug. 7	0 46 01.7		2 11 56.		3 27 56.3		0 17 13.8			
		6.8		1 19.7		45.4		9.3		
„ 14	0 45 14.3		2 02 37.9		3 22 38.4		0 18 18.7			
		8.3		1 19.5		46.8		10.2		
„ 21	0 44 16.		1 53 21.5		3 17 11.		0 19 30.		405 used in determining the Longitudes. Its Error and Rate before given.	
		8.7		1 19.7		46.9		12.2		
„ 28	0 43 14.8		1 44 03.6		3 11 42.4		0 20 55.4			
		12.2		1 19.8		47.4		16.		
Sept. 4	0 41 49.7		1 34 44.8		3 06 10.3		0 22 47.3			
		12.5		1 20.3		48.1		14.5		
„ 11	0 40 22.3		1 25 22.9		3 00 33.7		0 24 28.7			
		13.7		1 19.2		46.6		11.4		
„ 18	0 38 46.2		1 16 08.3		2 55 07.8		0 25 48.3			
		13.3		1 20.7		49.4		13.8		
„ 25	0 37 13.1		1 06 43.1		2 49 22.1		0 27 24.6			

The pocket Watches Nos. 14 and 1897 are omitted, as having been generally worn and constantly used on deck, for noting the times of Observations both in Summer and Winter.

er-mentioned period.

1821. Week ending	228	…9	326 with 228	326 with 253	326 with 405	326 with 2109	2109 with 259	2109 with 228	2109 with 253	2109 with 405	2109 with 326	Temperature. Maximum.	Temperature. Minimum.
	s.		s.	s.	s.	s.	s.	s.	s.	s.	s.	°	°
May 11	L3.11	13	G0.32	G4.43	L4.28	G9.68	L6.25	L9.36	L5.25	L13.96	L9.68		
18	1.75	3	L0.45	2.40	5.67	7.97	6.71	8.42	5.57	13.64	7.97		
25	2.96	56	1.40	1.43	6.62	7.43	5.86	8.82	6.0	14.05	7.43		
June 1	3.14	07	0.07	2.29	5.34	8.20	5.14	8.28	5.91	13.54	8.20		
8	1.5	54	2.04	L1.25	7.27	6.60	7.14	8.64	7.85	13.87	6.60		
15	G1.0	9	G0.1	G0.38	9.06	7.03	7.93	6.93	6.65	16.09	7.03	61	51
22	0.29	39	1.68	1.75	7.57	8.60	7.21	6.92	6.85	16.17	8.60	66	52½
29	L1.21	93	2.72	8.14	4.57	9.87	5.93	7.14	1.72	14.44	9.87	63	54
July 6	0.9	34	3.71	11.21	3.57	11.85	7.21	8.14	0.64	15.42	11.85		
13	0.7	29	3.58	8.93	4.28	11.58	7.29	8.0	2.65	15.86	11.58	66	55
20	0.0	14	4.14	7.5	3.57	11.78	7.64	7.64	4.28	15.35	11.78	66	53

TABLE, No

SHEWING the Going of the Chronometers used in the determination of th

1821. Week ending	259 with					228 with					253 with				
	228	253	405	326	2109	259	253	405	326	2109	259	228	405	326	210
	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
May 11	L3.11	G1.0	L7.71	L3.43	G6.25	G3.11	G4.11	L4.6	L0.32	G9.36	L1.0	L4.11	L8.71	L4.43	G5.2
18	1.75	1.14	6.93	1.3	6.71	1.75	2.85	5.22	G0.45	8.42	1.14	2.85	8.07	2.40	5.57
25	2.96	L0.14	8.19	1.56	5.86	2.96	2.82	5.23	1.40	8.82	G0.14	2.82	8.05	1.43	6.0
June 1	3.14	0.79	8.39	3.07	5.14	3.14	2.38	5.25	0.07	8.28	0.79	2.38	7.63	2.29	5.91
8	1.5	0.71	6.73	G0.54	7.14	1.5	0.79	5.23	2.04	8.64	0.71	0.79	6.02	G1.25	7.8
15	G1.0	G1.29	8.16	0.9	7.93	L1.0	0.28	9.16	L0.1	6.93	L1.29	0.28	9.44	L0.38	6.6
22	0.29	0.36	8.96	L1.39	7.21	0.29	0.07	9.25	1.68	6.92	0.36	0.07	9.32	1.75	6.8
29	L1.21	4.21	8.5	3.93	5.93	G1.21	5.42	7.29	2.72	7.14	4.21	5.42	12.71	8.14	1.7
July 6	0.93	6.57	8.21	4.64	7.21	0.93	7.5	7.28	3.71	8.14	6.57	7.5	14.78	11.21	0.64
13	0.71	4.64	8.57	4.29	7.29	0.71	5.35	7.86	3.58	8.0	4.64	5.35	13.21	8.93	2.6
20	0.0	3.36	7.71	4.14	7.64	0.0	3.36	7.71	4.14	7.64	3.36	3.36	11.07	7.5	4.2

TABLE, No. I.

used in the determination of the Longitude, upon each other, during the under-mentioned period.

	253 with				405 with					326 with					2109 with					Temperature.	
)	228	405	326	2109	259	228	253	326	2109	259	228	253	405	2109	259	228	253	405	326	Maxi-mum.	Mini-mum.
	s. L4.11	s. L8.71	s. L4.43	s. G5.25	s. G7.71	s. G4.6	s. G8.71	s. G4.28	s. G13.96	s. G3.43	s. G0.32	s. G4.43	s. L4.28	s. G9.68	s. L6.25	s. L9.36	s. L5.25	s. L13.96	s. L9.68		
4	2.85	8.07	2.40	5.57	6.93	5.22	8.07	5.67	13.64	1.3	L0.45	2.40	5.67	7.97	6.71	8.42	5.57	13.64	7.97		
4	2.82	8.05	1.43	6.0	8.19	5.23	8.05	6.62	14.05	1.56	1.40	1.43	6.62	7.43	5.86	8.82	6.0	14.05	7.43		
9	2.38	7.63	2.29	5.91	8.39	5.25	7.63	5.34	13.54	3.07	0.07	2.29	5.34	8.20	5.14	8.28	5.91	13.54	8.20		
1	0.79	6.02	G1.25	7.85	6.73	5.23	6.02	7.27	13.87	L0.54	2.04	L1.25	7.27	6.60	7.14	8.64	7.85	13.87	6.60		
9	0.28	9.44	L0.38	6.65	8.16	9.16	9.44	9.06	16.09	0.9	G0.1	G0.38	9.06	7.03	7.93	6.93	6.65	16.09	7.03	61°	51°
6	0.07	9.32	1.75	6.85	8.96	9.25	9.32	7.57	16.17	G1.39	1.68	1.75	7.57	8.60	7.21	6.92	6.85	16.17	8.60	66	52½
1	5.42	12.71	8.14	1.72	8.5	7.29	12.71	4.57	14.44	3.93	2.72	8.14	4.57	9.87	5.93	7.14	1.72	14.44	9.87	63	54
7	7.5	14.78	11.21	0.64	8.21	7.28	14.78	3.57	15.42	4.64	3.71	11.21	3.57	11.85	7.21	8.14	0.64	15.42	11.85		
4	5.35	13.21	8.93	2.65	8.57	7.86	13.21	4.28	15.86	4.29	3.58	8.93	4.28	11.58	7.29	8.0	2.65	15.86	11.58	66	55
6	3.36	11.07	7.5	4.28	7.71	7.71	11.7	3.57	15.35	4.14	4.14	7.5	3.57	11.78	7.64	7.64	4.28	15.35	11.78	66	53

…h other, during the under-mentioned period.

1821.		405 with					326 with						369 with						Temperature.	
Week ending	228	28	253	458	326	369	259	228	253	458	405	369	259	228	253	458	405	326	Maximum.	Minimum.
July 20	s. L 0.0	s. 7.71	s. G 11.07		s. G 3.57		s. G 4.14	s. G 4.14	s. G 7.5		s. L 3.57		s. L 7.78						66°	53°
27	G 0.07	7.78	11.64	s. G 9.29	2.35	s. G 15.36	5.36	5.43	9.29	s. G 7.0	2.35	s. G 13.0	7.64	s. L 7.57	s. L 3.71	s. L 6.07	s. L 15.36	s. L 13.0	64½	52½
Aug. 3	L 0.4	7.71	12.71	9.5	2.28	15.29	5.86	5.43	10.43	7.22	2.28	13.0	7.14	7.57	2.57	5.79	15.29	13.0	65	51½
10	0.9	8.43	13.36	11.29	0.22	16.72	9.14	8.21	13.14	11.07	0.22	16.5	7.36	8.29	3.36	5.43	16.72	16.5	65	52
17	1.4	9.07	15.21	13.28	2.43	17.29	8.07	6.64	12.78	10.85	2.43	14.86	6.79	8.22	2.08	4.01	17.29	14.86	63	52
24	1.3	8.86	16.93	12.49	1.29	17.07	8.93	7.57	15.64	11.21	1.29	15.79	6.86	8.22	0.14	4.58	17.07	15.79	67	50
31	1.0	9.57	18.93	13.57	2.57	17.07	8.07	7.0	16.36	11.0	2.57	14.5	6.43	7.5	G 1.86	3.50	17.07	14.5	65	52½
Sept. 7	0.8	0.71	20.64	14.07	3.29	19.0	8.28	7.42	17.35	10.79	3.29	15.71	7.43	8.29	1.64	4.93	19.0	15.71	Register-Thermometer out of order during this period.	
14	G 0.0	2.07	21.93	15.07	4.71	19.79	7.29	7.36	17.22	10.36	4.71	15.08	7.79	7.72	2.14	4.72	19.79	15.08		
21	0.4	3.0	23.14	16.64	5.50	18.79	7.07	7.50	17.64	11.14	5.50	13.28	6.21	5.79	4.36	2.14	18.79	13.28		
28	0.3	2.84	23.86	19.57	3.69	18.57	8.82	9.13	20.17	15.86	3.69	14.86	6.04	5.73	5.29	G 1.0	18.57	14.86		
Oct. 5	1.6	3.74	24.14	19.28	3.92	19.00	8.11	9.79	20.22	15.36	3.92	15.07	6.96	5.29	5.15	0.29	19.0	15.07		
12	1.8	5.57	27.42	25.14	2.21	19.13	11.50	13.36	25.91	22.93	2.21	16.92	5.36	3.56	8.29	6.01	19.13	16.92		

TABLE III.

AN ACCOUNT

OF THE

GOING OF THE CHRONOMETERS ON MEAN TIME,

AT WINTER ISLAND,

FROM OCTOBER 10, 1821, TO JUNE 29, 1822.

TABLE, No. II.

SHEWING the Going of the Chronometers used in the determination of the Longitude

1821.	259 with						228 with						253 with						458 with					
Week ending	228	253	458	405	326	369	259	253	458	405	326	369	259	228	458	405	326	369	259	228	253	405	326	369
July 20	s. L 0.0	s. G 3.36	s. G 1.93	s. L 7.71	s. L 4.14	s. G 7.78	s. L 0.0	s. G 3.36	s. G 0.0	s. L 7.71	s. L 4.14		s. L 3.36	s. L 3.36		s. L 11.07	s. L 7.5		s. L 1.93					
27	G 0.07	3.93	1.57	7.71	5.36	7.64	0.07	3.86	1.5	7.78	5.43	s. G 7.57	3.93	3.86	s. L 2.36	11.64	9.29	s. G 3.71	1.57	s. L 1.5	s. G 2.36	s. L 9.29	s. L 7.0	s. G 6.07
Aug. 3	L 0.43	4.57	1.36	8.14	5.86	7.14	G 0.43	5.0	1.79	7.71	5.43	7.57	4.57	5.0	3.21	12.71	10.43	2.57	1.36	1.79	3.21	9.5	7.22	5.7
10	0.93	4.0	1.93	9.36	9.14	7.36	0.93	4.93	2.86	8.43	8.21	8.29	4.0	4.93	2.07	13.36	13.14	3.36	1.93	2.86	2.07	11.29	11.07	5.4
17	1.43	4.71	2.79	10.5	8.07	6.79	1.43	6.14	4.21	9.07	6.64	8.22	4.71	6.14	1.93	15.21	12.78	2.08	2.79	4.21	1.93	13.28	10.85	4.0
24	1.36	6.71	2.29	10.21	8.93	6.86	1.36	8.07	3.64	8.86	7.57	8.22	6.71	8.07	4.43	16.93	15.64	0.14	2.29	3.64	4.13	12.49	11.21	4.5
31	1.07	8.29	2.93	10.61	8.07	6.43	1.07	9.36	4.0	9.57	7.0	7.5	8.20	9.36	5.36	18.93	16.36	L 1.86	2.93	4.0	5.36	13.57	11.0	3.5
Sept. 7	0.86	9.07	2.5	11.57	8.28	7.43	0.86	9.93	3.36	10.71	7.42	8.29	9.07	9.93	6.57	20.64	17.35	1.64	2.5	3.36	6.57	14.07	10 70	4.9
14	G 0.07	9.93	3.07	12.0	7.29	7.79	L 0.07	9.86	3.0	12.07	7.36	7.72	9.93	9.86	6.86	21.93	17.22	2.11	3.07	3.0	6.86	15.07	10.36	4.7
21	0.43	10.57	4.07	12.57	7.07	6.21	0.43	10.14	3.84	13.0	7.50	5.79	10.57	10.14	6.5	23.14	17.64	4.36	4.07	3.64	6.5	16.64	11.14	2.1
28	0.31	11.32	7.04	12.53	8.82	6.04	0.31	11.04	6.76	12.84	9.13	5.73	11.32	11.04	4.29	23.86	20.17	5.29	7.04	6.76	4.29	19.57	15.86	L 1.0
Oct. 5	1.68	12.11	7.26	12.03	8.11	6.06	1.68	10.40	5.54	13.74	0.79	5.29	12.11	10.40	4.86	24.14	20.22	5.15	7.26	5.54	4.86	19.28	15.36	0.2
12	1.86	13.71	11.43	13.71	11.50	5.36	1.86	11.85	9.57	15.57	13.36	3.56	13.71	11.85	2.28	27.42	25.21	8.29	11.43	9.57	2.28	25.14	22.93	6.0

TABLE, No. II.

letermination of the Longitude, upon each other, during the under-mentioned period.

458 with					405 with						326 with						369 with						Temperature.	
228	253	405	326	369	259	228	253	458	326	369	259	228	253	458	405	369	259	228	253	458	405	326	Maximum.	Minimum.
					s. G 7.71	s. G 7.71	s. G 11.07		s. G 3.57		s. G 4.14	s. G 4.14	s. G 7.5		s. L 3.57		s. L 7.78						66°	53°
s. L 1.5	s. G 2.36	s. L 9.29	s. L 7.0	s. G 6.07	7.71	7.78	11.64	s. G 9.29	2.35	s. G 15.36	5.36	5.43	9.29	s. G 7.0	2.35	s. G 13.0	7.64	s. L 7.57	s. L 3.71	s. L 6.07	s. L 15.36	s. L 13.0	64½	52½
1.79	3.21	9.5	7.22	5.79	8.14	7.71	12.71	9.5	2.28	15.29	5.86	5.43	10.43	7.22	2.28	13.0	7.14	7.57	2.57	5.79	15.29	13.0	65	51½
2.86	2.07	11.29	11.07	5.43	9.36	8.43	13.36	11.29	0.22	16.72	9.14	8.21	13.14	11.07	0.22	16.5	7.36	8.29	3.36	5.43	16.72	16.5	65	52
4.21	1.93	13.28	10.85	4.01	10.5	9.07	15.21	13.28	2.43	17.29	8.07	6.64	12.78	10.85	2.43	14.86	6.79	8.22	2.08	4.01	17.29	14.86	63	52
3.64	4.43	12.49	11.21	4.58	10.21	8.86	16.93	12.49	1.29	17.07	8.93	7.57	15.64	11.21	1.29	15.79	6.86	8.22	0.14	4.58	17.07	15.79	67	50
4.0	5.36	13.57	11.0	3.50	10.64	9.57	18.93	13.57	2.57	17.07	8.07	7.0	16.36	11.0	2.57	14.5	6.43	7.5	G 4.86	3.50	17.07	14.5	65	52½
3.36	6.57	14.07	10.79	4.93	11.57	10.71	20.64	14.07	3.29	19.0	8.28	7.42	17.35	10.79	3.29	15.71	7.43	8.29	1.64	4.93	19.0	15.71	Register-Thermometer out of order during this period.	
3.0	6.86	15.07	10.36	4.72	12.0	12.07	21.93	15.07	4.71	19.79	7.29	7.36	17.22	10.36	4.71	15.08	7.79	7.72	2.14	4.72	19.79	15.08		
3.64	6.5	16.64	11.14	2.14	12.57	13.0	23.14	16.64	5.50	18.79	7.07	7.50	17.64	11.14	5.50	13.28	6.21	5.79	4.36	2.14	18.79	13.28		
6.76	4.29	19.57	15.86	L 1.0	12.53	12.84	23.86	19.57	3.69	18.57	8.82	9.13	20.17	15.86	3.69	14.86	6.04	5.73	5.29	G 1.0	18.57	14.86		
5.54	4.86	19.28	15.36	0.29	12.03	13.74	24.14	19.28	3.92	19.00	8.11	9.79	20.22	15.36	3.92	15.07	6.96	5.29	5.15	0.29	19.0	15.07		
9.57	2.28	25.14	22.93	6.01	13.71	15.57	27.42	25.14	2.21	19.13	11.50	13.36	25.21	22.93	2.21	16.92	5.36	3.56	8.29	6.01	19.13	16.92		

TABLE No. III.

AN ACCOUNT of the going of the Chronometers on Mean Time, at Winter Islan[d]

N. B. The *hours* are omitted, as unimportant, except in the watches whos[e]

Day at Noon.	259 Fast.	259 Daily Rate.	228 Fast.	228 Daily Rate.	253 Fast.	253 Daily Rate.	254 Fast.	254 Daily Rate.	460 Fast.	460 Daily Rate.	458 Fast.	458 Daily Rate.	369 Fast.	369 Daily Rate.	326 Fast.	326 Daily Rate.	2109 Fast.	2109 Daily Rate.
1821	M. S.	s.	M. S.	s.	M. S.	s.	H. M. S.	s.	H. M. S.	s.	M. S.	s.	H. M. S.	s.	H. M. S.	s.	H. M. S.	s.
Oct. 10	36 03.02	G 4.67	39 10.4	G 4.32	22 07.4	L 8.8	2 41 19.9	L83.3	0 38 58.9	L32.05	29 56.6	L 8.15	0 6 47.4	L 1.3	0 50 21.9	G13.2	3 02 43.9	L22.05
14	36 21.7	4.87	39 27.7	3.03	21 32.2	8.8	0 35 46.7	83.47	0 36 50.7	32.47	29 24	5.18	0 6 42.2	1.88	0 51 17.7	13.2	0 01 15.7	23.75
20	36 50.9	3.75	39 45.9	2.29	20 39.4	9.91	0 27 25.9	81.56	0 33 35.9	39.55	28 52.9	11.87	0 6 30.9	....	0 52 36.9	15.29	....	....
Dec. 1	39 28.3	6.07	41 22.3	3.85	13 43.1	7.57	1 28 14.3	83.14	0 5 51.6	44.98	20 34.3	11.4	stopped 1 24 17.3	0.65	1 3 19.3	23.6	2 42 15.8	23.35
20	41 23.7	3.79	42 35.4	2.62	11 19.2	9.56	0 01 54.7	84.93	slow 0 8 20	63.61	16 57.7	7.23	0 25 05	4.74	0 10 47.7	17.09	0 31 52.2	25.01
30	42 01.6	5.07	43 01.6	2.01	9 43.6	9.14	0 47 45.4	84.61	0 18 56.1	45.47	15 45.4	6.47	0 23 17.6	4.93	0 13 44.6	22.93	0 30 42.1	25.03
1822 Jan. 6	42 37.1	6.16	43 15.7	3.5	8 39.6	7.77	0 37 53.1	83.44	0 24 14.4	41.49	15 00.1	5.84	0 22 43.1	0.91	0 16 25.1	22.23	0 27 46.9	See Col. of Remarks.
13	43 20.2	5.79	43 40.2	3.10	7 45.2	8.74	0 28 09	84.06	0 29 25.8	45.72	14 19.2	8.69	0 22 36.7	1.78	0 19 00.7	17.17	0 21 49.2	23.28
Feb. 4	45 27.5	5.9	44 48.5	2.19	4 33	8.37	slow 0 02 53.5	81.98	0 46 11.7	46.34	11 08	11.31	0 21 57.5	1.29	0 25 18.5	12.79	0 13 17	21.91
25	47 31.4	6.37	45 34.4	2.2	1 37.2	8.13	0 32 38.1	89.47	1 02 24.8	49.73	7 10.4	12.3	0 21 30.4	0.63	0 29 17.1	12.97	0 4 33.9	27.97
28	47 50.5	5.93	45 41	1.58	1 12.8	8.05	0 37 06.5	83.65	0 01 54	46.84	6 33.5	12.26	0 21 28.5	0.93	0 30 26	5.11	0 3 10	23.45
Mar. 20	50 24.6	6.9	46 22.1	4.82	an hour less 57 43.6	6.8	1 13 21.4	81.6	0 25 11.9	33.08	1 14.6	10.18	0 21 04.4	0.27	0 32 39.6	10.57	an hour less 0 53 00.6	23.27
April 1	51 06		46 51		57 02.8		1 21 31		0 28 31		0 13.5		0 21 02.8		0 34 37		0 50 41	
Week ending	H. M. S.	s.	H. M. S.	s.	H. M. S.	s.	H. M. S.	s.	H. M. S.	s.	H. M. S.	s.	H. M. S.	s.	M. S.	s.	H. M. S.	s.
May 4	5 51 12.3	G 6.29	5 48 36.3	G 2.5	5 52 46.5	L 7.74	9 53 06.3	L82.83	10 06 28.3	L43.61	4 51 49.3	L11	1 19 53.3	L 2.86			1 37 07.3	L24.69
11	0 54 56.3	8.3	0 48 53.8	2.51	0 51 52.3	7.03	0 43 26.5	82.51	0 1 23	43.37	0 53 32.3	12.91	0 19 30.3	2.27	38 51.7	G10.0	0 31 11.5	21.41
18	0 55 51.4	0.57	0 49 11.4	3.14	0 51 03.1	6.61	0 33 48.9	82.07	9 56 19.4	43.14	0 52 01.9	13.5	0 19 14.1	1.61	40 01.7	10.6	0 31 23.1	21.63
25	0 57 01.4	11.29	0 49 33.4	4.71	0 50 16.6	6.17	0 24 14.4	82.36	0 51 17.4	42.86	0 50 28.4	11	0 19 02.9	1.79	41 18.8	4.0	0 28 30.9	24 14
June 1	0 58 20.4	12.47	0 50 01.9	3.97	0 49 33.4	5.07	0 14 37.9	81.74	0 46 17.4	41.51	0 49 11.4	11.93	0 18 50.4	0.1			0 25 41.9	23.79
8	0 59 47.7	11.31	0 50 29.7	3.4	0 48 53.7	6.57	0 5 05.7	82.3	0 41 26.7	41.04	0 47 47.9	12.57	0 18 49.7	1.14	42 14.9		0 23 05.4	24.96
15	6 01 06.9	11.27	0 50 47.7	3.92	0 48 07.7	4.91	8 55 29.4	81.71	0 36 35.2	40.5	0 46 19.9	10.01	0 18 41.7	1.66		4.19	0 20 10.7	[illegible]
22	0 2 25.8	11.26	0 51 15.1	2.07	0 47 33.3	4.74	0 45 57.1	81.79	0 31 51.8	41.36	0 45 09.8	11.08	0 18 30.1	1.81			0 17 18.1	21.36
29	0 3 41.6		0 51 29.6		0 47 00.1		0 36 24.6		0 27 02.3		0 43 52.6		0 18 17.4		43 49.1		0 14 27.6	

TABLE No. III.

on Mean Time, at Winter Island, from October 10, 1821, to June 29, 1822.

nimportant, except in the watches whose rates are very considerable.

326		2109		14		1897		405		281		Temperature.			REMARKS.
Fast.	Daily Rate.	Fast.	Daily Rate.	Fast.	Daily Rate.	Fast.	Daily Rate.	Fast.	Daily Rate.	Fast.	Daily Rate.	Maximum.	Minimum.	Mean	
H. M. S.		H. M. S.				M. S.		H. M. S.		M. S.					
0 50 21.9	s.	3 02 43.9	s.	No. 14 worn in the pocket.		19 39.4	s.	0 42 47.9	s.	18 40.4	s.	°	°	°	
	G13.2		L22.05				L11.42		G18.95		L 2.8				
0 51 17.7		0 01 15.7				18 53.7		0 44 03.7		18 29.2					
	13.2		23.75				12.97		18.87		3.22				
0 52 36.9		....				17 35.9		0 45 56.9		18 09.9		+	+	+	
	15.29		....				10		19.39		0.35				369 found stopped on the 26th of November—took six turns to wind up—had stopped 3½ hours.
1 3 19.3		2 42 15.8		H. M. S.		10 35.8		0 59 31.3		17 55.3		64.5	33.5	50.4	
	23.6		23.35		s.	No. 1897 worn in the pocket.			20.78		G 1.50				
0 10 47.7		0 31 52.2		3 52 55.7				1 06 06.2		18 23.9		60.5	31.5	49.5	
	17.69		25.01		L32.61				15.94		1				December 21st; 460 let down.
0 13 44.6		0 30 42.1		0 47 29.6				1 8 45.6		18 33.9		62.5	50	56.9	
	22.93		25.03		36.21				17.53		3.39				
0 16 25.1		0 27 46.9		0 43 16.1				1 10 48.3		18 57.6		57	48.5	53	2109 lost 3m 4s more than usual between 9th and 10th of January—it was not used in the open air about that time.
	22.23		See Col. of Remarks.		38.41				19.44		4.7				
0 19 00.7		0 21 49.2		0 38 47.2				1 13 04.4		19 30.5		61	45	54.4	
	17.17		23.28		12.33				19.59		5.23				
0 25 18.5		0 13 17		0 34 10				1 20 15.5		21 25.5		59	41	50.5	
	12.79		24.91		40.67				19.9		5.73				
0 29 47.1		0 4 33.9		0 20 01.9				1 27 13.4		23 25.9		56	42.8	49.1	2109 used very frequently at a low temperature about this period.
	12.97		27.97		45.3				21.7		6.3				
0 30 26		0 3 10		0 17 46				1 28 13.5		23 44.8		55.5	44	50.3	
	5.11		23.45		38.13				20.7		5.55				
0 32 39.6		an hour less 0 53 00.6		0 1 14.6				1 37 16.8		26 09.1		62	36	49.5	The rate of 326 oscillating considerably about the 26th of March.
	10.57		23.27		28.27				22.15		6.9				
0 34 37		0 50 41		an hour less 0 58 25				1 39 29.7		26 50.5		58.5	39.5	49.7	
M. S.		H. M. S.				M. S.		H. M. S.		H. M. S.					
	s.	1 37 07.3	s.	No. 14 worn in the pocket.				7 50 20.5	s.	5 30 34.3	s.	°	°	°	
			L24.69						G17.21		G 6.21	64	48	54	
38 51.7		0 34 14.5				29 24.2	s.	0 52 21		0 31 47.8					
	G10.0		21.41				G 0.6		17.91		6.44	64	48½	57	The errors and rates below the double line are those obtained, during the last nine weeks of the continuance of the Expedition at Winter Island, for the purpose of fixing the rates of the chronometers. These, with the respective errors on Mean Greenwich Time at sailing, are given in the following page.
40 01.7		0 31 23.4				29 28.7		0 54 26.4		0 32 02.9					
	10.6		24.63				L 2.2		18.74		6.14	63	48	56	
41 18.8		0 28 30.9				29 13.3		0 56 37.6		0 32 45.9					
	1.0		24 14						17.0		5.79	63½	51½	57½	
		0 25 41.9						0 58 42.9		0 33 20.4					
			23.79				6.4		19.26		5.83	63½	50	56	
42 14.9		0 23 05.4				27 41.2		8 00 57.7		0 34 07.2					
			24.96						18.29		4.86	62½	47½	55½	
		0 20 10.7						0 3 05.7		0 34 41.2					
	4.49		24.66						21.34		4.7	64	49	58	
		0 17 18.1						0 5 33.1		0 35 14.1					
			24.36						21.57		4.5	63	50	57	
43 49.1		0 14 27.6						0 8 06.1		0 35 45.6					

TABLE, No. IV.

Chronometers.	Errors on Mean Greenwich Time, June 29th, 1822.				Rates assigned.	
		H.	M.	S.		S.
No. 228	Fast . . .	0	18	50.3	Gaining .	3.535
„ 259	„	0	31	05.3	„	11.52
„ 253	Slow. . .	0	45	39.2	Losing . .	6.184
„ 254	Fast . . .	3	03	45.3	„	82.167
„ 460	„	3	54	23	„	42.249
„ 458	Slow. . .	0	48	46.7	„	11.744
„ 369	„	4	14	21.9	„	1.659
„ 326	Fast . . .	0	11	00.8	Gaining .	7.3
„ 2109	Slow . . .	4	18	11.7	Losing . .	24.459
„ 14	Rates not obtained, being worn in the pocket.					
„ 1897						
„ 405	Fast . . .	2	35	26.8	Gaining .	19.027
„ 281	„	0	03	06.3	„	4.687

TABLE V.

SHEWING THE GOING OF THE CHRONOMETERS

USED IN THE

DETERMINATION OF THE LONGITUDE,

1822.

TABL No. V.

SHEWING the going of the Chronometers used in the determinati f the Longitude,

FIRS INTERVAL.

1822. Week ending	228 with						259 with						253 with						458 with			
	259	253	458	369	2109	281	228	253	458	369	2109	281	228	259	458	369	2109	28	228	259	253	369
	L s.	G s.	G s.	G s.	G s.	L s.	G s.	G s.	G s.	G s.	G s.	G s.	L s.	L s.	G s.	L s.	G s.	L s.	L s.	L s.	L s.	L s.
July 6	8	7.5	14.9	1.9	27.9	1.2	8	15.5	22.9	12.9	35.9	6.8	7.5	15.5	7.4	2.6	20.3	8.	14.9	22.9	7.4	10
13	8.6	6.1	13.9	4.7	28.6	2.2	8.6	14.7	22.5	13.4	37.2	6 5	6.1	14.7	7.8	1.4	22.5	8.	13.9	22.5	7.8	9.2
20	8.5	3.4	12.7	3.2	26	2.9	8.5	11.9	21.3	11.7	31.5	5.6	3.4	11.9	9.3	0.2	22.6	6.	12.7	21.3	9.3	9.6
27	9	2.9	13.1	2.8	26.3	3.4	9	11.9	22.1	11.8	35.3	5.6	2.9	11.9	10.2	0.2	23.1	6.	13.1	22.1	10.2	10.4

SECOND INTERVAL.

1822. Week ending	228 with						259 with						458 with						369 with			
	259	458	369	2109	405	281	228	458	369	2109	405	281	228	259	369	2109	405	281	228	259	458	2109
	L s.	G s.	G s.	G s.	L s.	L s.	G s.	G s.	G s.	G s.	L s.	G s.	L s.	L s.	L s.	G s.	L s.	L s.	L s.	L s.	G s.	G s.
July 31	8.4	13.6	3.3	26.6	20.4	3	8.4	21.9	11.7	31.9	12.1	5.4	13.6	21.9	10.3	13	31	16.6	3.3	11.7	10.3	23.3
Aug. 7	8.1	13.4	2.9	25.6	21.4	3	8.1	21.5	11	33.7	13.2	5.1	13.4	21.5	10.5	12.2	31.8	16.1	2.9	11	10.5	22.7
14	8.1	13.2	2.5	25.7	22.3	3.3	8.1	21.4	10.6	33.9	14.1	4.9	13.2	21.4	10.7	12.6	35.5	16.5	2.5	10.6	10.7	23.2
21	8.2	13.5	3.1	25.8	22.4	3.1	8.2	21.7	11.3	34.1	14.2	5.1	13.5	21.7	10.4	12.3	35.9	16.6	3.1	11.3	10.4	22.7
28	8.4	13.9	2.3	25.1	23	3.9	8.4	22.4	10.7	33.8	14.6	4.5	13.9	22.4	11.7	11.4	36.9	17.9	2.3	10.7	11.7	23.
Sept. 4	8.4	11.2	2.5	25	23.1	4.2	8.4	22.6	10.9	33.4	14.9	4.2	14.2	22.6	11.8	10.8	37.6	18.1	2.5	10.9	11.8	22.
11	.9	15.1	..	26.8	22.2	2.7	6.9	22		33.6	15.4	4.1	15.1	22	..	11.6	37.3	17.9	..	..	..	..
18	6.7	11.9	..	27.2	21.9	3.0	6.7	21.6	..	33.9	15.1	3.7	14.9	21.6	..	12.3	36.8	17.3	..	..	..	..
25	7.9	16.4	..	26.1	22.8	3.6	7.9	21.4	..	34	14.9	4.4	16.4	21.4	..	9.6	39.2	20	..	..	..	..

No. V.

of the Longitnde, upon each other, during the under-mentioned period.

INTERVAL.

458 with						369 with						2109 with						281 with						Temperature.	
228	259	253	369	2109	281	228	259	253	458	2109	281	228	259	253	458	369	281	228	259	253	458	369	2109	Maximum.	Minimum.
L s.	L s.	L s.	L s.	G s.	L s.	L s.	L s.	G s.	G s.	G s.	L s.	L s.	L s.	L s.	L s.	L s.	L s.	G s.	L s.	G s.	G s.	G s.	G s.	°	°
14.9	22.9	7.4	10	12.9	16.2	4.9	12.9	2.6	10	22.9	6.2	27.9	35.9	20.3	12.9	22.9	29.1	1.2	6.8	8.8	16.2	6.2	29.1	66½	50
13.9	22.5	7.8	9.2	14.7	16.1	4.7	13.4	1.4	9.2	23.8	6.9	28.6	37.2	22.5	14.7	23.8	30.8	2.2	6.5	8.3	16.1	6.9	30.8	67	56
12.7	21.3	9.3	9.6	13.3	15.7	3.2	11.7	0.2	9.6	22.8	6.1	26	31.5	22.6	13.3	22.8	28.9	2.9	5.6	6.4	15.7	6.1	28.9	66	53
13.1	22.1	10.2	10.4	13.1	16.5	2.8	11.8	0.2	10.4	23.5	6.2	26	35.3	23.4	13.1	23.5	29.7	3.4	5.6	6.3	16.5	6.2	29.7	65	53

INTERVAL.

369 with						2109 with						405 with						281 with						Temperature.	
228	259	458	2109	405	281	228	259	458	369	405	281	228	259	458	369	2109	281	228	259	458	369	2109	405	Maximum.	Minimum.
L s.	L s.	G s.	G s.	L s.	L s.	L s.	L s.	L s.	L s.	L s.	L s.	G s.	G s.	G s.	G s.	G s.	G s.	G s.	L s.	G s.	G s.	G s.	L s.	°	°
3.3	11.7	10.3	23.3	23.7	6.3	26.6	34.9	13	23.3	47	29.6	20.4	12.1	31	23.7	47	17.4	3	5.4	16.6	6.3	29.6	17.4	67	51
2.9	11	10.5	22.7	24.3	5.9	25.6	33.7	12.2	22.7	47	28.7	21.4	13.2	31.8	24.3	47	18.4	3	5.1	16.4	5.9	28.7	18.4	65	53
2.5	10.6	10.7	23.2	21.8	5.8	25.7	33.9	12.6	23.2	48	29	22.3	14.1	35.5	24.8	48	19	3.3	4.9	16.5	5.8	29	19	65	47
3.1	11.3	10.4	22.7	25.5	6.2	25.8	34.1	12.3	22.7	48.2	28.9	22.4	14.2	35.9	25.5	48.2	19.3	3.1	5.1	16.6	6.2	28.9	19.8	67	52
2.3	10.7	11.7	23.1	25.3	6.2	25.4	33.8	11.4	23.1	48.4	29.3	23	14.6	36.9	25.3	48.4	19.1	3.9	4.5	17.9	6.2	29.3	19.1	61	50
2.5	10.9	11.8	22.5	25.9	6.7	25	33.4	10.8	22.5	48.4	29.2	23.4	11.9	37.6	25.9	48.4	19.2	4.2	4.2	18.4	6.7	29.2	19.2	61	49
..	..	..	..	..	..	26.8	33.6	11.6	..	49	29.5	22.2	15.4	37.3	..	49	19.5	2.7	4.1	17.9	..	29.5	19.5	65	50
..	..	..	..	..	..	27.2	33.9	12.3	..	49.1	30.2	21.9	15.1	36.8	..	49.1	18.9	3	8.7	17.9	..	30.2	18.9	65	50
..	..	..	..	..	..	26.1	34	9.6	..	48.9	29.7	22.8	14.9	39.2	..	48.9	19.2	3.6	4.4	20	..	29.7	19.2	61	41

TABLE

SHEWING the going of the Chronometers on Mean Time, at Igloolik,

DAY.	228 Fast.	228 Daily Rate.	259 Fast.	259 Daily Rate.	253 Fast.	253 Daily Rate.	254 Fast.	254 Daily Rate.	460 Fast.	460 Daily Rate.
	H. M. S.	s.	H. M. S.	s.	H. M. S.	s.	H. M. S.	M. S.	H. M. S.	s.
1822. Nov. 2	5 52 31.5		6 20 07.5		5 00 07		5 43 51.5		7 46 38.5	
		G 2.4		G 9.1		G16.6		L1 19.7		L49.1
„ 21	5 53 17		6 23 00.5		5 05 21.5		5 18 37		7 31 05	
		3.5		10.7		12.9		1 19.9		48.7
Dec. 1	5 53 52.5		6 24 47.5		5 7 31		5 5 17.5		7 22 57.5	
		3.6		8.9		14.5		1 20.2		47.6
„ 16	5 54 46.2		6 27 00.7		5 11 08.2		4 45 15.2		7 11 04.2	
		4.2		9.2		14.7		1 19.4		49.5
„ 30	5 55 45.6		6 29 09.6		5 14 34.1		4 26 43.6		6 59 31.6	
		6.5		9.5		14.8		1 19.6		42.2
1823. Jan. 20	5 58 03		6 32 29		5 19 45.5		3 58 52.5		6 44 45	
				8.8		13.8		1 20.3		44.5
„ 29	5 37 39.8		6 33 48		5 21 49.8		3 46 49.8		6 38 04.8	
		4.8		8.1		13.4		1 20.8		44.9
Feb. 19	5 39 20.1		6 36 38.6		5 26 32.1		3 18 32.1		6 22 21.6	
		10		12.2		18.9		1 16.2		41.2
„ 24	5 40 10.1		6 37 47.6		5 28 06.6		3 12 11.1		6 18 55.6	
		7.6		11.0		14.6		1 20		47.4
March 7	5 41 34.2		6 39 48.7		5 30 47.2		2 57 30.7		6 10 14.2	
		7.8		9.8		14.4		1 20.9		46.6
„ 13	5 42 21.2		6 40 47.7		5 32 13.9		2 49 25.2		6 5 34.4	
		6.5		9.8		15.3		1 19.5		51.8
April 13	5 45 41.8		6 45 52.8		5 40 07.8		2 08 20.3		5 38 48.8	
		6.84		9.3		15.7		1 18.8		36.4
May 13	5 49 06.9		6 50 32.9		5 48 00.4		1 28 56.4		5 20 37.9	
		8.33		8.3		15.3		1 18.9		46.2
„ 20	5 50 05.2		6 51 31.2		5 49 47.7		1 19 44.2		5 15 14.2	
		9.33		10.0		15.8		1 18.3		45.5
„ 27	5 51 10.5		6 52 41		5 51 38.5		1 10 36		5 9 56	
		9.07		9.3		14 9		1 18.5		45.6
June 3	5 52 14		6 53 46		5 53 22.5		1 1 26.5		5 4 36.5	
		10.01		10.2		15.9		1 17.5		44.7
„ 10	5 53 24.1		6 54 57.6		5 55 14.1		0 52 24.1		4 59 23.4	
		10.01		10.1		16.4		1 16.6		42.6
„ 17	5 54 34.2		6 56 08.2		5 57 09.2		0 43 28.2		4 54 25.2	
		8.21		9.4		15.9		1 18.7		44.8
„ 24	5 55 31.7		6 57 14.2		5 59 00.7		0 34 17.2		4 49 11.7	
		8.63		11.1		17.1		1 17.9		43.9
July 1	5 56 32.1		6 58 32.1		6 01 00.1		0 25 11.6		4 44 04.6	
		8.13		10.3		18.1		1 16.2		41.9
„ 8	5 57 29		6 59 44.5		6 03 07		0 16 18.5		4 39 11	
		7.81		10.1		18		1 15.8		43.6
„ 15	5 58 23.7		7 00 55.2		6 5 13.2		0 7 27.7		4 34 05.7	
		7.79		11		18.9		1 14.6		43.1
„ 22	5 59 18.2		7 2 02.2		6 7 25.7		slow 0 1 14.3		4 29 04.2	
		7.80		10.9		21.1		1 13.3		44.1
„ 29	6 00 12.8		7 3 18.8		6 9 53.8		0 9 47.7		4 23 55.8	
		6.80		11		21.5		1 14.5		45.5
Aug. 5	6 1 00.4		7 4 25.9		6 12 24.4		0 18 29.1		4 18 37.4	
		8.49		10.14		17.41		1 16.73		44.3

No. VI.

from November 2, 1822, to the 5th of August, 1823.

458 Fast.	458 Daily Rate.	405 Fast.	405 Daily Rate.	281 Fast.	281 Daily Rate.	Temperature. Maximum.	Temperature. Minimum.	Temperature. Mean.	REMARKS.
H. M. S.	s.	H. M. S.	s.	H. M. S.	s.	°	°	°	
4 14 02.5		8 53 39.5		5 42 35.5					The Chronometers removed into the Bookcase on the 4th of October.
	L14.3		G26.0		G26.2	65	37	59	
4 9 31		9 01 54.5		5 44 33					
	14.8		28.6		6.8	55	39	47	
4 7 03		9 6 40.7		5 45 41.5					
	15.1		27.2		7.5	62	45	54	
4 3 16.7		9 13 28.2		5 47 34.2					
	14.4		28.0		8.0	62	47	55	
3 59 54.6		9 19 59.6		5 49 25.6					
	14.6		28.9		8.6	70	42	57	
3 54 47		9 30 07.		5 52 26					
	14.6		27.4		8.2	66	52	59	No. 228 let down by accident on the 23d of January. Set a-going again on the 24th.
3 52 35.3		9 34 13.8		5 53 39.8					
	15.1		25.9		7.5	67	44	60	
3 47 18.1		9 43 38.1		5 56 17.6					
	11		32.8		13.5	56	46	53	
3 46 23.1		9 46 22.1		5 57 25.1					
	15.5		30.6		9.7	54	36	46	
3 43 32.2		9 51 59.2		5 59 12.2					
	16		29.6		8.9	55	45	51	
3 41 56.2		9 54 56.9		6 00 05.7					
	15.3		29.2		9.8	65	53	58	
3 34 03.3		10 10 00.8		6 5 10.8					
	14.6		29.1		10.1	68	25	59	
3 26 43.9		10 24 32.9		6 10 14.9					
	15.4		32.2		8.4	65	45	54	
3 24 56.2		10 28 18.2		6 11 13.7					
	14.9		30.3		9.0	64	44	54	
3 23 12		10 31 50.5		6 12 16.5					
	15		29.1		8.4	64	43	55	
3 21 27		10 35 14.5		6 13 15.5					
	14		30.7		9.7	64	45	55	
3 19 49.1		10 38 49.6		6 14 23.1					
	13.6		30.5		9.7	66	50	58	The Errors and Rates below the line are those obtained during the last 12 weeks of the Ships' stay at Igloolik, for the purpose of fixing the Rates of the Chronometers; these, with the respective errors on Mean Greenwich Time at sailing, are given in the following page.
3 18 14.2		10 42 23.2		6 15 31.2					
	14.1		29.4		8.7	68	52	59	
3 16 35.7		10 45 48.7		6 16 32.2					
	14.5		29.7		9.3	66	53	60	
3 14 54.1		10 49 16.6		6 17 37.1					
	13.9		30.0		9.6	68	51	61	
3 13 17		10 52 46.2		6 18 44					
	14.0		39.5		8.1	67	50	59	
3 11 39.2		10 56 12.7		6 19 40.7					
	13.5		30.4		7	70	52	60	
3 10 04.7		10 59 45.7		6 20 29.7					
	13.		30		8.3	68	56	59	
3 8 33.8		11 03 15.8		6 21 27.8					
	14.3		30.1		7.4	68	50	57	
3 6 53.9		10 6 46.9		6 22 19.9					
	14.18		30.16		8.63				

Chronometers.	Errors of Chronometers on Mean Time at Igloolik, deduced from the foregoing Table.	Errors of Chronometers on Greenwich Mean Time, August 5th, 1823.	Assigned Daily Rate.
	H. M. S.	H. M. S.	S.
228	Fast . . . 6 01 00.4	Fast . . . 0 34 03.2	G 8.42
259	„ . . . 7 04 25.9	„ . . . 1 37 28.7	G 10.14
252	„ . . . 6 12 24.4	„ . . . 0 45 27.2	G 17.41
254	Slow . . 0 18 29.1	Slow. . . 5 45 26.3	L 76.73
460	Fast. . . 4 18 37.4	„ . . . 1 08 19.8	L 44.3
458	„ . . . 3 06 53.9	„ . . . 2 20 03.3	L 14.18
405	„ . . .11 06 46.9	Fast . . . 5 39 49.7	G 30.16
281	„ . . 6 22 19.9	„ . . . 0 55 22.7	G 8.63

On the return of the Expedition to Winter Island, on the 31st of August, 1823, observations were obtained at a station whose longitude had previously been determined to be 83° 00′ 16″.5 W. of Greenwich, from whence the errors and rates of the respective Chronometers were determined as follows: viz.

	H.	M.	S.
228 Fast of Mean Time at station, August 31st, at 5 P.M.	6	09	30
Proportion for five hours of 228's daily rate			1.7
228 Fast of Mean Time at station, August 31st, at noon .	6	09	28.3
Station W. of Greenwich 83° 00′ 16″.5=in time	5	32	01.3
228 Fast of Greenwich Mean Time	0	37	27

	228	259	253	254	460	458	405	281
	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
Errors of Chronometers, on 228 respectively, on the 31st August	......	F1 04 19	F0 18 32	S6 53 52.5	S2 05 42	S3 03 11.5	F5 16 03	F0 21 07.5
228's error on Greenwich Mean Time	F0 37 27	0 37 27	0 37 27	0 37 27	0 37 27	0 37 27	0 37 27	0 37 27
Chronometers respectively, on Greenwich Mean Time, on the 31st of August, at noon	F0 37 27	F1 41 46	F0 55 59	S6 16 25.5	S1 28 15	S2 25 44.5	F5 53 30	F0 58 34.5
Ditto, on the 5th of August, as above......	0 34 03.2	1 37 28.7	0 45 27.2	5 45 26.3	1 08 19.8	2 20 03.3	5 39 49.7	0 55 22.7
Lost or gained in interval of 26 days......	G0 03 23.8	G0 04 17.3	G0 10 31.8	L0 30 59.2	L0 19 55.2	L0 5 41.2	G0 13 40.3	G0 3 11.8
Rate per day........................	+ 7.8	+ 9.9	+ 24.3	− 71.5	− 45.97	− 13.12	+ 31.55	+ 7.38

Shortly after leaving Winter Island, 254 was observed, by comparison with the other Chronometers, to have altered its rate very considerably; and as it continued to go unsteadily for some time afterwards, it has been rejected in the computation of longitudes for the succeeding period.

On the arrival of the ships at the Humber, on the 18th of October, observations were obtained by three observers, by which 228 was found to be fast of Mean Time at that place $42^m\ 56^s.2$; the position of the Fury's station being ascertained by the trigonometrical survey to be latitude 53° 36′ 30″ N., longitude 00° 03′ 45″ E. of the meridian of Greenwich; from whence the errors of the respective chronometers on Greenwich Mean Time, were by comparison deduced, as follows, viz.

		M.	S.
228 fast of Mean Time at Fury's station on the 18th October, as above - - - - - - - - - - - - - - - - - -		42	56.2
Station of Fury E. of Greenwich, 0° 03′ 45″= - - - - - -		+	15
Actual error of 228 upon Greenwich Mean Time - -	Fast	43	11.2

	228	259	253	254	460	458	405	281
	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.	H. M. S.
Errors of Chronometers respectively on 228, by comparison, on the 18th October	. . . . . .	F1 06 19.5	F0 32 08	S7 47 21.2	S 2 48 42	S 3 20 30.5	F 5 34 50	F0 21 11.75
228's Error on Greenwich Mean Time, deduced above	F0 43 11.2	+0 43 11.2	+0 43 11.2	−0 43 11.2	−0 43 11.2	−0 43 11.2	+0 43 11.2	+0 43 11.2
Actual error of the Chronometers respectively, on Greenwich Mean Time	F0 43 11.2	F 1 49 30.7	F1 15 19.2	S7 04 10	S2 05 30.8	S 2 37 19.3	F6 18 07.2	F1 04 22.95
Errors of the Chronometers respectively, upon Greenwich Mean Time, according to the rates and errors determined on the 31st August, 1823..............	F0 43 39.2	F 1 49 41.2	F1 15 25.4	S 7 13 37	S2 05 01.6	S 2 37 54.3	F6 18 44.4	F1 04 28.75
Errors upon assigned rates..............	− 28	− 10.5	− 6.2		− 29.2	+ 35	− 37.2	− 5.8

Being a mean error upon seven chronometers (rejecting 254 for the reason above assigned) of $-11^s.7$ for which, as none of the lands discovered have their position dependent upon the longitudes computed during this interval, it has not been considered necessary to apply any correction.

458 with					405 with							281 with							Temperature.	
253	254	460	405	281	228	259	253	254	460	458	281	228	259	253	254	460	458	405	Maximum.	Minimum.
L. s.	G. s.	G. s.	L. s.	L. s.	G. s	G. s.	G. s.	G. s.	G. s.	G. s.	G. s.	L. s.	L. s.	L. s.	G. s.	G. s.	G. s.	L. s.	°	°
36.94	57.56	29.71	44.57	21.43	22.93	19.63	7.63	102.13	74.28	44.57	23.14	0.21	3.51	15.51	78.99	51.14	21.43	23.14	69	53
38.3	58.06	34.3	45.6	21.16	24.3	22.16	7.2	103.66	79.9	45.6	21.44	0.14	2.28	17.14	79.22	55.46	21.16	21.44	71	46
36.3	60.4	33.7	43.6	18	24.6	23.21	7.3	104	77.3	43.6	25.6	1	2.36	18.3	78.1	51.7	18	25.6	65	46
38.6	57	33.4	45.2	21.89	23.1	21.39	6.6	102.2	78.6	45.2	23.31	0.21	1.92	16.71	78.89	55.29	21.89	23.31	76	45
38.79	54.94	32.74	45.26	21.36	24.4	21.76	6.47	100.2	78	45.26	23.9	G. 0.5	2.14	17.43	76.3	54.1	21.36	23.9	65	52
39.1	34.2	31.8	45.0	21.4	23.9	21.69	5.9	79.2	76.8	45	23.6	0.8	1.91	17.7	55.6	53.2	21.4	23.6	67	51
38.72	46.74	33.14	45.76	21.36	23.4	22.4	7.04	92.5	78.9	45.76	24.4	L. 1	2	17.36	68.1	54.5	21.36	24.4	63	48
38.64	42.64	33.1	46	22	23.5	21.9	7.36	88.64	79.1	46	24	0.5	2.1	16.64	64.64	55.1	22	24	68	51
39.7	38.7	32.13	45.7	23.1	23.0	19.33	6	84.4	77.83	45.7	22.6	G. 0.4	3.27	16.6	61.8	55.23	23.1	22.6		
37.1	35.7	30.22	44.07	21.2	23.57	20.31	6.97	79.77	74.29	44.07	22.87	0.7	2.56	15.9	56.9	51.42	21.2	22.87		

TABLE No. VI

SHEWING the Going of the Chronometers upon each ot

Week ending	228 with 259	253	254	460	458	405	281
1823.	L. s.	L. s.	G. s.	G. s.	G. s.	L. s	G. s.
Aug. 12	3.3	15.3	79.2	51.35	21 64	22.93	0.21
19	2.14	17	79.36	55.6	21.3	24.3	0.14
26	1.36	17.3	79.4	52.7	19	24.6	1
Sept. 2	1.71	16.5	79.1	55.5	22.1	23.1	0.21
9	2.64	17.93	75.8	53.6	20.86	24.4	L. 0.5
16	2.21	18	55.3	52.9	21.1	23.9	0.3
23	1.0	16.36	69.1	55.5	22.36	23.4	G. 1
30	1.6	16.14	65.14	55.6	22.5	23.5	0.5
Oct. 7	3.67	17	61.4	54.83	22.7	23	L. 0.4
14	3.26	16.6	56.2	50.72	20.5	23.57	0.7

Week ending	259 with 228	253	254	460	458	405	281
1823.	G. s.	L. s.	G. s.	G. s.	G. s.	L. s.	G. s.
Aug. 12	3.3	12	82.5	51.65	21.94	19.63	3.51
19	2.14	14.86	81.5	57.74	23.44	22.16	2.28
26	1.36	15.94	80.76	51.06	20.36	23.24	2.36
Sept. 2	1.71	14.79	80.81	57.21	23.81	21.39	1.92
9	2.64	15.29	78.44	56.24	23.5	21.76	2.14
16	2.21	15.79	57.51	55.11	23.31	21.69	1.91
23	1	15.36	70.1	56.5	23.36	22.4	2
30	1.6	14.54	66.74	57.2	24.1	21.9	2.1
Oct. 7	3.67	13.33	65.07	58.5	26.37	19.33	3.27
14	3.26	13.34	59.46	53.98	23.76	20.31	2.56

Week ending	253 with 228	259	254	460	458	405	281
1823.	G. s.	L. s.	G. s.	G. s.	G. s.	L. s.	G. s.
Aug. 12	15.3	12	91.5	66.65	36.94	7.63	15.51
19	17	14.86	96.36	72.6	38.3	7.3	17.14
26	17.3	15.94	96.7	70	36.3	7.3	18.3
Sept. 2	16.5	14.79	95.6	72	38.6	6.6	16.71
9	17.93	15.29	93.73	71.53	38.79	6.47	17.43
16	18	15.79	73.3	70.9	39.1	5.9	17.7
23	16.36	15.36	85.46	71.86	38.72	7.04	17.36
30	16.14	14.51	81.28	71.74	38.64	7.36	18.64
Oct. 7	17	13.33	78.4	71.83	39.7	6	16.6
14	16.6	13.34	72.8	67.32	37.1	6.97	15.9

Week ending	254 with 228	259	253	460	458	405	281
1823.	L. s.	L. s.	L. s.	L. s.	L. s.	L. s.	L. s.
Aug. 12	79.2	82.5	94.5	27.85	57.56	102.13	78.99
19	79.36	81.5	96.36	23.76	58.06	103.66	79.22
26	79.4	80.76	96.7	26.7	60.4	104.0	78.4
Sept. 2	79.1	80.81	95.6	23.6	57	102.2	78.89
9	75.8	78.44	93.73	22.2	54.94	100.2	76.3
16	55.3	57.51	73.3	2.4	34.2	79.2	55.6
23	69.1	70.1	85.46	13.6	46.74	92.5	68 1
30	65.14	66.74	81.28	9.54	42.64	88.64	64.64
Oct. 7	61.4	65.07	78.4	6.57	38.7	81.4	61.8
14	56.2	59.46	72.8	5.48	35.7	79.77	56.9

Week ending	228	25
1823.	L. s	L. s
Aug. 12	51.35	54.6
19	55.6	57.7
26	52.7	54.0
Sept. 2	55.5	57.2
9	53.6	56.2
16	52.9	55.1
23	55.5	56.5
30	55.6	57.2
Oct. 7	54.83	58.5
14	50.72	53.98

TABLE No. VII.

the Chronometers upon each other, during the undermentioned period.

54 h				460 with						
60	458	405	281	228	259	253	254	458	405	281
	L. s.	L. s.	L. s.	L. s	L. s	L. s.	G. s.	L. s.	L. s.	L. s.
.85	57.56	102.13	78.99	51.35	54.65	66.65	27.85	29.71	74.28	51.11
.76	58.06	103.66	79.22	55.6	57.71	72.6	23.76	34.3	79.9	55.46
.7	60.4	104.0	78.4	52.7	54.06	70	26.7	33.7	77.3	51.7
.6	57	102.2	78.89	55.5	57.21	72	23.6	33.4	78.6	55.29
.2	54.94	100.2	76.3	53.6	56.21	71.53	22.2	32.71	78	51.1
.4	34.2	79.2	55.6	52.9	55.11	70.0	2.4	31.8	76.8	53.2
.6	46.74	92.5	68 1	55.5	56.5	71.86	13.6	33.14	78.9	54.5
54	42.64	88.64	64.64	55.6	57.2	71.74	9.54	33.1	79.1	55.1
57	38.7	84.4	61.8	54.83	58.5	71.83	6.57	32.13	77.83	55.23
48	35.7	79.77	56.9	50.72	53.98	67.32	5.48	30.22	74.29	51.42

458 with							405 with						
228	259	253	254	460	405	281	228	259	253	254	460	458	281
L. s.	L. s.	L. s.	G. s.	G. s.	L. s.	L. s.	G. s	G. s.	G. s.	G. s.	G. s.	G. s.	G. s.
21.64	24.91	36.91	57.56	29.71	44.57	21.43	22.93	19.63	7.63	102.13	74.28	44.57	23.14
21.3	23.41	38.3	58.06	34.3	45.6	21.16	24.3	22.16	7.2	103.66	79.9	45.6	21.41
19	20.36	36.3	60.4	33.7	43.6	18	24.6	23.24	7.3	104	77.3	43.6	25.6
22.1	23.81	38.6	57	33.4	45.2	21.89	23.1	21.39	6.6	102.2	78.6	45.2	23.31
20.86	23.5	38.79	54.94	32.71	45.26	21.36	24.4	21.76	6.47	100.2	78	45.26	23.9
21.1	23.31	39.1	34.2	31.8	45.0	21.4	23.9	21.69	5.9	79.2	76.8	45	23.6
22.36	23.36	38.72	46.74	33.14	45 76	21.36	23.4	22.4	7.04	92.5	78.9	45.76	21.4
22.5	24.1	38.64	42.64	33.1	46	22	23.5	21.9	7.36	88.64	79.1	46	21
22.7	26.37	39.7	38.7	32.13	45.7	23.1	23.0	19.33	6	84.4	77.83	45.7	22.6
20.5	23.76	37.1	35.7	30.22	44.07	21.2	23.57	20.31	6.97	70.77	74.29	44.07	22.87

281 with							Temperature.	
228	259	253	254	460	458	405	Maximum.	Minimum.
L. s.	L. s.	L. s.	G. s.	G. s.	G. s.	L. s.	°	°
0.21	3.51	15.51	78.99	51.14	21.43	23.14	69	53
0.14	2.28	17.14	79.22	55.46	21.16	21.44	71	46
1	2.36	18.3	78.1	51.7	18	25.6	65	46
0.21	1.92	16.71	78.89	55.29	21.89	23.31	76	45
G. 0.5	2.14	17.43	76.3	51.1	21.36	23.9	65	52
0.3	1.91	17.7	55.6	53.2	21.4	23.6	67	51
L. 1	2	17.36	68.1	51.5	21.36	24.4	63	48
0.5	2.1	16.64	64.64	55.1	22	24	68	51
G. 0.4	3.27	16.6	61.8	55.23	23.1	22.6		
0.7	2.56	15.9	56.9	51.42	21.2	22.87		

N°. II.

TABLE I.

THIS and the following table contain the observations made for determining the longitude by chronometers during the summers of the years 1821 and 1822, by which the lands surveyed by the Expedition, are laid down in the Chart; those made at sea, while crossing the Atlantic, being omitted as unimportant. One or two of the principal bearings are attached to most of the observations; the whole of those contained in the surveying book being much too bulky to insert in a table of this nature.

The times contained in the second and seventh columns are according to the astronomical day, at the places of observation; those by 259, in the second column, being carried on beyond twenty-four hours, when necessary.

In the columns of altitudes $\underline{\odot}$ and $\overline{\odot}$ denote the lower and upper limbs of the sun by artificial horizon; $\overline{\underline{\odot}}$, both limbs having been observed, and the altitude of the centre inserted. The double or observed angle is, in the latter case, always inserted. L and U signify the lower and upper limbs by the natural horizon.

An asterisk in the column of dip implies that the observation has been made by the boats employed in the examination of the coast, or during the various journeys by land or over ice.

In the column of observers, either in this table or any other, the letters denote as follows:

F Mr. Fisher	N Lieut. Nias	H Mr. Hooper	B Mr. Bushnan
P Capt. Parry	Re Lieut. Reid	R Mr. Ross	C Mr. Crozier

OBSERVATIONS FOR DETERMINING THE LONGITUDE BY CHRONOMETERS.

1821	Time by 259	259's Correction to Mean Greenwich Time.	Observed Altitude of Limb.	Obser-ver.	Dip of Hori-zon.	Apparent Time.	Latitude.	Longitude. By 259.	Longitude. By Mean of the Chronometers.	Mean Longitude by different Observers.	REMARKS.
	H. M. S.	FAST. M. S.	° ′ ″		′ ″	H. M. S.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	
July 1	6 36 16.9	0 27.1	44 01 38 L	P	4 11	2 21 28.1	62 11 45	62 44 22.5	62 45 33.5	62 45 33.5	
„	7 31 04.9	0 27.1	38 51 43 L	R	3 50	3 15 33.1	62 07 10	62 55 00	62 56 10.5	62 56 10.5	
2	24 52 59.3	0 28.5	37 42 48 L	R	3 50	20 32 28.5	61 33 00	64 04 27	64 05 25.5		
„	24 59 36	0 28.5	38 26 3 L	F	4 00	20 39 07	61 33 00	64 04 07.5	64 05 06	64 03 10.2	
„	25 08 35.5	0 28.5	39 26 05 L	B	3 56	20 48 30.4	61 33 00	63 58 00.5	63 58 59		
3	7 31 40.1	0 28.5	39 42 33 L	P	4 04	3 09 45.4	61 19 12	64 24 39	64 25 37.5	64 25 37.5	Hatton's Headland,—S. 87°, W. 4 or 5 leagues.
„	24 30 03	0 29.1	69 46 22 $\underline{\odot}$	H	...	20 07 45.5	61 19 29	64 28 16.5	64 29 10.5	64 29 15	Ditto ditto N. 89°, W. 4 or 5 leagues.
„	24 42 00.7	0 29.2	72 29 11 $\underline{\odot}$	P	...	20 19 42.3	61 19 29	64 28 25.5	64 29 19.5		
5	6 26 11.4	0 29.9	45 55 10 L	P	4 11	2 02 26.7	61 18 15	64 46 33	64 47 22.5		
„	6 28 10.1	0 30	45 46 40 L	H	4 15	2 04 25.5	61 18 15	64 46 31.5	64 47 21	64 47 13.1	
„	6 29 55.1	0 29.9	45 38 22 L	R	4 00	2 06 09.6	61 18 15	64 46 45	64 47 34.5		
„	9 12 50.8	0 29.9	28 09 07 L	B	4 11	4 49 10.9	61 19 27	64 45 45	64 46 34.5		
„	9 15 17	0 29.9	27 49 22 L	F	4 16	4 51 39	61 19 52	64 44 46.5	64 45 36	64 45 36	
7	25 24 53	0 32	40 28 05 L	R	3 50	21 01 13.9	61 18 00	64 37 42	64 38 24	64 35 46.5	Ditto ditto N. 80°, W. 9 or 10 miles.
„	25 26 37.5	0 32	40 39 39 L	B	3 41	21 03 19.5	61 18 00	64 32 27	64 33 09		
8	8 48 17.2	0 32	30 53 32 L	P	4 11	4 23 54.8	61 13 15	64 47 49.5	64 48 31.5	64 51 06.7	Ice horizon.
„	8 54 14	0 32.1	30 14 31 L	H	4 11	4 29 30.8	61 13 15	64 53 00	64 53 42		
„	24 37 10.5	0 32.7	34 52 02 L	P	4 11	20 10 30	61 10 30	65 20 42	65 21 24	65 21 22.5	Ditto ditto N. 54°, E. 5 or 6 leagues.
„	24 39 02.3	0 32.7	35 04 56 L	R	4 0	20 12 22	61 10 30	65 20 39	65 21 21		
„	25 18 04.9	0 32.7	78 44 50 $\underline{\odot}$	B	...	20 51 47.4	61 10 30	65 14 52.5	65 15 34.5	65 15 34.5	
9	25 03 45	0 33.4	75 15 30 $\underline{\odot}$	P	...	20 37 00	61 15 00	65 19 25.5	65 20 06	65 19 51.8	Ditto ditto N. 65°, E. 4 or 5 leagues.
„	25 11 33	0 33.3	76 57 11 $\underline{\odot}$	H	...	20 44 25.4	61 15 00	65 18 57	65 19 37.5		
„	25 24 58.3	0 33.3	70 28 46 $\underline{\odot}$	B	...	20 58 22.8	61 15 00	65 32 01.5	65 32 42	65 32 42	
10	8 29 40.2	0 33.4	66 24 42 $\underline{\odot}$	R	...	4 02 05.9	61 09 05	65 32 34.5	65 33 15	65 32 09	
„	8 33 13	0 33.4	65 35 03 $\underline{\odot}$	B	...	4 05 41.5	61 08 40	65 30 22.5	65 31 03		
„	25 03 30	0 34.1	74 59 58 $\underline{\odot}$	P	...	20 36 18.6	61 04 45	65 23 45	65 24 24	65 25 05.2	No land distinctly seen
„	25 07 [illegible]	0 34	75 58 03 $\underline{\odot}$	H	...	20 40 37.8	61 04 45	65 25 07.5	65 25 46.5		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	...	[illegible]	61 08 00	65 24 48	65 25 27	65 25 27	
12	8 54 46.2	0 34.8	60 59 53 $\overline{\odot}$	P	...	4 25 29	61 04 00	65 52 25.5	65 53 04.5		
„	8 59 59	0 34.8	59 46 35 $\overline{\odot}$	R	...	4 30 35.6	61 04 00	65 54 01.5	65 54 40.5	65 54 15	
„	9 23 01.6	0 34.8	53 43 06 $\underline{\odot}$	B	...	4 53 36.7	61 04 00	65 54 21	65 55 00		
„	25 15 11.6	0 35.5	76 46 59 $\underline{\odot}$	F	...	20 46 28	61 01 51	65 42 37.5	65 43 15		
„	25 20 24.2	0 35.5	78 57 04 $\overline{\odot}$	P	...	20 51 44.3	61 02 15	65 41 42	65 42 19.5		

,,	25 24 58.3	0 33.3	70 28 46	$\underline{\odot}$	B	...	20 58 22.8	61 15 00	65 32 01.5	65 32 42	65 32 42	
10	8 29 40.2	0 33.4	66 24 42	$\underline{\odot}$	R	...	4 02 05.9	61 09 05	65 32 34.5	65 33 15	65 32 09	
,,	8 33 13	0 33.4	65 35 03	$\underline{\odot}$	B	...	4 05 41.5	61 08 40	65 30 22.5	65 31 03		
,,	25 03 30	0 34.1	74 59 58	$\underline{\odot}$	P	...	20 36 18.6	61 04 45	65 23 45	65 24 24	65 25 05.2	No land distinctly seen.
,,	[illegible]	0 34	75 58 03	[illegible]	H	...	20 40 37.8	61 04 45	65 25 07.5	65 25 46.5		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	...	[illegible]	61 03 00	65 24 48	65 25 27	65 25 27	
12	8 54 46.2	0 34.8	60 59 53	$\overline{\odot}$	P	...	4 25 29	61 04 00	65 52 25.5	65 53 04.5		
,,	8 59 59	0 34.8	59 46 35	$\overline{\odot}$	R	...	4 30 35.6	61 04 00	65 54 01.5	65 54 40.5	65 54 15	
,,	9 23 01.6	0 34.8	53 43 06	$\underline{\odot}$	B	...	4 53 36.7	61 04 00	65 54 21	65 55 00		
,,	25 15 11.6	0 35.5	76 46 59	$\underline{\odot}$	F	...	20 46 28	61 01 51	65 42 37.5	65 43 15		
,,	25 20 24.2	0 35.5	78 57 04	$\overline{\odot}$	P	...	20 51 44.3	61 02 15	65 41 42	65 42 19.5		The land about Cape Chidley,—S. 33° E., to S. 36° E., distant 10 or 10 leagues.
,,	25 28 29.2	0 35.4	79 35 20	$\overline{\odot}$	H	...	20 59 47	61 02 15	65 42 18	65 42 55.5	65 42 27.7	
,,	25 29 02.1	0 35.4	79 43 30	$\underline{\odot}$	B	...	21 00 26.2	61 02 00	65 40 43.5	65 41 21		
13	10 35 56	0 35.5	35 48 16	$\underline{\odot}$	R	...	6 07 09.7	61 02 00	65 42 39	65 43 16.5	65 43 16.5	
,,	25 10 24.4	0 36.2	75 31 20	$\underline{\odot}$	R	...	20 41 42.7	61 00 00	65 40 18	65 40 48		
,,	25 14 36.7	0 36.1	76 24 42	$\underline{\odot}$	H	...	20 45 49.6	61 00 00	65 41 39	65 42 09	65 41 30	
,,	25 16 12.6	0 36.2	76 45 39	$\underline{\odot}$	F	...	20 47 22.5	61 00 20	65 42 28.5	65 42 58.5		
,,	25 16 51.1	0 36.2	76 56 03	$\underline{\odot}$	B	...	20 48 16.2	61 00 00	65 39 34.5	65 40 04.5		
14	7 29 14	0 36.2	79 16 06	$\underline{\odot}$	P	...	3 00 20.6	61 00 00	65 42 46.5	65 43 16.5	65 43 16.5	
16	25 05 53.3	0 38.3	72 40 32	$\overline{\odot}$	P	...	20 30 45.8	61 09 00	67 11 46.5	67 11 54		
,,	25 11 54	0 38.2	73 59 51	$\overline{\odot}$	H	...	20 36 47.1	61 09 00	67 11 37.5	67 11 45		
,,	25 14 17	0 38.3	74 00 34	$\underline{\odot}$	R	...	20 39 16.1	61 09 00	67 10 07.5	67 10 15	67 11 08.7	Extremes of Green, or Grass Island, S. 27° W., to S. 46° W., distant about 10 miles; but uncertain, on account of atmospherical refraction.
,,	25 16 43.1	0 38.3	75 02 11	$\overline{\odot}$	F	...	20 41 36	61 09 15	67 11 39	67 11 46.5		
,,	25 20 18	0 38.3	75 18 14	$\underline{\odot}$	B	...	20 45 17.8	61 09 00	67 09 55.5	67 10 03		
17	24 25 03.9	0 38.9	31 28 15	L	H	4.11	19 51 21	61 16 06	66 49 01.5	66 49 01.5	66 49 01.5	
,,	24 27 26.5	0 39	31 42 37	L	F	4.4	19 53 24	61 18 00	66 54 07.5	66 54 07.5	66 54 07.5	
18	8 24 35.9	0 39	33 11 53	L	P	4.11	3 52 17.2	61 38 58	66 27 51	66 27 51	66 27 51	
,,	11 17 56.7	0 39	26 26 14	$\overline{\odot}$	P	...	6 45 26.5	61 35 40	66 30 36	66 30 36		
,,	11 24 15.6	0 39.2	25 33 40	$\overline{\odot}$	H	...	6 51 45.8	61 35 40	66 30 25.5	66 30 25.5	66 30 30	East Bluff, N. 42°, E. 4 leagues. Lower Savage Islands, from S. 85° E. to N. 50°, E. 7 to 10 miles.
,,	11 24 36.7	0 39	24 57 36	$\overline{\odot}$	R	...	6 52 06.3	61 35 40	66 30 37.5	66 30 37.5		
,,	25 06 51.2	0 40.2	71 47 15	$\underline{\odot}$	F	...	20 33 33	61 35 30	66 41 45	66 41 31.5		
,,	25 10 31.2	0 40	73 06 10	$\underline{\odot}$	P	..	20 37 18.3	61 35 45	66 40 24	66 40 10.5	66 40 44.6	
,,	25 15 00	0 40.2	74 03 19	$\overline{\odot}$	H	...	20 41 47	61 35 45	66 40 21	66 40 07.5		
,,	26 06 39.7	0 40.2	84 00 58	$\underline{\odot}$	B	...	21 35 22.4	61 35 15	66 41 22.5	66 41 09		
19	8 31 45.5	0 40.4	65 05 55	$\overline{\odot}$	R	...	3 58 28.2	61 35 30	66 41 04.5	66 40 46	66 40 46	East Bluff, N. 58° E., distant 4 or 5 leagues.
,,	25 12 39.4	0 41.2	36 18 28	L	R	4.00	20 38 33.2	61 35 10	66 52 25.5	66 51 58.5	66 51 58.5	

OBSERVATIONS FOR DETERMINING THE LONGITUDE BY CHRONOMETERS, *continued.*

1821.	Time by 259	259's Correction to Mean Greenwich Time.	Observed Altitude of Limb.	Obser-ver.	Dip of Hori-zon.	Apparent Time.	Latitude.	Longitude. By 259	Longitude. By Mean of the Chronometers.	Mean Longitude by different Observers.	REMARKS.
	H. M. S.	FAST. M. S.	° ′ ″		′ ″	H. M. S.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	
July 20	9 14 03	0 41.4	54 35 50 ☉̲	F	. . .	4 39 56.5	61 38 50	66 52 09	66 51 32		
,,	9 17 56.3	0 41.6	54 12 36 ☉̅	P	. . .	4 43 51.4	61 39 00	66 51 45	66 51 18		
,,	9 19 53.2	0 41.7	53 42 48 ☉̅	R	. . .	4 45 57	61 39 00	66 49 33	66 49 06	66 51 12.7	East Bluff, N. 79° E., distant 5 or 6 leagues.
,,	9 22 19.1	0 41.6	52 39 10 ☉̅	H	. . .	4 48 13.6	61 39 00	66 51 52.5	66 51 25.5		
,,	9 23 35.1	0 41.6	52 22 14 ☉̅	B	. . .	4 49 24.5	61 39 00	66 53 09	66 52 42		
,,	24 39 10.5	0 42.4	32 18 56 L	P	3 50	20 04 09.5	61 46 55	67 05 16.5	67 04 55.5		
,,	24 41 00	0 42.6	32 31 29 L	F	3 30	20 06 13	61 46 47	67 01 36	67 01 15	67 03 16.1	Centre of Snowy land, N. 29°, E. distance from shore 10 or 12 miles.
,,	24 42 12.4	0 42.4	32 39 47 L	H	3 50	20 07 15.1	61 46 55	67 04 06	67 03 45		
,,	24 47 20.4	0 42.4	33 14 28 L	R	4 00	20 12 25.5	61 45 30	67 03 30	67 03 09		
,,	25 38 35.5	0 42.4	38 37 23 L	B	4 17	21 03 20.5	61 45 43	67 08 30	67 08 09	67 08 09	
22	25 26 54	0 44.8	35 53 23 L	R	none	20 40 19.3	61 40 45	69 26 33	69 26 24	69 26 24	
23	23 35 24	0 46.3	23 05 39 L	F	4 04	18 49 00	62 06 18	69 53 10.5	69 53 09	69 53 09	
,,	24 25 21.1	0 46.1	28 55 20 L	P	4 11	19 39 42.5	62 11 33	69 49 18	69 49 16.5		
,,	24 28 33	0 46	29 14 01 L	R	4 00	19 42 28.8	62 11 30	69 48 13.5	69 48 12	69 49 02.5	
,,	24 28 53	0 46.3	29 14 57 L	F	4 04	19 42 42.4	62 10 39	69 49 40.5	69 49 39		
24	9 33 39.5	0 46.6	51 22 07 ☉̲	P	. . .	4 46 57	62 31 30	69 57 31.5	69 57 30		
,,	9 36 10.2	0 46.2	51 18 27 ☉̅	F	. . .	4 49 30	62 31 30	69 57 03	69 57 01.5		
,,	9 39 42.8	0 46.4	49 58 49 ☉̲	H	. . .	4 53 00.9	62 31 30	69 57 25.5	69 57 24	69 57 19.5	On shore, near the S.E. point of the largest and easternmost of the Savage Islands (of Baffin.)
,,	9 45 37.8	0 46.4	48 37 15 ☉̲	R	. . .	4 58 56	62 31 30	69 57 24	69 57 22 5		
,,	9 49 25.5	0 46.6	47 44 37 ☉̲	B	. . .	5 02 43.7	62 31 30	69 57 21	69 57 19.5		
25	24 21 51	0 48.6	27 13 45 L	F	4 04	19 29 41	62 30 00	71 18 36	71 18 48	71 18 48	
,,	24 42 29.4	0 48.4	29 33 43 L	P	4 11	19 49 25	62 29 35	71 32 13.5	71 32 25.5	71 32 21.7	
,,	24 47 24.9	0 48.4	30 06 21 L	H	4 06	19 54 19.4	62 29 35	71 32 06	71 32 18		
,,	25 22 11.7	0 48.4	33 49 31 L	R	4 00	20 28 53.7	62 29 05	71 35 37.5	71 35 49.5	71 36 20.3	Land, from N. 42° E. to N. 86° E. distant from 5 to 7 leagues.
,,	25 25 05.3	0 48.4	34 07 19 L	B	4 11	20 31 43.2	62 29 05	71 36 39	71 36 51		

26	24 32 58.3	0 49.6	27 59 26 L	P	4 11	19 38 09.8	63 01 00	71 57 55.5	71 58 13.5		
,,	24 35 13	0 49.8	28 14 26 L	F	4 04	19 40 38	63 01 00	71 54 33	71 54 51		
,,	24 37 25	0 49.6	28 28 51 L	R	4 04	19 42 38.6	63 01 00	71 57 24	71 57 42	71 56 18	Land, (principally islands and broken shore,) from N. 7° E., to S. 61° E., distant from 8 to 13 miles.
,,	24 38 49.5	0 49.6	28 39 05 L	H	4 04	19 44 10	63 01 00	71 55 40.5	71 55 58.5		
,,	25 58 16.2	0 49.8	36 47 35 L	B	3 25	21 03 41.4	63 00 54	71 54 27	71 54 45		
28	24 59 59.4	0 52	29 18 50 L	P	4 11	19 56 36.7	63 48 44	74 19 05	74 04 28.5		
,,	25 01 57.4	0 52.2	29 31 18 L	F	2 00	19 58 38.7	63 49 00	74 05 18	74 05 27	74 06 32.3	Broken land appearing like islands, from N. 7° E., to N. 42° E., distant 6 or 7 leagues.
,,	25 09 18	0 52	30 17 54 L	H	4 36	20 05 42.3	63 48 45	74 09 33	74 09 42		
29	9 50 47.1	0 52.4	48 57 18 ☉	B	. . .	4 47 29.5	63 45 00	74 05 10.5	74 05 19.5		
,,	9 53 13.5	0 52.4	48 54 54 ☉	P	. . .	4 50 00.3	63 45 00	74 03 55.5	74 04 04.5	74 04 07.5	
,,	9 54 38.9	0 52.4	48 04 51 ☉	H	. . .	4 51 29	63 45 00	74 03 06	74 03 15		
,,	9 56 52.1	0 52.4	48 07 39 ☉	R	. . .	4 53 39.8	63 45 00	74 03 42	74 03 51		
30	10 25 31.6	0 53.7	21 13 22 L	F	4 00	5 13 31.3	64 15 00	76 16 39	76 16 45	76 16 45	
31	8 18 03	0 54.8	34 16 36 L	H	4 04	3 07 35.6	64 00 40	75 53 01.5	75 53 03	75 53 03	
,,	10 30 58.5	0 54.9	20 38 05 L	H	4 04	5 19 02.6	64 10 00	76 15 10.5	76 15 12		
,,	10 35 15.7	0 54.9	20 10 58 L	R	4 00	5 23 11	64 10 00	76 17 21	76 17 22.5	76 15 44.3	
,,	10 38 20.3	0 54.8	19 49 41 L	P	4 06	5 26 07	64 10 00	76 14 37.5	76 14 39		
,,	16 18 06.9	0 55	20 15 32 *	P	4 07	11 04 08.1	64 05 54	76 46 06	76 46 07.5	76 45 57.7	North end of Nottingham Island, — S. 87° 31′ W.; Salisbury Island, from S. 9° 16′ E., to S. 33° 46′ W., — distance, 7 or 8 leagues.
,,	16 21 25.9	0 55.2	19 53 44 *	R	4 00	11 07 28.1	64 06 15	76 45 46.5	76 45 48	Arcturus W. of Mer.	
,,	25 23 52.6	0 55.5	29 43 19 L	F	4 00	20 07 49.3	64 08 41	77 17 18	77 17 15		
,,	25 24 38.5	0 55.6	29 48 42 L	P	4 11	20 08 38.6	64 07 58	77 16 31.5	77 16 28.5	77 17 34.9	Extremes of Salisbury Island, S. 22° E., and S. 10° 51′ W.; Extremes of Nottingham Island S. 32° W., and S. 69° W.
,,	25 26 48	0 55.6	30 01 12 L	H	4 16	20 10 39.8	64 07 58	77 18 36	77 18 33		
,,	25 55 01.1	0 55.6	32 46 15 L	R	4 00	20 38 55	64 09 20	77 18 06	77 18 03		
,,	26 12 35.2	0 55.6	34 24 36 L	B	4 04	20 56 44.1	64 10 10	77 14 21	77 14 18	77 14 18	
Aug. 1	12 52 23	0 56.2	6 31 58 L	R	4 04	7 33 25	64 21 00	78 06 22.5	78 06 19.5	78 06 19.5	Trinity Islands (Fox,) from N. 6° E., to N. 4° W., — distance 4 to 6 miles.
,,	24 24 29.4	0 56.7	22 11 04 L	P	4 11	18 59 14	64 59 45	79 36 00	79 35 52.5	79 37 28.5	Ice horizon. No land in sight.
,,	24 27 36.2	0 56.8	22 29 10 L	R	4 00	19 02 07.8	64 59 14	79 39 12	79 39 04.5		
,,	25 04 47.5	0 56.8	26 19 03 L	H	4 04	19 39 11	64 59 45	79 41 16.5	79 41 09	79 41 09	
,,	25 18 10	0 56.7	27 38 13 L	F	4 00	19 52 15	64 59 00	79 45 57	79 45 49.5	79 45 49.5	
,,	26 15 14.2	0 56.8	33 01 43 L	B	3 56	20 49 04.6	65 00 00	79 49 36	79 49 28.5	79 49 28.5	
2	10 20 44.7	0 57.2	22 28 53 L	H	none	4 56 16.2	65 05 00	79 24 33	79 24 25.5	79 24 25.5	No land in sight.
3	8 31 33.1	0 58.5	32 59 28 L	P	3 00	3 06 31.9	65 08 00	79 33 28.5	79 33 16.5	79 33 16.5	
,,	8 32 28.8	0 58.5	32 57 09 L	B	3 33	3 07 19.7	65 09 00	79 35 27	79 35 15	79 35 15	

OBSERVATIONS FOR DETERMINING THE LONGITUDE BY CHRONOMETERS, *continued.*

1821	Time by 259	259's Correction to Mean Greenwich Time.	Observed Altitude of Limb.	Observer.	Dip of Horizon.	Apparent Time.	Latitude.	Longitude. By 259.	Longitude. By Mean of the Chronometers.	Mean Longitude by different Observers.	REMARKS.
	H. M. S.	FAST. M. S.	° ′ ″		′ ″	H. M. S.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	
Aug. 3	8 34 23.4	0 58.4	32 47 02 L	H	3 00	3 09 25.7	65 06 30	79 32 37.5	79 32 25.5	79 32 25.5	
,,	8 36 53.7	0 58.4	32 34 03 L	R	3 00	3 11 30.7	65 09 45	79 38 55.5	79 38 43.5	79 38 43 5	
,,	25 26 05.9	0 59.2	27 55 11 L	H	4 00	20 00 07.8	65 04 15	79 48 22.5	79 48 22.5	79 48 22 5	
,,	26 05 00.5	0 59.1	31 36 48 L	P	4 00	20 39 00.7	65 03 30	79 48 48	79 48 48	79 51 11.2	Distant land, much refracted from S 53° E., to N. 82° E.
,,	26 08 51.5	0 59.2	31 56 00 L	R	4 00	20 42 32.9	65 04 00	79 53 34.5	79 53 34.5		
,,	26 28 34.6	0 59.2	33 40 08 L	B	3 07	21 02 30.9	65 02 51	79 49 55.5	79 49 55.5	79 49 55.5	
4	26 16 44.8	1 00.6	63 10 40 ☉	F	. . .	20 43 51.7	65 20 00	81 33 04.5	81 33 16.5		
,,	26 16 46.8	1 00.3	63 10 37 ☉	P	. . .	20 43 50.9	65 20 00	81 33 57	81 34 09		
,,	26 20 32.4	1 00.4	63 50 11 ☉	H	. . .	20 47 35.7	65 20 00	81 34 07.5	81 34 19.5	81 33 54	
,,	26 21 27.2	1 00.4	65 02 15 ☉	R	. . .	20 48 28.7	65 20 00	81 34 34.5	81 34 46.5		
,,	26 24 36.5	1 00.4	64 33 34 ☉	B	. . .	20 51 45.3	65 20 00	81 32 46.5	81 32 58.5		
5	10 42 07.8	1 00.9	41 36 00 ☉	R	. . .	5 07 42.4	65 27 00	81 56 43.5	81 56 55.5		
,,	11 06 49.2	1 00.8	36 59 41 ☉	H	. . .	5 32 26.6	65 27 00	81 56 03	81 56 15	81 57 00.4	
,,	11 09 15.7	1 00.8	35 27 46 ☉	H	. . .	5 34 46	65 27 00	81 57 49.5	81 58 01.5		
,,	11 21 14.2	1 00.8	32 57 46 ☉	B	. . .	5 46 49.4	65 27 00	81 56 37.5	81 56 49.5		
,,	26 28 39.7	1 01.5	64 14 44 ☉	P	. . .	20 53 47.6	65 28 15	82 04 13.5	82 04 37.5		
,,	26 31 50.4	1 01.6	64 46 48 ☉	H	. . .	20 56 56.9	65 28 15	82 04 34.5	82 04 58.5	82 04 29.2	Two remarkable hills on Southampton Island, S. 56° 27′ W. & S. 60° 05 W.
,,	26 34 23.2	1 01.6	65 13 02 ☉	B	. . .	20 59 39.9	65 28 15	82 02 03	82 02 27		
,,	26 34 54.2	1 01.6	65 48 31 ☉	R	. . .	20 59 57.1	65 28 15	82 05 30	82 05 54		
9	9 49 06.2	1 05.7	25 05 47 L	P	3 00	4 12 56.8	65 34 00	82 28 43.6	82 29 46.5		
,,	9 52 52.6	1 05.6	24 46 15 L	H	4 14	4 16 28.4	65 34 00	82 32 24	82 32 27	82 31 20	
,,	9 56 23.5	1 05.6	24 24 38 L	R	4 10	4 20 06	65 34 00	82 30 43.5	82 31 46.5		
,,	25 29 38	1 06.4	25 20 43 L	H	4 10	19 51 03.1	65 32 00	83 06 16.5	83 07 33	83 07 33	
10	7 30 30.1	1 06.9	73 20 24 ☉	P	. . .	1 51 07.4	65 31 00	83 18 36	83 19 52.5		
,,	7 34 10.5	1 06.7	72 54 05 ☉	H	. . .	1 54 50.9	65 31 00	83 17 57	83 19 13.5	83 19 50.6	
,,	7 37 25.9	1 06.7	72 30 27 ☉	R	. . .	1 58 07.2	65 31 00	83 17 42	83 18 58.5		
,,	7 41 02.7	1 06.9	72 03 48 ☉	F	. . .	2 01 34.7	65 31 30	83 20 01.5	83 21 18		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
11	26 41 24.8	1 08.8	62 08 52 ☉	H	. . .	21 01 26	65 35 00	83 51 28.5	[illegible]	[illegible]	
12	10 48 54.8	1 09.3	18 47 21 L	P	4 00	5 07 36	65 34 45	83 52 15	83 53 37.5		
,,	10 54 24.6	1 09.3	18 16 48 L	F	4 00	5 11 56.6	65 34 45	84 09 40.5	84 11 04	84 02 04.2	S.E. End of Baffin Island, N. 64° E., 4 or 5 leagues.
,,	10 59 08	1 09.3	17 46 40 L	R	4 00	5 17 26.5	65 34 45	83 58 27	83 59 49.5		
,,	11 02 56	1 09.3	17 24 07 L	B	3 16	5 20 56.8	65 34 45	84 02 22.5	84 03 46		
,,	[illegible]	[illegible]	[illegible] L	F	[illegible]	10 53 45	65 35 00	84 09 22.5	84 10 48	84 10 48	

11	26 41 24.8	1 08.8	62 08 52 $\underline{\odot}$	H	...	21 01 26	65 35 00	83 31 28.5	83 32 51		
12	10 48 54.8	1 09.3	18 47 21 L	P	4 00	5 07 30	65 34 45	83 52 15	83 53 37.5	84 02 04.2	S.E. End of Baffin Island, N. 64° E., 4 or 5 leagues.
,,	10 54 24.6	1 09.3	18 16 48 L	F	4 00	5 11 56.6	65 34 45	84 09 40.5	84 11 04		
,,	10 59 08	1 09.3	17 46 40 L	R	4 00	5 17 26.5	65 34 45	83 58 27	83 59 49.5		
,,	11 02 56	1 09.3	17 24 07 L	B	3 16	5 20 56.8	65 34 45	84 02 22.5	84 03 46		
,,	25 36 06	1 09.9	24 45 07 L	F	3 00	19 53 45	65 35 00	84 09 22.5	84 10 48	84 10 48	
13	10 50 40.8	1 10.5	36 50 21 $\underline{\odot}$	F	...	5 07 50.7	65 35 00	84 17 24	84 18 49.5	84 18 37.5	Cape Welsford, S. 55° W., 3 or 4 leagues.
,,	10 55 53	1 10.5	36 48 56 $\overline{\odot}$	F	...	5 13 03	65 35 00	84 17 25.5	84 18 51		
,,	11 06 18.6	1 10.5	33 37 18 $\underline{\odot}$	P	...	5 23 27.8	65 34 00	84 17 34.5	84 19 00		
,,	11 09 28.7	1 10.4	32 58 14 $\underline{\odot}$	H	...	5 26 37.8	65 33 30	84 17 37.5	84 19 03		
,,	11 12 29	1 10.4	33 23 57 $\overline{\odot}$	B	..	5 29 38.4	65 34 00	84 17 34.5	84 19 00		
,,	11 13 00.1	1 10.5	32 44 35 $\overline{\odot}$	R	...	5 30 17.2	65 33 30	84 15 36	84 17 01.5		
15	24 23 21.3	1 13.5	33 20 54 $\overline{\odot}$	P	*..	18 39 33.2	65 28 13	84 38 24	84 39 58.5	84 40 06.7	On Shore at Cape Welsford.
,,	24 27 03.1	1 13.5	34 06 43 $\overline{\odot}$	R	*..	18 43 13.8	65 28 13	84 38 40.5	84 40 15		
,,	25 21 40.8	1 13.5	22 16 45 L	F	4 00	19 36 41.7	65 29 20	84 26 18	84 27 52	84 27 52	
16	25 01 29.2	1 15.1	39 41 58 $\underline{\odot}$	P	...	19 15 56.6	65 27 37	85 14 48	85 16 25.5	85 15 35.1	On Shore West side of Duke of York's Bay.
,,	25 04 01.8	1 15.2	40 07 09 $\underline{\odot}$	H	...	19 17 57.6	65 27 30	85 15 10.5	85 16 48		
,,	25 05 00.3	1 15.4	41 23 26 $\overline{\odot}$	F	...	19 19 10	65 27 37	85 13 42	85 15 19.5		
,,	25 06 11.7	1 15.4	40 33 50 $\underline{\odot}$	F	...	19 20 19.5	65 27 37	85 12 58.5	85 14 36		
,,	25 07 42	1 15.4	40 52 18 $\underline{\odot}$	B	...	19 21 45.8	65 27 30	85 13 09	85 14 46.5		
18	28 21 39.2	1 18.3	71 09 16 $\overline{\odot}$	P	...	22 37 19.4	65 20 56	84 55 16.5	84 57 04.5	84 57 04.5	On a Shoal in Duke of York's Bay.
19	10 45 59.7	1 18.9	17 17 44 L	F	4 00	5 02 55	65 27 00	84 37 16.5	84 39 04.5	84 39 04.5	Sea horizon, running out of Duke of York's Bay.
20	11 59 46.6	1 20.5	9 31 42 L	H	4 00	6 16 04.3	66 00 00	84 49 57	84 51 51	84 48 40.5	Cape Frigid, (Middleton), S.87° W.
,,	12 04 31.8	1 20.5	9 00 45 L	P	4 00	6 21 15	66 00 00	84 43 36	84 45 30		
21	26 40 29.7	1 23.2	53 14 50 $\underline{\odot}$	F	...	20 50 44	66 31 00	86 26 03	86 28 04.5	86 30 20.1	On Shore on the north side of Repulse Bay.
,,	26 40 32.5	1 23.1	53 16 18 $\underline{\odot}$	P	...	20 50 43.5	66 31 00	86 26 49.5	86 28 51		
,,	26 51 00.8	1 23.3	54 54 31 $\underline{\odot}$	R	...	21 01 02.9	66 31 00	86 29 00	86 31 01.5		
,,	26 56 32.1	1 23.2	56 47 33 $\overline{\odot}$	B	...	21 06 33.4	66 31 00	86 29 16.5	86 31 18		
,,	27 08 57.1	1 23.2	58 05 57 $\underline{\odot}$	H	...	21 18 59.4	66 31 00	86 29 03	86 31 04.5		
,,	27 16 19.9	1 23.3	59 08 06 $\overline{\odot}$	R	...	21 26 21.4	66 31 00	86 29 13.5	86 31 15		
,,	27 28 17.5	1 23.1	60 45 00 $\underline{\odot}$	P	...	21 38 21.2	66 31 00	86 28 45	86 30 46		
27	9 27 34	1 31.6	43 56 10 $\underline{\odot}$	H	a..	3 46 03.7	66 12 36	84 41 09	84 43 27		

OBSERVATIONS FOR DETERMINING THE LONGITUDE BY CHRONOMETERS, *continued.*

1821	Time by 259	259's Correction to Mean Greenwich Time.	Observed Altitude of Limb.	Observer.	Dip of Horizon.	Apparent Time.	Latitude.	Longitude. By 259.	Longitude. By Mean of the Chronometers.	Mean Longitude by different Observers.	REMARKS.
	H. M. S.	FAST. M. S.	° ′ ″		′ ″	H. M. S.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	
Aug. 27	24 28 28.3	1 32.6	28 24 44 $\overline{\odot}$	P*	h .	18 49 18.5	66 13 36	84 08 25.5	84 10 39	84 11 27	The observations marked h, i, k, were made on the main-land, opposite Georgina Island.
,,	24 39 55.3	1 32.6	29 37 17 $\underline{\odot}$	P*	i . .	19 00 44.3	66 13 36	84 08 45	84 10 58.5		
,,	25 39 09	1 32.5	41 47 00 $\overline{\odot}$	B*	. . .	19 58 42.4	66 12 23	84 27 52.5	84 30 05	84 30 05	
28	8 31 16.6	1 33.3	52 32 02 $\underline{\odot}$	F	. . .	2 50 14.3	66 12 44	84 37 48	84 40 01.5	84 40 07.5	East Shore of Duckett Cove.
,,	8 33 42.4	1 33.3	53 13 33 $\overline{\odot}$	F	. . .	2 52 39.3	66 12 44	84 38 00	84 40 13.5		
,,	10 38 42	1 33.3	29 49 54 $\overline{\underline{\odot}}$	R*	k . .	4 59 30.5	66 13 36	84 10 30	84 12 43.5		
,,	24 48 54.7	1 34.2	31 04 53 $\overline{\underline{\odot}}$	P*	. . .	19 08 40	66 09 15	84 29 10.5	84 31 25.5	84 31 25.6	On Shore on Point Cheyne.
,,	24 53 12.8	1 34.2	31 55 42 $\overline{\underline{\odot}}$	R*	. . .	19 12 59.2	66 09 15	84 29 10.8	84 31 25.8		
,,	25 18 17.5	1 34.4	36 34 08 $\overline{\underline{\odot}}$	H	b . .	19 37 08.1	66 12 36	84 42 24	84 44 34.5	84 44 01.9	The observations marked a, b, c, d, e, f, g, in the column of Dip, were made on shore in Duckett Cove.
,,	25 24 58.2	1 34.4	37 49 52 $\overline{\underline{\odot}}$	H	c . .	19 43 48.7	66 12 36	84 42 25.5	84 44 36		
29	25 13 21.9	1 35.9	35 01 29 $\overline{\underline{\odot}}$	P	d . .	19 32 29.6	66 12 36	84 42 12	84 44 28.5		
,,	25 24 34	1 35.9	27 09 21 $\overline{\underline{\odot}}$	H	e . .	19 43 43.7	66 12 36	84 41 43.5	84 44 00		
,,	27 09 48.5	1 35.9	54 04 50 $\overline{\underline{\odot}}$	B	f . .	21 29 01	66 12 29	84 41 21	84 43 37.5		
,,	27 01 25.1	1 36	53 26 20 $\overline{\underline{\odot}}$	R	g . .	21 20 37.9	66 12 34	84 41 13.5	84 43 30		
31	10 07 59.7	1 38.2	16 48 00 $\overline{\underline{\odot}}$	P	4 15	4 31 13	66 07 00	83 46 24	83 48 39	83 48 57.7	Sea horizon—much ice.
,,	10 09 55.2	1 38.1	16 52 44 $\overline{\odot}$	R	4 00	4 33 06.4	66 07 00	83 47 01.5	83 49 16.5		
,,	23 55 56.8	1 39.1	9 33 37 $\underline{\odot}$	P	4 08	18 20 16 8	66 01 40	83 32 13.5	83 34 30	83 34 30	Sea horizon—much ice.
Sept. 1	25 44 15.1	1 40.7	19 57 27 $\underline{\odot}$	P	4 14	20 09 44.3	65 47 00	83 19 36	83 21 54	83 21 54	SE. end of Baffin Island, S. 20° W. 6 or 7 miles.
3	24 28 00.5	1 43.9	12 03 55 $\underline{\odot}$	P	4 02	18 54 17.3	65 14 25	83 20 19.5	83 22 42	83 22 42	A very small islet, S. 86° E. 6 or 7 miles.
4	26 40 04.7	1 45.5	23 46 08 $\underline{\odot}$	P	3 50	21 06 36.6	65 39 10	83 17 21	83 19 26	83 19 26	Sea horizon—much ice.
8	26 19 11.2	1 51.9	39 45 32 $\underline{\odot}$	F	a . .	20 43 28.6	66 37 24	84 09 16.5	84 11 13.5		
,,	27 01 47.6	1 52	45 44 27 $\overline{\underline{\odot}}$	R*	. . .	21 23 38.4	66 55 40	84 46 18	84 48 13.5	84 47 57	On Shore on a point of land, West branch of Lyon Inlet.
,,	27 08 02.9	1 51.9	46 30 30 $\overline{\underline{\odot}}$	P*	. . .	21 29 56	66 55 40	84 45 45	84 47 40.5		
9	8 46 02	1 52.4	41 02 47 $\overline{\odot}$	H	b . .	3 10 27.9	66 37 20	84 08 40	84 10 37		
,,	9 07 58.2	1 52.4	38 07 30 $\overline{\odot}$	P*	. . .	3 29 40.3	66 57 04	84 49 42	84 51 37.5	84 52 17.2	
,,	9 13 53.9	1 52.4	36 37 56 $\overline{\underline{\odot}}$	R*	. . .	3 35 30.7	66 57 04	84 51 01.5	84 52 57		
,,	9 26 28	1 52.5	34 51 55 $\overline{\odot}$	H	c . .	3 50 55.4	66 37 25	84 08 22.5	84 10 19.5	84 10 50.2	The observations marked a, b, c, d, e, f, were made in Five-Hawser Bay.
,,	24 58 47	1 53.5	25 02 14 $\underline{\odot}$	H	d . .	10 23 21.5	66 37 20	84 09 43.5	84 11 24		
,,	25 02 53.9	1 53.5	25 48 45 $\underline{\odot}$	H	e . .	19 27 30	66 37 20	84 09 21	84 11 01.5		
,,	25 06 07.9	1 53.5	26 25 05 $\underline{\odot}$	H	f . .	19 30 46.4	66 37 20	84 08 45	84 10 25.5		
,,	25 30 39.6	1 53.5	30 32 51 $\overline{\odot}$	R*	. . .	19 52 03	66 59 06	84 57 37.5	84 59 34.5	84 59 34.5	On Shore at the northern part of Lyon Inlet.

”	9 26 28	1 52.5	34 51 55 $\overline{\odot}$	H	c..	3 50 55.4	66 37 25	84 08 22.5	84 10 19.5		
”	24 58 47	1 53.5	25 02 14 $\underline{\odot}$	H	d..	19 23 21.5	66 37 20	84 09 43.5	84 11 24	84 10 50.2	The observations marked a, b, c, d, e, f, were made in Five-Hawser Bay.
”	25 02 53.9	1 53.5	25 48 45 $\underline{\odot}$	H	e..	19 27 30	66 37 20	84 09 21	84 11 01.5		
”	25 06 07.9	1 53.5	26 25 05 $\underline{\odot}$	H	f..	19 30 46.4	66 37 20	84 08 45	84 10 25.5		
”	25 30 39.6	1 53.5	30 32 51 $\overline{\odot}$	R*	...	19 52 03	66 59 06	84 57 37.5	84 59 34.5	84 59 34.5	On Shore at the northern part of Lyon Inlet.
10	10 22 04.5	1 54.2	24 00 22 $\overline{\odot}$	R*	...	4 42 32.2	66 56 00	85 13 13.5	85 14 46.5	85 14 46.5	Near the Esquimaux huts.
13	7 55 47.5	1 58.8	45 00 00 $\overline{\odot}$	H	...	2 21 25.3	66 38 39	84 09 45	84 10 39		
”	7 58 50.2	1 58.8	44 05 10 $\underline{\odot}$	F	...	2 24 27.4	66 38 39	84 09 55.5	84 10 49.5	84 10 45	
”	7 59 53	1 58.8	45 00 50 $\overline{\odot}$	F	...	2 25 30.4	66 38 39	84 09 52.5	84 10 46.5		
”	7 59 52.1	1 58.8	44 26 29 $\overline{\odot}$	P*	...	2 23 17.7	66 51 06	84 42 51	84 43 45	84 43 18.7	On Shore at Tide Point.
”	8 03 37.8	1 58.8	43 57 15 $\overline{\odot}$	R*	...	2 27 08	66 51 06	84 41 58.5	84 42 52.5		
14	7 55 55.3	2 00.5	44 02 44 $\overline{\odot}$	P*	...	2 20 33.5	66 50 40	84 29 30	84 30 09	84 29 24	On Shore, north side of Norman Creek
”	8 00 54.8	2 00 5	43 24 58 $\overline{\odot}$	R*	...	2 25 40	66 50 40	84 28 00	84 28 39		
17	7 58 40.1	2 08.9	40 56 50 $\underline{\odot}$	H	a..	2 25 06.2	66 41 40	84 16 16.5	84 16 55.5		
”	8 32 49.2	2 08.9	37 07 46 $\overline{\odot}$	P*	...	2 59 46.2	66 24 30	84 08 39	84 09 18	84 08 47.2	On Shore in a small bay, West side of the entrance to Lyon Inlet.
”	8 36 44.6	2 08.9	36 31 25 $\overline{\odot}$	R*	...	3 03 45.9	66 24 30	84 07 37.5	84 08 16.5		
”	26 37 43.9	2 11.2	37 42 53 $\overline{\odot}$	P	...	21 05 45.4	66 09 50	83 56 01.5	83 56 42	83 57 40.5	On Shore at Cape Martineau.
”	26 43 40	2 11.2	38 33 30 $\overline{\odot}$	R*	...	21 11 33.5	66 09 50	83 57 58.5	83 58 39		
”	26 49 53.5	2 11.1	37 56 12 $\underline{\odot}$	H	b..	21 16 22.6	66 41 34	84 19 09	84 19 49.5		
18	10 29 00.4	2 11.9	15 29 40 $\underline{\odot}$	H	c..	4 55 41.4	66 41 34	84 17 37.5	84 18 18	84 18 22.2	Mean of observations marked a, b, c, d, in Dip column, on shore at the Anchorage.
”	10 33 18.2	2 12	14 41 21 $\underline{\odot}$	B	d..	4 59 58	66 41 17	84 17 55.5	84 18 26		
”	25 31 05	2 14.2	12 35 29 $\underline{\odot}$	R*	4 04	19 56 52.4	66 16 30	84 33 43.5	84 34 22.5	84 34 29.2	Sea horizon indifferent—On Farhill Point.
”	25 33 16.7	2 14.2	12 47 10 $\underline{\odot}$	P*	4 06	19 59 03	66 16 30	84 33 57	84 34 36		
19	7 42 41.7	2 15	20 59 37 $\underline{\odot}$	R*	2 00	2 08 12.5	66 24 33	84 39 01.5	84 39 40.5	84 39 50.2	On the beach, at the head of Gore Bay
”	7 45 00.5	2 15	20 51 43 $\underline{\odot}$	P*	2 00	2 10 30.2	66 24 33	84 39 21	84 40 00		
28	8 19 39.5	2 39.6	30 02 42 $\overline{\odot}$	R	...	2 51 10	66 31 59	83 48 54	83 48 54	83 48 54	South shore of Safety Cove.
Oct. 4	27 04 19.5	2 59.3	28 54 53 $\overline{\odot}$	R	a..	21 37 39.1	66 23 05	83 48 36	83 47 15	83 47 18.7	On shore near the Anchorage on the east side of the entrance to Lyon Inlet.
”	27 26 28.7	2 59.3	31 22 04 $\overline{\odot}$	R	b..	21 59 49.2	66 23 05	83 48 43.5	83 47 22.5		
5	7 42 39.3	2 59.3	28 58 20 $\underline{\odot}$	P	...	2 16 05.7	66 22 49	83 47 52.5	83 46 31.5	83 45 48	
”	7 51 45.2	2 59.4	27 52 42 $\underline{\odot}$	H	...	2 25 17.6	66 22 49	83 46 25.5	83 45 04.5		
”	8 18 17.2	2 59.5	24 25 38 $\underline{\odot}$	B	c..	2 51 42.9	66 23 05	83 48 06	83 46 45	83 46 40.5	
”	8 23 35.8	2 59.5	24 12 58 $\overline{\odot}$	R	d..	2 57 02.2	66 23 05	83 47 57	83 46 36		

TABLE II.

OBSERVATIONS FOR DETERMINING THE LONGITUDE BY CHRONOMETERS, A. D. 1822.

1822	Time by 228.	228's Correction to Mean Greenwich Time.	Observed Altitude of Limb.		Observer.	Dip of Horizon.	Apparent Time.	Latitude.	Longitude. By 228.	Longitude. By Mean of the Chronometers.	Mean Longitude by different Observers.	REMARKS.
	H. M. S.	FAST. M. S.	° ′ ″			′ ″	H. M. S.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	
July 2	24 31 37.6	19 04.4	49 25 56.5	$\underline{\odot}$	P	. . .	18 39 38.7	66 43 00	82 18 12	82 17 27	82 18 30	Point Elizabeth, N. 7° E., 5 miles.
„	24 39 18.1	19 04.4	50 55 33	$\underline{\odot}$	R	. . .	18 47 12	66 43 00	82 20 15	82 19 33		
„	27 02 25.6	19 08.3	77 11 36	$\underline{\odot}$	F	. . .	21 12 22	66 54 17	81 45 22.5	81 44 28.5		
„	27 04 11.6	19 08.3	78 31 01	$\overline{\odot}$	F	. . .	21 14 17.8	66 54 17	81 45 25.5	81 44 31.5		
3	27 09 02	19 08.3	78 46 39.5	$\overline{\odot}$	H	. . .	21 19 16.8	66 54 17	81 45 46.5	81 44 48		
„	27 14 24.9	19 08.3	79 31 10	$\overline{\odot}$	B	. . .	21 24 16.2	66 54 17	81 46 40.5	81 45 55	81 44 57.7	Cape Wilson, N. 22° E., 4 miles.
4	8 48 36.4	19 09	75 58 32	$\overline{\odot}$	R	. . .	2 58 26.4	66 54 17	81 46 12	81 45 12		
„	11 52 56	19 09.8	41 28 45	$\overline{\odot}$	C	. . .	6 02 45.3	66 54 17	81 45 49.5	81 44 51		
„	27 14 04.9	19 15.9	78 33 18	$\underline{\odot}$	F	. . .	21 23 57.8	66 56 27	81 39 06	81 37 37.5		
„	27 19 54	19 15.9	80 27 05	$\overline{\odot}$	F	. . .	20 29 44.3	66 56 27	81 39 45	81 38 16.5		
5	27 22 17.5	19 15.8	79 40 30	$\underline{\odot}$	Re	. . .	21 31 41	66 56 17	81 46 40.5	81 45 09	81 39 18.6	
„	27 27 30.1	19 15.7	80 28 50	$\underline{\odot}$	B	. . .	21 37 23.6	66 55 55	81 39 00	81 37 45		
„	27 34 13.6	19 15.8	81 55 09	$\overline{\odot}$	C	. . .	21 44 06	66 56 00	81 39 16.5	81 37 45		
6	26 48 46.3	19 19.2	74 24 59	$\underline{\odot}$	P	. . .	20 58 25	66 56 00	81 39 25.5	81 37 40.5		
„	27 01 43.5	19 19.3	76 58 38	$\overline{\odot}$	H	. . .	21 11 16.6	66 56 00	81 40 46.5	81 39 01.5	81 38 42.7	Island of Owlitteewack, from N. 10° E., to N. 42° E., 1 mile.
„	27 03 57	19 19.3	76 48 02	$\underline{\odot}$	Re	. . .	21 13 28	66 56 17	81 41 15	81 39 30		
„	27 05 15.5	19 19.3	78 02 55	$\overline{\odot}$	C	. . .	21 14 50.1	66 56 00	81 40 24	81 38 39		
8	10 24 15.6	19 24.2	57 26 22	$\underline{\odot}$	P	. . .	4 34 10.2	67 02 21	81 31 03	81 28 52.5		
„	10 26 38	19 24.3	56 59 08	$\underline{\odot}$	H	. . .	4 36 33	67 02 25	81 30 54	81 28 49.5		
„	10 28 43.5	19 24.2	56 35 40	$\underline{\odot}$	B	. . .	4 38 34.7	67 02 25	81 31 52.5	81 29 45		
„	12 32 22.7	19 24.5	33 51 45	$\overline{\odot}$	R	. . .	6 42 18.3	67 02 24	81 30 30	81 28 16.5		
„	26 50 06.7	19 26.8	74 09 09	$\underline{\odot}$	Re	. . .	21 00 01	67 02 07	81 26 37.5	81 24 01.5	81 27 49 7	The Continental shore, from half to three-quarters of a mile distant to the Westward.
„	26 59 51.7	19 27	75 38 12	$\underline{\odot}$	H	. . .	21 09 33.8	67 02 30	81 31 54	81 29 12		
„	27 16 56.5	19 27	78 12 27	$\underline{\odot}$	B	. . .	21 26 43.3	67 02 25	81 30 40.5	81 28 03		
„	27 25 33	19 26.9	79 25 13	$\underline{\odot}$	C	. . .	21 35 19.1	67 02 30	81 30 52.5	81 28 10.5		
„	23 26 11.1	19 33.8	35 42 10	$\underline{\odot}$	P	.	17 35 42.3	67 11 37	81 28 52.5	81 25 16.5		

10	23 33 32.8	19 33.8	37 05 57	$\underline{\odot}$	C	. . .	17 43 09	67 11 29	81 27 37.5	81 23 54		
,,	26 38 21.8	19 34.3	72 01 50	$\overline{\odot}$	H	. . .	20 47 43.5	67 11 30	81 30 51	81 27 07.5		
,,	26 43 53	19 34.3	72 26 35	$\underline{\odot}$	R	. . .	20 53 27.7	67 11 30	81 27 36	81 23 55.5		
,,	26 59 50.4	19 34.4	74 57 03	$\underline{\odot}$	B	. . .	21 09 20.7	67 11 26	81 28 39	81 24 58.5	81 24 36.9	Made fast alongside the rocks on the Continental shore.
,,	27 24 37.4	19 34.4	39 20 03	L	Re	3 57	21 34 04	67 11 17	81 29 36	81 25 45		
11	10 10 48.5	19 35.4	59 19 12	$\underline{\odot}$	F	. . .	4 20 23.8	67 11 35	81 25 31	81 22 40.5		
,,	10 16 50.5	19 35.5	58 10 58	$\underline{\odot}$	N	. . .	4 26 22.7	67 11 38	81 27 33.5	81 23 57		
12	26 46 40.8	19 41.8	72 10 18	$\underline{\odot}$	Re	. . .	20 55 52	67 18 54	81 27 48	81 23 06		
,,	27 00 14.2	19 41.8	74 49 47	$\overline{\odot}$	B	. . .	21 09 20.6	67 18 41	81 28 52.5	81 24 10.5	81 22 47.1	One mile to the N.N.E. of the entrance to Barrow River.
,,	27 05 02.2	19 41.8	75 01 29	$\underline{\odot}$	C	. . .	21 14 18	67 19 00	81 26 31	81 21 46		
,,	27 09 10.3	19 41.9	75 38 20	$\underline{\odot}$	R	. . .	21 18 24.9	67 18 57	81 26 48	81 22 06		
14	11 05 37.5	19 46.5	24 13 35	L	P	4 04	5 13 23.8	68 06 00	81 45 19.5	81 40 27		
,,	11 08 48	19 46.5	23 55 18	L	F	3 56	5 16 45	68 06 00	81 43 37.5	81 37 45		
,,	11 09 10.2	19 46.5	23 55 00	L	R	4 00	5 16 45 2	68 06 00	81 48 09	81 43 13.5	81 40 04.8	Amitioke, from N. 44° E., to N. 76 E., 4 or 5 leagues.
,,	11 10 15.8	19 46.5	23 48 31	L	Re	4 04	5 18 07	68 06 00	81 44 13.5	81 39 21		
,,	11 12 03.5	19 46.5	23 37 37	L	N	3 56	5 19 53	68 06 00	81 44 30	81 39 37.5		
,,	24 29 42.2	19 48.7	23 22 09	L	P	4 04	18 38 12.9	68 19 00	81 32 46.5	81 28 00		
,,	24 36 01	19 49	23 57 54	L	R	4 00	18 44 42	68 19 00	81 30 06	81 25 21		
,,	24 46 46.4	19 49	24 56 49	L	B	4 17	18 55 20	68 19 00	81 31 54	81 27 10.5	81 27 49.5	
,,	26 17 15.8	19 48.9	32 55 10	L	Re	3 59	20 25 31	68 18 23	81 35 33	81 30 46.5		
15	11 56 00.2	19 50.4	19 22 15	L	Re	3 59	6 04 13	68 28 23	81 36 09	81 31 24		
19	10 33 49.7	20 05	25 23 55	L	F	3 42	4 50 11.1	69 32 35	79 25 03	79 21 30		
,,	10 37 43.9	20 05	25 04 37	L	N	3 54	4 53 58	69 32 00	79 26 52.5	79 23 16.5		
,,	10 41 28.6	20 05	24 43 47	L	P	3 50	4 57 56.9	69 32 45	79 23 18	79 19 42		
,,	10 42 26.6	20 05	24 39 27	L	R	4 00	4 58 49	69 32 34	79 24 46.5	79 21 09	79 22 16.5	Land, apparently Islands, from N. 50° E., to S. 12° E.
,,	10 43 25.4	20 05.1	24 37 18	L	Re	3 59	4 59 22	69 32 00	79 31 09	79 27 16.5		
,,	11 15 14.8	20 05.2	21 48 05	L	B	3 56	5 31 34	69 32 34	79 25 30	79 21 52.5		
,,	11 18 36.9	20 05	21 30 17	L	C	4 00	5 39 45.7	69 32 34	79 24 49.5	79 21 09		
20	24 21 24.6	20 11	21 45 53	L	R	3 50	18 30 55	69 22 00	81 04 46.5	81 02 09	81 01 42.7	
,,	24 31 04.8	20 11	22 35 48	L	B	3 56	18 40 37.6	69 22 00	81 04 10.5	81 01 16.5		
21	26 18 14	20 14.8	62 27 41	$\underline{\odot}$	F	. . .	20 27 07.6	69 33 27	81 12 12	81 10 15.5		
,,	26 48 39.4	20 14.9	33 30 16	L	N	3 42	20 57 25.8	69 33 27	81 17 37.5	81 16 00		

OBSERVATIONS FOR DETERMINING THE LONGITUDE BY CHRONOMETERS, *continued*.

1822	Time by 228.	228's Correction to Mean Greenwich Time. FAST.	Observed Altitude of Limb.	Limb	Observer.	Dip of Horizon.	Apparent Time.	Latitude.	Longitude. By 228.	Longitude. By Mean of the Chronometers.	Mean Longitude by different Observers.	REMARKS.
	H. M. S.	M. S.	° ′ ″			′ ″	H. M. S.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	
July 21	26 51 56.7	20 14.9	33 43 33	L	Re	3 59	21 00 18.1	69 33 27	81 20 12	81 18 34.5		
,,	26 53 37.8	20 14.9	68 09 59	$\overline{\odot}$	P	...	21 02 37.2	69 33 27	81 10 42	81 09 04.5		
,,	26 56 08	20 15.1	68 30 23	$\overline{\odot}$	C	...	21 05 06.6	69 33 27	81 10 51	81 08 58.5	81 09 13	Tern Island, S. 81° E., 6 miles.
,,	26 59 25.4	20 15	68 56 57	$\overline{\odot}$	H	...	21 08 22.1	69 33 27	81 11 21	81 09 36		
22	24 26 18.9	20 18.2	21 41 20	L	B	1 56	18 34 34 6	69 28 00	81 20 15	81 19 13.5	81 18 58.5	
,,	24 30 05.5	20 18.4	22 00 23	L	C	1 56	18 38 23.9	69 28 00	81 19 31.5	81 18 43.5		
23	8 27 12.3	20 19.5	70 29 45	$\underline{\odot}$	N	...	2 34 20.5	69 20 45	81 36 37.5	81 35 54		
,,	8 28 46.5	20 19.5	70 15 40	$\underline{\odot}$	P	...	2 36 12.3	69 20 45	81 32 15	81 31 31.5	81 33 16.1	At the Esquimaux tents, Igloolik.
24	9 23 55.5	20 23.2	62 02 28	$\underline{\odot}$	Re	...	3 31 09	69 20 45	81 33 58.5	81 33 58.5		
,,	9 27 44.3	20 23	61 57 10	$\overline{\odot}$	R	...	3 35 07.3	69 20 45	81 31 40.5	81 31 40.5		
,,	24 16 03	20 24.4	20 25 08	L	Re	3 57	18 24 15	69 23 00	81 18 49.5	81 18 45		
,,	24 51 56.6	20 24.5	23 31 12	L	N	3 42	18 59 48	69 24 30	81 23 57	81 23 51		
25	8 59 19.8	20 25.3	65 17 27	$\underline{\odot}$	P	...	3 06 43.7	69 20 45	81 30 36	81 30 30		
,,	9 02 06	20 25.3	65 57 16	$\overline{\odot}$	P	...	3 09 24.7	69 20 45	81 31 54	81 31 48		
,,	9 05 15.5	20 25	65 29 06	$\overline{\odot}$	B	...	3 12 28.6	69 20 45	81 33 19.5	81 33 13.5		
,,	9 06 46	20 25	64 12 03	$\underline{\odot}$	B	...	3 14 04.4	69 20 45	81 32 00	81 31 54		
,,	9 09 41	20 25.3	63 47 14	$\underline{\odot}$	H	...	3 17 00.9	69 20 45	81 31 33	81 31 27	81 31 31.5	At the Esquimaux tents, Igloolik.
,,	9 12 08	20 25.3	64 28 02	$\underline{\odot}$	H	...	3 19 30	69 20 45	81 31 01.5	81 30 55.5		
,,	9 17 26.3	20 25	63 40 05	$\overline{\odot}$	C	...	3 24 42	69 20 45	81 31 40.5	81 31 34.5		
,,	9 19 52.2	20 25	62 14 47	$\underline{\odot}$	C	...	3 27 10.2	69 20 45	81 30 55.5	81 30 49.5		
26	24 47 31.3	20 28.4	46 07 29	$\overline{\odot}$	R	...	18 57 03.8	69 32 40	80 57 30	80 57 10.5		
,,	26 51 03	20 28.5	65 27 33	$\underline{\odot}$	Re	...	21 01 13	69 32 40	80 48 03.5	80 47 54		
,,	27 08 36.2	20 28.5	68 14 17	$\overline{\odot}$	P	...	21 18 12	69 32 28	80 56 39	80 56 30	80 55 45.5	Tern Island, EbN.; 1 mile.
,,	27 18 16.6	20 28.3	69 26 32	$\overline{\odot}$	H	...	21 27 46.9	69 32 40	80 58 06	80 57 46.5		
,,	27 30 12.1	20 28.5	70 21 42	$\underline{\odot}$	B	...	21 39 47.1	69 32 28	80 56 51	80 56 33		
,,	27 34 46.6	20 28.6	71 23 10	$\overline{\odot}$	R	...	21 44 1[illegible]	69 32 40	80 58 58.5	80 58 39		

27	24 31 12.9	20 30.1	42 43 06	☉̲	B	...	18 42 [illegible]	69 28 24	80 25 28.5	80 25 06		
"	26 40 59.3	20 30.2	44 24 02	☉̲	Re	...	18 52 28	69 27 47	80 28 09	80 27 46.5	80 26 23.7	Middle of the Calthorpe Islands, EbN., 1 mile and a quarter.
"	27 31 37.7	20 30.4	70 55 48.4	☉̄	P	...	21 43 10.1	69 28 27	80 26 57	80 26 18.5		
29	10 52 12.3	20 33	22 12 16	L	Re	3 00	5 04 35	69 21 47	80 14 22.5	80 13 51		
"	11 08 36	20 33	20 45 49	L	N	3 50	5 21 10.5	69 21 00	80 11 27	80 10 55.5		
"	25 02 00.6	20 34	23 56 20	L	P	2 00	19 17 11.1	69 20 00	79 32 27	79 31 52.5	79 31 52.5	
Aug. 1	27 01 31	20 40.1	32 08 02	L	Re	3 00	21 10 08	69 28 38	81 11 40.5	81 10 51	81 10 51	
2	25 12 08.4	20 42	46 38 11	☉̲	Re	...	19 21 29	69 33 34	81 01 18	81 00 25.5	81 00 35.2	Tern Island, ESE., 2 miles and a half.
"	25 18 34.9	20 42.1	47 42 20	☉̲	N	...	19 27 54	69 33 40	81 01 39	81 00 45		
3	11 05 37	20 42.7	40 35 27	☉̄	R	...	5 15 26.2	69 34 20	80 54 27	80 53 34.5	80 53 34.5	
4	25 41 12.7	20 46	50 15 23	☉̄	P	...	19 49 05.9	69 32 00	81 24 42	81 24 00		
"	25 50 31.4	20 46	52 48 26	☉̲	R	...	19 58 18.8	69 32 00	81 26 10.5	81 25 28.5		
5	25 51 48.6	20 48	51 29 31	☉̲	B	...	19 59 52	69 32 00	81 23 12	81 22 30		
"	25 55 26.5	20 47.9	52 03 38	☉̲	C	...	20 03 30.3	69 32 01	81 23 22.5	81 22 37.5	81 23 06.2	North end of the Island of Neerlonakto, N. 87° W., 6 or 7 miles.
"	26 31 07.4	20 47.5	57 31 50	☉̲	F	...	20 39 03.1	69 32 05	81 25 19.5	81 24 34.5		
6	11 50 52.5	20 48.7	30 55 16	☉̲	Re	...	5 59 10	69 32 20	81 20 12	81 19 27		
10	26 28 05.1	20 57.3	27 13 32	L	Re	3 57	20 35 49	69 33 44	81 36 00	81 35 24		
11	8 58 37.4	20 58.3	56 44 31	☉̲	F	...	3 06 15	69 32 33	81 37 36	81 37 00		
"	9 01 47.4	20 58.3	57 21 34	☉̄	F	...	3 09 22.6	69 32 33	81 38 12	81 37 36		
"	10 53 14.5	20 58.5	38 25 40	☉̲	R	...	5 00 53.2	69 32 24	81 37 16.5	81 36 40.5		
13	8 25 49.6	21 02.1	59 53 25	☉̲	Re	...	2 33 27	69 32 15	81 41 07.5	81 40 37.5	81 37 24.5	North end of the Island of Neerlonakto, N. 88° W., 1 mile and a half.
"	9 28 24.6	21 02.2	51 11 59.5	☉̲	P	...	3 36 23.4	69 32 24	81 36 07.5	81 35 37.5		
"	9 32 01	21 02.3	50 39 40	☉̲	B	...	3 39 54.4	69 32 24	81 39 27	81 39 07		
"	9 36 08.2	21 02.2	50 33 24		R	...	3 44 00.2	69 32 24	81 37 43.5	81 37 13.5		
17	10 36 07	21 10.2	37 19 20	☉̲	Re	...	4 47 14	69 30 52	81 28 40.5	81 28 16.5		
20	10 17 17.5	21 16.1	38 54 29	☉̲	F	...	4 26 56.7	69 32 00	81 29 00	81 28 22.5	81 30 44.2	Ditto, WbN. half N., 4 miles.
"	10 23 09	21 16.1	37 59 38	☉̲	Re	...	4 32 31	69 31 26	81 33 28.5	81 33 06		
23	25 59 10.2	21 23.2	42 40 00	☉̄	P	...	20 07 59.3	69 36 05	81 53 16.5	81 53 13.5		
"	26 04 43.9	21 23.2	44 03 37	☉̄	H	...	20 13 30.4	69 36 05	81 54 03	81 54 00		
"	26 06 40.7	21 23.2	43 18 27	☉̲	H	...	20 15 28.8	69 36 05	81 53 39	81 53 36	81 54 47.2	Bouverie Islands, from N. 23° W., to S. 86° W., distant from 1 to 3 and a half miles.
"	26 47 30.5	21 23.2	49 11 08	☉̲	B	...	20 56 08.8	69 36 05	81 56 07.5	81 56 04.5		
"	26 53 04.6	21 23.2	49 55 28	☉̲	B	...	21 01 46.2	69 36 05	81 55 19.5	81 55 16.5		

OBSERVATIONS FOR DETERMINING THE LONGITUDE BY CHRONOMETERS, *continued.*

1822	Time by 228.	228's Correction to Mean Greenwich Time.	Observed Altitude of Limb.		Observer.	Dip of Horizon.	Apparent Time.	Latitude.	Longitude. By 228.	Longitude. By Mean of the Chronometers.	Mean Longitude by different Observers.	REMARKS.
	H. M. S.	M. S.	° ′ ″			′ ″	H. M. S.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	
Aug. 23	26 50 15.3	21 23	49 32 16	☉̲	C	3 57	20 58 50	69 36 05	81 57 00	81 56 57		
„	26 55 57.5	21 23.2	50 19 23	☉̲	Re	...	21 04 49	69 36 13	81 52 45	81 52 42		
24	9 58 55.2	21 23.8	39 29 00	☉̲	N	...	4 07 37	69 36 05	81 56 16.5	81 56 15	81 54 47.2	Bonverie Islands, from N. 23° W. to S. 86 W. dist. from one to three and half miles.
„	10 03 40.6	21 23.8	38 43 05	☉̲	Re	...	4 12 26	69 36 13	81 55 25.5	81 55 24		
„	10 23 45.5	21 23.8	35 56 08	☉̅	R	...	4 32 35	69 36 05	81 54 25.5	81 54 24		
26	11 38 46	21 27.9	22 05 29	☉̲	R	...	5 42 40.7	69 44 35	83 15 28.5	83 15 39		
„	11 46 45	21 27.9	20 42 50	☉̲	B	...	5 50 40	69 44 30	83 15 24	83 15 34.5		
„	12 01 03.5	21 27.9	18 16 07	☉̲	C	...	6 04 56	69 44 35	83 16 04.5	83 16 13.5	83 15 35.1	West end of Liddon Island, N.W., distance 3 miles.
„	12 03 22	21 27.9	17 51 45	☉̲	B	...	6 07 16.8	69 44 30	83 15 27	83 15 37.5		
„	12 04 02	21 27.9	17 44 20	☉̲	B	...	6 08 00	69 44 30	83 14 40.5	83 14 51		
„	27 39 50.4	21 29	52 48 56	☉̲	F	...	21 44 11.3	69 42 25	81 11 27	83 11 42		
„	27 42 20.9	21 29	54 08 30	☉̅	F	...	21 46 44	69 42 25	83 10 54	83 11 09	83 12 06.7	On shore on the South Coast of the Strait of the Fury and Hecla.
„	27 48 27	21 29.1	53 42 30	☉̲	Re	...	21 52 40	69 42 24	83 13 24	83 13 29		
30	10 49 04.3	21 35.6	28 53 20	☉̅	R	...	4 53 42.2	69 45 15	83 20 01.5	83 20 40.5		
31	24 39 05.2	21 38.7	24 04 40	☉̅	R	...	18 44 09.5	69 45 15	83 19 58.5	83 20 48		
„	26 36 33.6	21 38.7	41 34 58	☉̲	P	...	20 41 34.3	69 45 15	83 21 10.5	83 22 01.5		
„	26 40 11.3	21 38.8	42 05 05	☉̲	H	...	20 45 12.2	69 45 15	83 21 07.5	83 21 58.5		
Sept. 3	9 02 07.3	21 43.2	41 26 37	☉̲	Re	...	3 07 54	69 44 51	83 17 46.5	83 18 51		
6	10 01 42	21 49.4	30 26 25	☉̲	H	...	4 08 19.2	69 45 15	83 20 10.5	83 21 25.5	83 21 37.8	West end of Liddon Island, N. half E., 2 miles.
„	10 04 14.4	21 49.4	31 06 10	☉̅	H	...	4 10 50	69 45 15	83 20 34.5	83 21 49.5		
„	26 59 20.6	21 50.7	40 33 52	☉̲	Re	...	21 05 48	69 45 22	83 25 48	83 27 06		
„	27 27 48.1	21 50.7	43 55 07	☉̲	H	...	21 34 37.9	69 45 15	83 20 19.5	83 21 37.5		
„	27 29 50.9	21 50.7	45 12 59	☉̅	H	...	21 36 41 3	69 45 15	83 20 10.5	83 21 28.5		
„	27 34 29.7	21 50.7	45 11 14	☉̅	B	...	21 41 25.5	69 45 15	83 18 51	83 20 09		
8	10 21 29.2	21 53.2	26 19 35	☉̅	R	...	4 23 10.6	69 48 20	83 28 19.5	83 29 40.5		
„	26 43 54.6	21 54.5	37 06 02	☉̲	F	...	20 50 54	69 48 10	83 27 01.5	83 28 25.5	83 29 27.1	Lying between Liddon and Amherst Islands.
„	26 46 42.3	21 54.5	37 25 22	☉̲	P	...	20 53 23.4	69 48 10	83 26 21	83 27 45		
„	26 48 38.7	21 54.5	37 43 30	☉̲	H	...	20 55 40	69 48 10	83 29 00	83 30 24		
„	27 07 13.7	21 54.6	40 02 25	☉̲	C	...	21 14 08.6	69 48 12	83 28 07.5	83 29 31	83 29 27.1	Lying between Liddon and Amherst Islands.
9	10 30 15.2	21 55.2	23 38 12	☉̲	N	...	4 37 10	69 48 02	83 29 33	83 30 57		
„	26 42 56.3	21 58.5	31 01 39	☉̅	Re	...	20 44 51	69 59 50	84 52 24	84 53 48	84 53 48	On shore, North side of the Strait of the Fury and Hecla.
24	26 48 56.4	22 26	28 03 37	☉̲	F	...	21 08 26.7	69 20 11	81 34 40.5	81 34 40.5		

,,	26 48 38.7	21 54.5	37 43 30	☉̲	H	...	20 55 40	69 48 10	83 29 00	83 30 24	83 29 27.1	Lying between Liddon and Amherst Islands.
,,	27 07 13.7	21 54.6	40 02 25	☉̲	C	...	21 14 08.6	69 48 12	83 28 07.5	83 29 31		
9	10 30 15.2	21 55.2	23 38 12	☉̲	N	...	4 37 10	69 48 02	83 29 33	83 30 57		
,,	26 42 56.3	21 58.5	31 01 39	☉̄	Re	...	20 44 51	69 59 50	84 52 24	84 53 48	84 53 48	On shore, North side of the Strait of the Fury and Hecla.
24	26 48 56.4	22 26	28 03 37	☉̲	F	...	21 08 26.7	69 20 11	81 34 40.5	81 34 40.5	81 34 44.7	On the Beach, at the South side of Igloolik.
,,	26 51 09.6	22 26	29 24 12	☉̄	F	...	21 10 45.7	69 20 11	81 34 13.5	81 34 13.5		
,,	26 55 17	22 26	29 53 40	☉̄	H	...	21 14 44.4	69 20 11	81 35 27	81 35 27		
,,	26 57 46.6	22 26	29 08 21	☉̲	H	...	21 17 18.5	69 20 11	81 34 21	81 34 21		
,,	27 01 49.1	22 25.8	30 08 26	☉̄	R	...	21 21 18.2	69 20 11	81 35 01.5	81 35 01.5		

Mem.—In laying down the land in the strait of the Fury and Hecla the angles obtained from the various stations have been in some instances preferred to single Observations for Latitude and Longitude.

TABLE III.

OBSERVATIONS for ascertaining the Error of No. 259 on Mean Time, and thence the apparent Time, used in the Lunar Observations at Winter Island, 1821-22.

DAY.	Time by 259	Observed Altitude.	Object observed.	Observer.	Barometer.	Thermometer.	Mean Time.	259 Fast of Mean Time.	REMARKS.
1821	H. M. S.	° ′ ″				°	H. M. S.	H. M. S.	
October 11	8 01 22.2	22 27 52	$\underline{\odot}$	H	29 68	+11	2 28 13		
„ „	8 06 57.6	23 10 42	$\overline{\odot}$	H	„	„	2 30 57	5 36 02.97	
„ „	8 13 03.7	21 50 35	$\overline{\underline{\odot}}$	P	„	„	2 37 01.9		
„ „	8 19 36.3	20 55 10	$\overline{\underline{\odot}}$	R	„	„	2 43 31		
„ 14	8 08 48.87	18 55 17	$\underline{\odot}$	P	29 70	+6	2 32 26.02	5 36 22.35	
„ „	8 16 14.66	18 57 58	$\overline{\odot}$	R	„	„	2 39 52.8		
„ 20	7 02 58.2	22 25 36	$\overline{\underline{\odot}}$	P	29 60	Zero	1 26 08.2	5 36 51.3	
„ „	7 13 01.5	21 31 34	$\overline{\underline{\odot}}$	H	„	„	1 36 05.9		
November 4	16 01 34.1	108 57 28	*Capella	P	30 11	„	10 23 51.8	5 37 41.3	* East of Meridian.
„ „	16 33 30.7	115 19 09	„	H	„	„	10 55 50.4		Ditto.
December 1	12 17 26	85 07 26	„	P	29 81	−20	6 37 57		Ditto.
„ „	12 21 28.5	82 54 37	α Lyra	R	„	„	6 42 00.3	5 39 29.33	* West of Meridian.
„ „	12 36 05.4	88 43 14	Capella	H	„	„	6 56 34.6		* East of Meridian.
„ 20	15 11 42.6	70 38 15	α Cygni	R	29 88	−19	9 30 17	5 41 25.6	* West of Meridian.
„ 30	14 57 12.4	79 03 54	Pollux	R	30 00	−30	9 15 07.5	5 42 03.33	* East of Meridian.
„ „	14 58 58.3	79 24 31	„	P	„	„	9 16 55.2		Ditto.
1822 January 6	15 12 22	86 44 50	„	P	29 82	−26	9 29 44.9	5 42 37.1	Ditto.
„ 13	23 39 00	81 08 25	α Lyræ	R	29 80	−32	17 55 35.6	5 43 24.75	Ditto.
„ „	23 39 31.85	81 15 35	„	P	„	„	17 56 06.75		Ditto.
February 4	14 59 01.5	49 40 55	Regulus	P	„	−35	9 13 32.27	5 45 29.94	Ditto.
„ „	14 59 03.7	49 41 22		R	„	„	9 13 33.05		Ditto.
„ 25	15 10 24.88	32 12 17	Arcturus	P	30 00	−30	9 22 49.2	5 47 33.55	Ditto.
„ „	15 20 00.52	34 06 31	„	R	„	„	9 32 26.7		Ditto.
„ 28	15 05 29.6	33 30 10	„	P	29 63	−34	9 17 37.9	5 47 52.6	Ditto.
„ „	15 16 07.2	35 36 02	„	R	„	„	9 28 13.7		Ditto
March 26	8 33 45.65	40 45 43	$\overline{\underline{\odot}}$	P	30 33	−2	2 43 19.1	5 50 25.18	
„ „	8 38 15.42	40 08 14	$\overline{\underline{\odot}}$	R	„	„	2 47 51.6		
April 1	8 31 18.62	45 23 56.1	$\overline{\underline{\odot}}$	P	29 07	−5	2 40 10.9		
„ „	8 36 12.12	44 43 13.5	$\overline{\underline{\odot}}$	R	„	„	2 45 01.2	5 51 06.75	
„ „	8 43 09.1	43 44 16.5	$\overline{\underline{\odot}}$	H	„	„	2 52 04.5		

N°. III.

TABLE I.

LUNAR OBSERVATIONS,

FOR DETERMINING THE ERRORS OF THE CHRONOMETERS,

ON MEAN GREENWICH TIME,

MADE DURING THE SUMMER OF 1821.

LUNAR OBSERVATIONS FOR DETERMINING THE ERRORS OF THE CHRONOMETERS ON MEAN GREENWICH TIME, made during the Summer of 1821.

DATE. 1821.	Time by 259	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre.	Apparent Altitudes. Sun's centre	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	259 On Mean Greenwich Time.	PHENOMENA.
	H. M. S.	° ′ ″	° ′ ″	° ′ ″				°	° ′ ″	H. M. S.	M. S.	
June 20	20 54 09.4	109 36 49	20 01 19	11 41 26	R	10	30 03	+35	109 51 42.6	20 53 15	S. 0 19.4	⊙ East of ☾
„	21 01 43.5	109 33 47.5	20 0[illegible] 57	12 28 56	R	10	„	„	109 47 41.8	21 00 45	0 15.4	„
„	21 10 24	109 30 15.5	20 03 45	13 25 55	R	10	„	„	109 43 06.4	21 09 17.4	0 07.4	„
„	21 17 37.4	109 26 53.5	20 02 23	14 13 20	R	10	„	„	109 38 55.2	21 17 04 5	0 41.1	„
„	21 23 36.9	109 24 16.5	20 00 16	14 52 40	R	10	„	„	109 35 34.8	21 23 17	0 54.2	„
„	21 30 50.5	109 21 32	19 55 47	15 40 02	R	8	„	„	109 32 01.5	21 29 54.5	0 18.1	„
„	21 47 17	109 14 37.6	19 40 07	17 32 19	R	10	„	„	109 23 16.7	21 46 16	0 07.3	„
„	21 53 56.4	109 11 52.5	19 31 38	18 17 53	R	10	„	„	109 19 46.8	21 52 40	F. 0 02.1	„
„	22 02 45.3	109 08 12	19 18 13	19 18 44	R	10	„	„	109 15 10.66	22 01 14	0 16.9	„
„	22 10 37.4	109 04 32	19 03 35	20 13 10	R	10	„	„	109 10 42.8	22 09 33	S. 0 10.1	„
„	22 19 24.2	109 00 50.8	18 45 22	21 14 50	R	12	„	„	109 06 07.6	22 18 03	F. 0 06.6	„
„	23 25 57.7	108 31 04	15 23 10	29 11 53	P	9	„	„	108 30 14.4	23 24 46.8	S. 0 04.2	„
„	23 30 09	108 29 16	15 05 14	29 40 46	P	10	„	„	108 28 11.2	23 28 35.8	F. 0 08.1	„
„	23 35 46.6	108 26 37	14 42 42	30 22 10	P	10	„	„	108 25 06.4	23 34 20	0 11.5	„
„	23 39 51	108 24 40	14 26 08	30 51 27	P	9	„	„	108 22 45.6	23 38 41.5	S. 0 05.6	„
„	23 43 37.5	108 22 43	14 09 29	31 18 04	P	10	„	„	108 20 38.4	23 42 38.2	F. 0 15.8	„
„	23 48 07.9	108 20 55	13 48 51	31 50 24	P	10	„	„	108 18 32	23 46 33	0 19.7	„
„	23 52 25.3	108 18 49	13 29 43	32 21 34	P	11	„	„	108 16 08.8	23 50 58.2	0 11.9	„
„	23 59 41.4	108 15 24	12 57 54	33 14 18	H	7	„	„	108 12 12	23 58 17.7	0 09.2	„
„	24 09 41.9	108 10 43	12 09 34	34 25 10	H	10	„	„	108 06 58	24 08 01.1	0 25.2	„
„	24 16 40.1	108 06 46	11 34 23	35 13 30	H	10	„	„	108 02 40	24 16 00.3	S. 0 35.9	„
21	23 35 21.7	95 23 29.3	24 03 06	30 19 59	H	10	30 14	+34	95 25 10	23 34 36.5	0 43.1	„
„	23 47 03.1	95 18 09.7	23 24 33	31 40 30	R	10	„	„	95 18 46.4	23 46 20.6	0 45.8	„
„	23 54 14.2	95 14 33.4	22 57 58	31 53 04	H	5	„	„	95 15 03	23 53 10.5	0 24.7	„
„	24 08 43.3	95 08 49	22 02 32	34 25 21	P	10	„	„	95 07 20	24 07 20.5	0 05.8	„
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	R	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
July 5	8 39 34	73 21 43	27 09 35	32 19 56	P	10	29 69	+35	73 30 50.4	8 35 05	F. 0 19.3	⊙ West of ☾
„	8 42 50.3	73 22 59.8	27 11 12	31 54 59	P	10	„	„	73 32 28.4	8 38 38.4	0 02.3	„
„	8 47 48	73 25 13	27 15 11	31 20 56	H	10	„	„	73 35 11	8 44 28.5	S. 0 50.1	„
„	8 49 57	73 25 02.1	27 18 04	31 04 16	F	11	„	„	73 35 11.4	8 44 33	F. 1 13.7	„
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	H	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

July 5	8 39 34	73 21 43	27 09 35	32 19 56	P	10	29 60	+35	73 30 50.4	8 35 05	F. 0 19.3	☉ West ☾
,,	8 42 50.3	73 22 59.8	27 11 12	31 54 59	P	10	,,	,,	73 32 28.4	8 38 38.4	0 02.3	,,
,,	8 47 48	73 25 13	27 15 11	31 20 56	H	10	,,	,,	73 35 11	8 44 28.5	S. 0 50.1	,,
,,	8 49 57	73 25 02.1	27 18 04	31 04 16	F	11	,,	,,	73 35 11.4	8 44 33	F. 1 13.7	,,
,,	8 56 45.7	73 27 50	27 20 05	30 18 29	H	10	,,	,,	73 38 41	8 52 11.7	0 24.3	,,
,,	9 02 59.5	73 30 14	27 21 38	29 32 46	P	12	,,	,,	73 41 44	8 58 50.2	S. 0 00.6	,,
,,	9 06 33.1	73 31 39	27 21 54	29 06 29	P	10	,,	,,	73 43 41.4	9 02 44.3	0 21.1	,,
,,	9 10 48	73 33 26	27 21 05	28 35 47	H	10	,,	,,	73 45 05	9 06 08.5	F. 0 29.8	,,
,,	9 15 33.5	73 34 46	27 18 24	28 01 15	H	10	,,	,,	73 47 32	9 11 29	S. 0 05.3	,,
,,	9 20 38.2	73 36 37	27 16 04	27 24 05	P	11	,,	,,	73 49 55.2	9 16 41.1	0 12.9	,,
,,	9 25 22.8	73 38 12	27 13 47	26 50 52	P	5	,,	,,	73 51 58.4	9 21 09.3	S. 0 03.5	,,
8	9 13 31.9	106 23 00	8 01 38	28 08 52	P	10	29 90	+33	106 28 42	9 09 05.2	S. 0 12.4	,,
,,	9 23 09	106 27 02	8 29 59	26 58 31	H	10	,,	,,	106 33 21	9 19 18.4	0 48.7	,,
,,	9 30 00.6	106 29 37	8 48 15	26 06 14	P	10	,,	,,	106 36 27	9 26 07.3	0 45.8	,,
,,	9 30 04.8	106 29 30	8 48 32	26 16 01	R	10	,,	,,	106 36 13.3	9 25 37.5	0 12	,,
,,	9 32 14	106 29 42	8 58 28	25 52 30	F	11	,,	,,	106 36 26.9	9 26 07.1	F. 1 28.2	,,
,,	9 33 49.8	106 30 40	8 57 49	25 41 38	P	10	,,	,,	106 37 42.6	9 28 53.5	0 17.1	,,
,,	9 34 42.1	106 31 22.5	9 00 16	25 36 02	R	10	,,	,,	106 38 31.8	9 30 41.75	S. 0 38.9	,,
,,	9 39 05	106 32 33	9 11 24	25 04 19	H	10	,,	,,	106 40 00	9 33 55.5	F. 0 30.1	,,
,,	9 40 19.6	106 33 49	9 14 33	24 55 37	R	10	,,	,,	106 41 16.2	9 35 43	S. 1 02.7	,,
,,	9 45 31.4	106 35 34.5	9 27 00	24 17 26	R	10	,,	,,	106 43 33	9 41 44	0 52	,,
,,	9 48 32.3	106 36 32	9 34 00	23 54 46	H	10	,,	,,	106 44 43	9 44 17.5	0 25	,,
,,	9 50 32.2	106 37 17.5	9 38 42	23 40 14	R	10	,,	,,	106 45 41.4	9 46 25.5	0 32.7	,,
,,	9 52 29.6	106 37 49	9 42 09	23 25 44	P	10	,,	,,	106 46 01	9 47 31.1	F. 0 19.2	,,
,,	9 54 51.3	106 38 57	9 46 47	23 0[illegible] 54	R	10	,,	,,	106 47 41.5	9 50 49.5	S. 0 37.7	,,
,,	9 55 38.7	106 39 11	9 48 35	23 02 55	P	10	,,	,,	106 47 50	9 51 08.8	0 09.5	,,
,,	9 56 34	106 39 00	9 49 24	22 57 19	F	11	,,	,,	106 47 42	9 50 47.	F. 1 07.3	,,
,,	9 59 40	106 40 37.5	9 56 47	23 34 39	R	10	,,	,,	106 49 45.2	9 55 21	S. 0 20.5	,,
,,	10 01 01	106 41 16	9 58 52	22 25 10	H	10	,,	,,	106 50 27.5	9 56 54.6	0 33.1	,,
,,	10 04 21.5	106 42 15.5	10 05 18	22 01 32	R	10	,,	,,	106 51 42	9 59 38	F. 0 04	,,
,,	10 05 37.5	106 42 59	10 07 42	21 54 00	H	10	,,	,,	106 52 34	10 01 32.5	S. 0 34.6	,,

LUNAR OBSERVATIONS FOR DETERMINING THE ERRORS OF THE CHRONOMETERS ON MEAN GREENWICH TIME, made during the Summer of 1821.

DATE.	Time by 259	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre.	Apparent Altitudes. Sun's centre.	Obser-ver.	No. of Obser-vations	Barometer.	Thermome-ter.	True distance.	Apparent Greenwich Time.	259 On Mean Greenwich Time.	PHENOMENA.
	H. M. S.	° ′ ″	° ′ ″	° ′ ″					° ′ ′	H. M. S.	M. S.	
July 8	10 09 12.5	106 44 10	10 13 20	21 25 12	P	10	29 90	+33	106 54 07	10 04 57.5	S. 0 24.5	☉ West of ☾
„	10 09 28.1	106 43 49.5	10 13 37	21 24 06	R	10	„	„	106 53 49	10 04 18	F. 0 30.5	„
„	10 15 13.6	106 45 48	10 23 18	20 43 29	P	10	„	„	106 56 27	10 10 04.8	S. 0 29.3	„
„	10 15 35.9	106 46 40.5	10 24 02	20 41 05	R	10	„	„	106 57 13	10 11 40.5	0 44.2	„
„	10 19 54.2	106 47 48	10 30 41	20 10 27	H	10	„	„	106 58 39.5	10 14 55.8	F. 0 18.7	„
„	10 20 06.6	106 48 18	10 31 09	20 07 03	R	10	„	„	106 59 16	10 16 16	S. 0 49.1	„
„	10 24 25	106 48 52	10 37 13	19 38 19	H	10	„	„	107 00 09.5	10 18 13.5	F. 1 31.7	„
„	10 24 30.1	106 49 59	10 37 33	19 37 48	R	10	„	„	107 01 19	10 20 46	S. 0 55.6	„
„	10 28 46.4	106 51 06	10 42 20	19 08 04	P	11	„	„	107 02 48.4	10 24 02.8	F. 0 04.1	„
„	10 29 37.9	106 51 37	10 44 52	18 47 41	R	10	„	„	107 03 36.9	10 25 49	S. 0 50.9	„
„	10 32 22.9	106 52 28	10 46 06	18 43 20	P	10	„	„	107 04 28.6	10 27 42.8	F. 0 00.4	„
„	10 34 21	106 53 18.5	10 48 25	18 30 16	R	10	„	„	107 05 31	10 30 00	S. 0 18.8	„
„	10 36 41.5	106 53 35	10 49 48	18 13 10	H	10	„	„	107 06 02	10 31 08.2	F. 0 53.5	„
„	10 38 54.9	106 55 00	10 53 52	17 44 07	R	10	„	„	107 07 52.7	10 35 11	S. 0 55.9	„
„	10 41 24.2	106 55 02	10 54 13	17 40 44	H	10	„	„	107 07 57	10 35 21	F. 1 23.2	„
„	10 43 08.6	106 56 43	10 56 47	17 29 18	R	10	„	„	107 09 46.5	10 39 21	S. 0 52.2	„
„	11 09 41.3	107 05 51.7	11 05 01	14 27 15	P	10	„	„	107 21 35.6	11 05 20.3	0 18.7	„
„	11 13 06.3	107 07 05	11 05 01	14 04 51	P	10	„	„	107 23 10.2	11 08 48	0 21.6	„
„	11 17 58	107 08 21	11 03 41	13 32 09	H	10	„	„	107 24 51.5	11 12 30.4	F. 0 47.6	„
„	11 22 43.7	107 10 04	11 00 40	12 58 53	H	10	„	„	107 27 08	11 17 29.8	0 33.8	„
„	11 28 51.1	107 12 24	10 57 28	12 17 10	R	10	„	„	107 30 11.6	11 24 14.5	S. 0 03.5	„
„	11 34 35.6	107 14 24	10 53 59	11 40 05	P	11	„	„	107 32 52	11 30 05.7	0 11.1	„
„	11 38 31.3	107 15 54	10 50 23	11 15 19	P	10	„	„	107 34 41.4	11 34 06.2	0 15	„
„	11 43 44.6	107 17 37	10 44 46	10 42 10	H	10	„	„	107 36 58	11 39 05.4	0 01	„
„	11 45 54	107 18 37.5	10 42 14	10 29 36	R	10	„	„	107 38 13	11 41 50	0 36.3	„
„	[illegible]	107 18 56	10 39 18	10 09 50	H	10	„	„	107 38 51	[illegible]	F. 0 58.4	„
„	[illegible]	[illegible]	[illegible]	[illegible]	R	10	„	„	107 40 11.7	[illegible]	S. 0 47.4	„
„	11 52 48.5	107 20 45	10 34 39	9 44 50	P	10	„	„	107 41 19	11 48 40	0 31.7	„
„	11 53 17.5	107 21 08	10 34 00	9 42 05	R	5	„	„	107 41 28.5	11 48 59.5	0 22.4	„
„	11 57 01	107 22 10	10 28 11	9 18 02	H	10	„	„	107 42 58	11 52 16.2	F. 0 04.6	„
„	11 58 15.2	107 23 06.1	10 26 24	9 09 47	R	10	„	„	107 43 35	11 53 36.5	S. 0 01.7	„
	12 02 13.4	107 24 10.5	10 21 28	8 44 13	R	10			[illegible]	[illegible]	[illegible]	

"	11 50 03.4	107 20 15	10 38 42	10 02 15	R	10	"	"	107 40 11.7	11 46 10.5	S. 0 47.4	"
"	11 52 48.5	107 20 45	10 34 39	9 44 50	P	10	"	"	107 41 19	11 48 40	0 31.7	"
"	11 53 17.5	107 21 08	10 34 00	9 42 05	R	5	"	"	107 41 28.5	11 48 59.5	0 22.4	"
"	11 57 01	107 22 10	10 28 11	9 18 02	H	10	"	"	107 42 58	11 52 16.2	F. 0 04.6	"
"	11 58 15.2	107 23 06.1	10 26 24	9 09 47	R	10	"	"	107 43 35	11 53 36.5	S. 0 01.7	"
"	12 02 13.4	107 24 10.5	10 21 38	8 44 12	R	10	"	"	107 45 35.1	11 58 01.5	0 28.6	"
20	1 12 50	110 25 57.6	15 57 35	36 28 58	P	10	29 94	39	110 17 22	1 05 26.2	F. 1 28.5	⊙ East of ☾
"	1 16 41.4	110 23 51	15 34 28	36 52 46	P	10	"	"	110 15 03	1 09 38.3	1 07.8	"
"	1 22 25	110 20 58.5	14 58 55	37 28 33	R	10	"	"	110 11 58	1 15 14	1 15.7	"
"	1 23 33.6	110 20 12	14 51 50	37 35 45	H	10	"	"	110 11 13.4	1 16 34.7	1 03.6	"
"	1 23 52.4	110 19 26.3	14 53 10	37 37 29	F	11	"	"	110 10 15.4	1 18 19.9	S. 0 23.0	"
"	1 30 40.2	110 16 59	14 06 27	38 18 40	H	10	"	"	110 07 48	1 22 47	F. 1 57.9	"
"	1 36 19.6	110 14 01	13 29 28	38 56 35	P	10	"	"	110 04 40	1 28 27.5	1 56.7	"
"	1 39 59.6	110 11 35.5	13 05 56	39 20 50	R	10	"	"	110 02 07.8	1 33 02.5	1 01.8	"
"	1 42 51.4	110 9 46.3	12 44 37	39 28 47	F	11	"	"	110 00 15.9	1 36 26	0 30.1	"
"	1 45 20.8	110 08 22	12 31 40	39 50 20	R	10	"	"	109 58 51.5	1 38 59	0 26.5	"
"	1 48 24.6	110 06 33	12 05 37	40 12 44	P	10	"	"	109 57 03	1 42 15.8	0 13.4	"
"	1 51 47.2	110 05 25.2	11 53 56	40 26 6	R	10	"	"	109 55 51	1 44 26.5	1 25.3	"
"	1 53 47.9	110 04 11	11 40 08	40 38 19	P	10	"	"	109 54 39	1 46 37	1 05.4	"
"	1 57 35.1	110 02 09.5	11 18 26	40 58 56	R	10	"	"	109 52 34	1 50 38	1 01.7	"
"	1 57 56	110 02 00.6	11 16 23	41 00 34	P	10	"	"	109 52 27.4	1 50 37.2	1 23.3	"
"	1 59 34	110 01 06.6	11 02 59	41 08 29	F	11	"	"	109 51 14	1 52 48	0 50.7	"
"	2 02 00.6	109 59 33	10 50 13	41 21 36	P	10	"	"	109 50 00.2	1 55 02.2	1 02.9	"
"	2 06 10.2	109 57 23	10 23 36	41 39 54	P	10	"	"	109 47 56	1 58 47.5	1 27.2	"
"	2 06 37.8	109 57 05	10 20 36	41 47 00	R	10	"	"	109 47 32.8	1 59 28.5	1 13.9	"
"	2 10 47.9	109 54 38	9 53 09	42 07 54	P	10	"	"	109 45 13	2 03 42.9	1 09.5	"
"	2 12 05.8	109 54 09.5	10 13 21	42 15 01	R	10	"	"	109 44 22.7	2 05 13.5	0 56.9	"
"	2 14 12.8	109 52 43	9 31 06	42 24 39	P	10	"	"	109 43 22.4	2 07 03.3	1 14	"
"	2 17 30.9	109 50 51.5	9 10 26	42 39 16	R	10	"	"	109 41 35	2 10 18.5	1 17	"
"	23 49 36.6	97 46 06.4	33 47 12	26 54 14	F	11	29 80	37	97 48 21	23 43 34.8	0 03.4	"
"	23 53 45.3	97 45 09	33 30 17	27 19 42	P	10	"	"	97 47 09.4	23 45 45.2	2 01.6	"
"	23 58 25.6	97 42 40	33 10 53	27 53 20	P	10	"	"	97 44 12	23 51 06.8	1 20.4	"

LUNAR OBSERVATIONS FOR DETERMINING THE ERRORS OF THE CHRONOMETERS ON MEAN GREENWICH TIME, made during the Summer of 1821, *continued*.

DATE.	Time by 259.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre.	Apparent Altitudes. Sun's centre.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	259 On Mean Greenwich Time.	PHENOMENA.
	H. M. S.	° ′ ″	° ′ ″	° ′ ″					° ′ ″	H. M. S.	M. S.	
July 21	0 01 36.9	97 40 36.5	32 55 16	28 13 22	R	10	29 80	37	97 41 58.6	23 55 08.7	F. 0 29.8	☉ East of the ☾
,,	0 04 17.5	97 39 36	32 43 12	28 32 21	H	10	,,	,,	97 40 36.8	23 57 37.2	0 41.9	,,
,,	0 04 24	97 39 11.3	32 51 85	28 37 19	F	11	,,	,,	97 40 01	23 58 42	S. 0 16.4	,,
,,	0 09 51.3	97 36 50.5	32 19 47	29 10 56	R	10	,,	,,	97 37 25.4	0 03 26.1	F. 0 26.8	,,
,,	0 12 14.5	97 35 52	32 11 14	29 27 31	H	10	,,	,,	97 36 08.2	0 05 44.5	0 31.6	,,
,,	0 13 44	97 34 46	32 05 49	29 38 01	R	10	,,	,,	97 35 00.3	0 07 49.6	S. 0 04	,,
,,	0 17 49.3	97 33 48	31 49 11	30 07 11	P	10	,,	,,	97 33 29.6	0 10 32.2	F. 1 18.7	,,
,,	0 18 47	97 32 48.5	31 39 19	30 11 30	R	10	,,	,,	97 32 34.4	0 12 14.1	0 34.5	,,
,,	0 21 49.7	97 32 01	31 28 38	30 34 57	P	10	,,	,,	97 31 21.2	0 14 24.7	1 26.6	,,
,,	0 23 09.8	97 30 48.5	31 21 22	30 43 05	R	10	,,	,,	97 30 09	0 16 38	0 33.4	,,
,,	0 27 46.7	97 28 21	30 57 14	31 13 46	H	10	,,	,,	97 27 16	0 21 50	S. 0 01.7	,,
,,	0 33 58.8	97 25 24	30 24 46	31 55 22	H	10	,,	,,	97 23 47.7	0 28 08	0 07.6	,,
,,	0 36 25.9	97 24 39.5	30 13 01	32 12 02	R	10	,,	,,	97 22 54.6	0 29 46.5	F. 0 40.9	,,
,,	1 07 09.7	97 10 28	27 32 18	35 38 22	P	10	,,	,,	97 05 55.8	1 00 33.1	0 38.1	,,
,,	1 10 54	97 08 54	27 10 47	36 02 40	P	10	,,	,,	97 04 16.2	1 03 33.8	1 21.7	,,
,,	1 15 10.8	97 06 35.5	26 43 09	36 27 51	H	10	,,	,,	97 01 45.6	1 08 09	1 03.3	,,
,,	1 20 11.8	97 04 01.8	26 13 53	36 58 49	H	10	,,	,,	96 58 59.9	1 13 22.8	0 50.5	☉ East of the ☾
,,	1 24 01.2	97 01 44.2	25 49 23	37 28 27	P	14	,,	,,	96 56 14	1 18 08.7	S. 0 00.6	,,
24	3 54 21.6	56 04 00.5	41 16 19	46 36 54	F	11	,,	,,	56 11 28.6	3 48 31.1	0 15	,,
,,	4 03 37.4	56 00 18	40 15 44	46 51 16	P	10	,,	,,	56 07 09	3 56 30.5	F. 1 01.2	,,
,,	4 07 53	55 57 54.3	39 54 38	47 00 14	F	11	,,	,,	56 04 24.6	4 01 35	0 12.5	,,
,,	4 08 37.1	55 58 08	39 48 37	47 01 36	P	10	,,	,,	56 04 09.6	4 02 02	0 29.4	,,
,,	4 11 30.5	55 56 48	39 29 05	47 04 51	R	10	,,	,,	56 03 00.7	4 04 11	1 13.8	,,
,,	4 14 31	55 55 29	39 10 12	47 08 11	H	10	,,	,,	56 01 34	4 06 50.5	1 35	,,
,,	4 16 37.5	55 54 18.5	38 57 10	47 10 57	R	10	,,	,,	56 00 12.8	4 09 20	1 11.9	,,
,,	4 19 00.9	55 53 10.5	38 41 52	47 12 49	H	10	,,	,,	55 58 57.9	4 11 39.2	1 16.2	,,
,,	4 21 41.5	55 51 55.5	38 26 10	47 15 17	R	10	,,	,,	55 57 38.8	4 14 07	1 28.9	,,
,,	5 48 17	55 09 22.8	29 02 54	46 02 51	H	10	,,	,,	55 10 57.5	5 40 27.3	1 44	☉ West of the ☾
Aug. 1	7 12 56	42 52 14	26 10 05	39 46 42	R	10	29 60	36	42 58 50	7 05 31	1 27.7	,,
,,	7 13 20.6	42 52 38	26 10 36	39 49 56	P	10	,,	,,	42 59 13	7 06 19.2	1 04.1	,,
,,	7 18 21.2	42 54 52	26 16 09	39 29 59	P	10	,,	,,	43 01 35.4	7 11 24.7	0 59.2	,,

,,	4 21 41.5	55 51 55.5	38 26 10	47 15 17	R	10	,,	,,	55 57 38.8	4 14 07	1 28.0	,,
,,	5 48 17	55 09 22.8	29 02 54	46 09 51	H	10	,,	,,	55 10 57.5	5 40 27.3	1 44	⊙ West of the ☾
Aug. 1	7 12 56	42 52 14	26 10 05	39 46 42	R	10	29 60	36	42 58 50	7 05 31	1 27.7	,,
,,	7 13 20.6	42 52 38	26 10 36	39 49 56	P	10	,,	,,	42 59 13	7 06 19.2	1 04.1	,,
,,	7 18 21.2	42 54 52	26 16 09	39 29 59	P	10	,,	,,	43 01 35.4	7 11 24.7	0 59.2	,,
,,	7 21 02	42 55 05.5	26 19 20	39 14 07	R	10	,,	,,	43 02 34.4	7 13 33	1 32.3	,,
,,	7 26 37	42 57 08	26 22 09	38 54 42	H	10	,,	,,	43 04 51.2	7 18 26.8	2 12.8	,,
,,	7 34 00.8	42 59 42	26 27 32	38 22 48	H	10	,,	,,	43 08 04.6	7 25 22.3	2 41.1	,,
,,	7 39 38	43 02 29	26 30 59	37 54 10	P	10	,,	,,	43 11 25.4	7 32 34.5	1 06.3	,,
,,	7 43 28.8	43 03 53	26 32 59	37 40 09	P	10	,,	,,	43 13 07	7 36 11.6	1 20	,,
,,	7 47 57	43 05 12	26 32 56	37 17 46	H	10	,,	,,	43 14 33.8	7 39 18.5	2 41.2	,,
3	9 35 56.7	65 54 53	13 54 30	27 08 36	R	10	29 90	34	66 06 04	9 28 54	1 14.1	,,
,,	9 39 10	65 56 08.5	13 53 31	26 49 23	R	10	,,	,,	66 07 36	9 32 16.5	1 04.9	,,
,,	9 41 21.2	65 56 49	13 51 45	26 36 12	P	10	,,	,,	66 08 29.4	9 34 13.8	1 15.9	,,
,,	9 43 02	65 57 18.5	13 50 25	26 26 24	H	10	,,	,,	66 09 06.5	9 35 35.6	1 37.7	,,
,,	9 45 18.3	65 58 07.3	13 48 03	26 06 29	H	10	,,	,,	66 10 12	9 37 59.8	1 29.8	,,
,,	9 46 56.8	65 58 55	13 47 26	26 02 24	P	10	,,	,,	66 11 03	9 39 52	1 16.3	,,
,,	9 52 15.9	66 01 09	13 43 56	25 30 20	R	10	,,	,,	66 13 42.5	9 45 43.5	0 43.8	,,
,,	9 53 47.6	66 01 21	13 42 30	25 20 35	P	10	,,	,,	66 14 04.6	9 46 13	1 46.1	,,
,,	9 54 06.8	66 01 11.8	13 44 58	25 17 09	F	11	,,	,,	66 13 55	9 46 11.5	2 06.8	,,
,,	9 55 52.2	66 02 22	13 40 58	25 09 32	R	10	,,	,,	66 15 14.2	9 49 05	0 58.6	,,
,,	9 57 06.8	66 02 35	13 39 46	25 00 38	P	10	,,	,,	66 15 35	9 49 51.3	1 27	,,
,,	10 00 27	66 03 51	13 37 25	24 40 35	H	10	,,	,,	66 17 08.5	9 53 17.2	1 21.2	,,
,,	10 02 11.7	66 04 33	13 34 59	24 29 33	P	11	,,	,,	66 18 60	9 55 10.7	1 12.5	,,
,,	10 03 16.4	66 04 45.1	13 34 01	24 23 07	H	10	,,	,,	66 18 17.4	9 55 49	1 38.8	,,
,,	10 04 47.9	66 05 05.7	13 32 56	24 14 27	F	11	,,	,,	66 18 41	9 56 41	2 18.4	,,
,,	10 06 55	66 06 14	13 29 12	24 00 18	P	10	,,	,,	66 20 05.4	9 59 46.9	1 19.6	,,
,,	10 08 21.1	66 06 49.5	13 27 18	23 51 35	R	10	,,	,,	66 20 46.4	10 01 17	1 15.6	,,
,,	10 10 25.7	66 07 33	13 25 07	23 36 25	P	11	,,	,,	66 21 44	10 03 24	1 13.3	,,
,,	10 11 28.3	66 07 50	13 22 21	23 32 14	R	10	,,	,,	66 22 02.5	10 04 05	1 34.8	,,
,,	10 14 57.6	66 09 12	13 16 29	23 10 08	P	10	,,	,,	66 23 43.4	10 07 47	1 12.2	,,
,,	10 15 28.5	66 09 14	13 19 06	23 06 54	F	11	,,	,,	66 23 46	10 07 53	1 47	,,

LUNAR OBSERVATIONS FOR DETERMINING THE ERRORS OF THE CHRONOMETERS ON MEAN GREENWICH TIME, made during the Summer of 1821, *continued.*

DATE.	Time by 259	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre.	Apparent Altitudes. Sun's centre.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	259 On Mean Greenwich Time.	PHENOMENA.
	H. M. S.	° ′ ″	° ′ ″	° ′ ″					° ′ ″	H. M. S.	M. S.	
Aug. 3	10 15 58	66 09 23.7	13 15 50	23 04 01	H	10	29 90	+34	66 24 00.6	10 08 25	F. 1 44.4	☉ West of the ☾
,,	10 18 25.3	66 10 36	13 11 40	22 48 25	P	10	,,	,,	66 25 24.2	10 11 29	1 07.9	,,
,,	10 19 35.7	66 10 58.3	13 09 57	22 41 09	H	10	,,	,,	66 25 54	10 12 34.9	1 12.2	,,
,,	10 22 42.3	66 12 00	13 04 55	22 21 37	P	10	,,	,,	66 27 12.4	10 15 27.4	1 26.5	,,
,,	10 23 02.4	66 12 16.5	13 04 36	22 19 43	R	10	,,	,,	66 27 28.8	10 16 05	1 09	,,
,,	10 25 45.8	66 13 11	13 00 18	22 02 34	P	11	,,	,,	66 28 38.6	10 18 37.4	1 20	,,
,,	10 26 03.75	66 13 16.5	13 00 02	22 00 52	R	10	,,	,,	66 28 46	10 18 54	1 21.3	,,
,,	10 26 31.5	66 13 57.3	13 00 36	21 58 52	F	11	,,	,,	66 29 25	10 20 20	0 23	,,
,,	10 30 23.9	66 15 03	12 52 38	21 33 50	P	10	,,	,,	66 30 53.6	10 23 34.7	1 00.8	,,
,,	10 30 43	66 15 03.6	12 52 15	21 32 04	H	10	,,	,,	66 30 56	10 23 40	1 14.4	,,
,,	10 32 50.4	66 15 54	12 48 06	21 18 48	P	10	,,	,,	66 31 57.8	10 25 56	1 06.1	,,
,,	10 34 51	66 16 23.4	12 44 27	21 06 30	H	10	,,	,,	66 32 36.9	10 27 22.7	1 39.7	,,
,,	10 36 46.6	66 16 56.3	12 36 10	20 54 31	F	11	,,	,,	66 33 14	10 28 45	2 13.1	,,
,,	10 37 16	66 17 29	12 40 12	20 50 44	P	10	,,	,,	66 34 02	10 30 29.8	0 57.9	,,
,,	10 39 16.8	66 18 25.5	12 35 31	20 38 04	R	10	,,	,,	66 35 01.2	10 32 40.5	0 47.9	,,
,,	10 40 35.1	66 18 47	12 30 35	20 34 36	P	10	,,	,,	66 35 26	10 33 34.8	1 12	,,
,,	10 42 20.4	66 19 25	12 29 22	20 18 18	R	10	,,	,,	66 36 16.6	10 35 27	1 05	,,
,,	10 44 47	66 20 11	12 24 19	20 02 39	P	10	,,	,,	66 37 16.2	10 37 37.3	1 21.4	,,
,,	10 47 46.3	66 21 24	12 18 24	19 43 44	P	10	,,	,,	66 38 45.4	10 40 54	1 04	,,
4	10 39 44	77 11 57	8 38 35	20 29 05	P	10	30 12	38	77 27 19.8	10 32 15	1 45.9	,,
,,	10 42 40 6	77 13 04	8 35 27	20 12 04	P	10	,,	,,	77 28 39.6	10 35 13.3	1 44	,,
,,	10 42 48.6	77 13 02	8 35 26	20 11 22	H	10	,,	,,	77 28 37.6	10 35 09.5	1 55.7	,,
,,	10 46 00 4	77 14 22.4	8 32 13	19 51 19	H	10	,,	,,	77 30 14.7	10 38 44	1 33	,,
,,	10 46 59.4	77 14 50	8 30 58	19 44 47	P	10	,,	,,	77 30 48	10 39 57.4	1 18.7	,,
,,	10 50 12.6	77 16 19	8 27 54	19 23 56	R	10	,,	,,	77 32 31.2	10 43 45	0 44 2	,,
,,	10 50 21 [illegible]	77 16 11	8 27 33	19 22 51	P	11	,,	,,	77 32 33	10 43 49.3	0 38.5	,,
,,	10 53 13.4	77 17 50	8 24 53	19 05 05	R	10	,,	,,	[illegible]	[illegible]	[illegible]	,,
,,	10 55 20.3	77 17 51	8 23 25	18 50 59	P	10	,,	,,	77 34 33.6	10 48 15.5	1 21.6	,,
,,	10 58 28.8	77 18 59.6	8 16 44	18 31 14	H	10	,,	,,	77 35 57.6	10 51 21.2	1 24.2	,,
,,	10 58 35.1	77 19 02	8 16 27	18 30 28	P	10	,,	,,	77 36 01.4	10 51 29.5	1 22.4	,,
,,	11 01 50.8	77 20 21	8 11 25	18 10 02	H	10	,,	,,	77 37 36	10 54 58.7	1 08.8	,,
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	P	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

”	10 53 13.4	77 [illegible]	8 24 53	19 05 03	R	10	”	”	77 33 [illegible]	10 4[illegible]	1 [illegible]	”
”	10 55 20.3	77 17 51	8 23 25	18 50 59	P	10	”	”	77 34 33.6	10 48 15.5	1 21.6	”
”	10 58 28.8	77 18 59.6	8 16 44	18 31 14	H	10	”	”	77 35 57.6	10 51 21.2	1 24.2	”
”	10 58 35.1	77 19 02	8 16 27	18 30 28	P	10	”	”	77 36 01.4	10 51 29.5	1 22.4	”
”	11 01 50.8	77 20 21	8 11 25	18 10 02	H	10	”	”	77 37 36	10 54 58.7	1 08.8	”
”	11 03 06.8	77 20 37	8 09 29	18 13 51	P	10	”	”	77 37 49.6	10 55 28.1	1 55.5	”
”	11 05 43.8	77 21 42	8 05 08	17 52 07	R	10	”	”	77 39 09.6	10 58 24.5	1 35.8	”
”	11 06 39.8	77 21 51	8 03 23	17 39 52	P	10	”	”	77 39 31	10 59 12.3	1 44.3	”
”	11 08 40.6	77 22 48.5	8 00 18	17 26 48	R	10	”	”	77 40 36.8	11 01 36.5	1 20.6	”
”	11 11 07.4	77 23 38	7 56 44	17 11 13	P	10	”	”	77 41 42.4	11 04 02.4	1 21.8	”
”	11 12 42.3	77 24 12	7 54 40	17 00 46	H	10	”	”	77 42 24.5	11 05 35.4	1 23.6	”
”	11 14 21.2	77 24 44	7 52 14	16 56 17	P	11	”	”	77 43 01.6	11 06 57.3	1 41.7	”
”	11 15 21.9	77 25 10	7 48 28	16 42 57	H	10	”	”	77 43 37	11 08 15.5	1 23.1	”
”	11 18 55.6	77 26 28.5	7 43 27	16 20 08	R	10	”	”	77 45 18.6	11 12 00	1 12	”
”	11 19 05.9	77 26 40	7 42 50	16 18 37	P	10	”	”	77 45 28.6	11 12 21.8	1 00.9	”
”	11 21 54.8	77 27 30	7 36 22	16 00 56	R	10	”	”	77 46 30.1	11 14 36.5	1 34.7	”
”	11 22 13	77 27 50	7 35 22	15 58 50	P	10	”	”	77 46 54	11 15 30.4	0 59.4	”
”	11 26 30.3	77 29 20	7 25 15	15 31 46	H	10	”	”	77 48 45.8	11 19 37.4	1 09.6	”

Total, 218 Sets of Observations, containing 2187 Lunar Distances.

No. 259, 38ˢ.67 fast of Mean Greenwich Time, July 18, 1821.

TABLE II.

LUNAR OBSERVATIONS

FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION,

DURING THE WINTER OF 1821--22.

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION, during the Winter of 1821—22.

DATE.	Time by 259.	Apparent Time.	Observed Distance of Limbs.	Apparent Altitude: Moon's centre	Apparent Altitude: Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ″	° ′ ″	° ′ ″	
Oct. 19	28 08 19.5	22 46 36	58 07 08.5	30 22.3	12 18.3	R	11	29 60	0	58 43 57	28 20 27.5	83 27 52.5	☉ from ☾ East
,,	28 08 34.3	22 46 50.9	58 08 00	30 20.2	12 18.8	P	10	,,	,,	58 44 50	28 18 35	82 56 01.5	,,
,,	28 12 26.4	22 50 43	58 06 26.7	30 03.7	12 25.8	P	10	,,	,,	58 42 59	28 22 30.5	82 56 52.5	,,
,,	28 12 26.8	22 50 43.3	58 05 36.9	30 03.7	12 25.8	R	10	,,	,,	58 42 07.2	28 24 21	83 24 25.7	,,
,,	28 18 26.6	22 56 43.3	58 04 09	29 37.5	12 35.9	P	10	,,	,,	58 40 14	28 28 20.3	82 54 15	,,
,,	28 18 26.7	22 56 43.3	58 03 27.4	29 37.5	12 35.9	H	10	,,	,,	58 39 39	28 29 35.5	83 13 03	,,
,,	28 22 06.7	23 00 23.4	58 01 51	29 21.1	12 41.9	H	10	,,	,,	58 37 46.2	28 33 34.9	83 17 52.5	,,
,,	28 22 06.8	23 00 23.5	58 02 37	29 21.1	12 41.9	P	10	,,	,,	58 38 25.2	28 32 11	82 56 52.5	,,
,,	28 29 01.8	23 07 18.5	57 59 00.7	28 50	12 51.6	H	10	,,	,,	58 34 25.4	28 40 40.9	83 20 36	,,
,,	28 29 01.8	23 07 18.5	57 59 06	28 50.1	12 51.6	R	10	,,	,,	58 34 29.8	28 40 33	83 18 37.5	,,
,,	28 33 00.1	23 11 16.9	57 57 35.7	28 32	12 56.6	R	10	,,	,,	58 32 40	28 44 25	83 17 02	,,
,,	28 33 00.1	23 11 16.9	57 57 38.3	28 32	12 56.6	H	10	,,	,,	58 32 46.8	28 44 10.6	83 13 25.5	,,
,,	28 40 19.2	23 18 35.9	57 55 13	27 57.1	13 04.7	P	10	,,	,,	58 29 46.4	28 50 33	82 59 16.5	,,
,,	28 40 19.6	23 18 36.4	57 54 32.5	27 57.1	13 04.7	R	10	,,	,,	58 29 06	28 52 18	83 24 39	,,
,,	28 43 58.2	23 22 14.9	57 53 47	27 39	13 08.1	P	10	,,	,,	58 28 08	28 54 01.5	82 56 39	,,
,,	28 43 58.4	23 22 15.2	57 53 13.7	27 39.1	13 08.1	R	10	,,	,,	58 27 33	28 55 17	83 15 27.6	,,
,,	28 49 41.3	23 27 58.1	57 50 47	27 11.2	13 13.5	H	10	,,	,,	58 24 50.4	29 01 02.1	83 16 00	,,
,,	28 49 41.8	23 27 58.6	57 51 20	27 11.2	13 13.5	P	10	,,	,,	58 25 18.4	29 00 01.5	83 00 43.5	,,
,,	28 53 10.5	23 31 27.4	57 49 09.2	26 54.6	13 17	H	10	,,	,,	58 23 00.7	29 04 55.2	83 21 57	,,
,,	28 53 11.2	23 31 28	57 50 02	26 54.5	13 16.9	P	10	,,	,,	58 23 46.6	29 03 16	82 57 00	,,
,,	28 59 07.9	23 37 24.7	57 47 20.7	26 25.4	13 21.1	R	10	,,	,,	58 20 44.8	29 09 55.5	83 07 42	,,
,,	28 59 07.9	23 37 24.9	57 46 50.5	26 25.4	13 21.1	H	10	,,	,,	58 20 19.5	29 10 38	83 18 16.5	,,
,,	29 02 56.1	23 41 13.2	57 45 08.8	26 06.5	13 22.9	H	10	,,	,,	58 18 24.5	29 14 42.6	83 22 21	,,
,,	29 02 56.1	23 41 12.9	57 45 30.4	26 06.6	13 22.9	R	10	,,	,,	58 18 40.4	29 14 19.4	83 16 39	,,
,,	29 08 38.7	23 46 55.6	57 43 04.9	25 37.8	13 25.2	R	10	,,	,,	58 15 56.8	29 19 59.5	83 15 58.5	,,
,,	29 08 38.9	23 46 55.8	57 43 40	25 37.8	13 25.3	P	10	,,	,,	58 16 30.6	[illegible]	[illegible]	,,
,,	29 11 36	23 49 52.9	57 41 34	25 22.4	13 26.3	R	10	,,	,,	58 14 14	29 23 34.5	83 25 24	,,
,,	29 11 36.5	23 49 53.4	57 42 10	25 22.5	13 26.3	P	10	,,	,,	58 14 52	29 22 11.8	83 04 21	,,
,,	29 17 03.6	23 55 20.8	57 39 22.9	24 53.2	13 27.1	H	10	,,	,,	58 11 50.9	29 28 38.8	83 19 30	,,
,,	29 17 04.7	23 55 21.7	57 40 04	24 53.1	13 27.4	P	10	,,	,,	58 12 30.6	29 27 11.2	82 57 22.5	,,
[illegible]	[illegible]	[illegible]	57 37 47	24 34.5	13 27.8	H	10	[illegible]	[illegible]	58 10 04	[illegible]	[illegible]	[illegible]

"	29 11 36	23 49 52.9	57 41 34	25 22.4	13 26.3	R	10	"	"	58 14 14	29 23 34.5	83 25 24	"
"	29 11 36.5	23 49 53.4	57 42 10	25 22.5	13 26.3	P	10	"	"	58 14 52	29 22 11.8	83 04 21	"
"	29 17 03.6	23 55 20.8	57 39 22.9	24 53.2	13 27.1	H	10	"	"	58 11 50.9	29 28 38.8	83 19 30	"
"	29 17 04.7	23 55 21.7	57 40 04	24 53.1	13 27.4	P	10	"	"	58 12 30.6	29 27 11.2	82 57 22.5	"
"	29 29 26.6	23 58 43.8	57 37 47	24 34.5	13 27.8	H	10	"	"	58 10 04	29 32 25.8	83 25 30	"
"	29 20 27.9	23 58 44.9	57 38 38	24 34.6	13 27.8	P	10	"	"	58 10 50.8	29 30 43.6	82 59 40.5	"
20	5 27 14.2	00 05 31.5	57 34 43	23 57	13 27.2	H	10	"	"	58 06 39.2	5 39 41.2	83 32 25.5	"
"	5 27 14.2	00 05 31.3	57 34 54.1	23 57 1	13 27.2	R	10	"	"	58 06 46 8	5 39 25.8	83 28 37.5	"
"	5 30 14.2	00 08 31.3	57 33 30.2	23 40.5	13 26.6	R	10	"	"	58 05 12	5 42 42.9	83 32 43.5	"
"	5 30 14.2	00 08 31.5	57 33 13.2	23 40.5	13 26.6	H	10	"	"	58 05 00.5	5 43 11.8	83 40 04.5	"
"	5 35 37.2	00 13 54.5	57 30 51	23 12.8	13 24.7	R	10	"	"	58 02 20.8	5 48 50.9	83 44 06	"
"	5 35 37.9	00 13 55	57 32 20	23 12.8	13 24.7	P	10	"	"	58 03 48	5 45 46.7	82 57 55.5	"
"	5 38 31.4	0 16 48.7	57 29 25.3	22 59.2	13 23.4	R	9	"	"	58 00 48.4	5 52 05.8	83 49 16.5	"
"	5 38 32.1	0 16 49.2	57 30 51	22 59.2	13 23.4	P	9	"	"	58 02 12.4	5 49 09	83 04 57	"
"	5 45 14.3	0 23 31.6	57 27 10.2	22 17.7	13 19.5	H	10	"	"	57 58 19.6	5 57 23.7	83 28 01.5	"
"	5 45 15.7	0 23 32.9	57 28 03	22 17.8	13 19.6	P	10	"	"	57 59 04.6	5 55 48	83 03 46.5	"
"	5 48 34.6	0 26 51.9	57 25 48.1	21 58	13 17.4	H	10	"	"	57 56 48.7	6 00 36.7	83 26 12	"
"	5 48 36 1	0 26 53.3	57 26 45	21 58	13 17.4	P	10	"	"	57 57 38.6	5 58 51	82 59 25.5	"
"	5 54 03.8	0 32 21.2	57 23 18.5	21 27.1	13 13	H	10	"	"	57 54 05.4	6 06 23.6	83 30 36	"
"	5 54 03.8	0 32 21.1	57 23 40.9	21 27.1	13 13	R	10	"	"	57 54 22	6 05 48.6	83 21 52.5	"
"	5 57 24.5	0 35 41.8	57 22 05.9	21 09.1	13 09 8	R	10	"	"	57 52 34.4	6 09 36.7	83 28 43.5	"
"	5 57 24.5	0 35 41.9	57 21 50.9	21 09 1	13 09.8	H	10	"	"	57 52 30.1	6 09 46.5	83 31 09	"
"	6 12 43	0 51 00.4	57 14 43	19 39.7	12 52.3	R	10	"	"	57 44 44.5	6 26 16.7	83 49 04.5	"
"	6 12 43.9	0 51 01.2	57 16 31	19 39.7	12 52.3	P	10	"	"	57 46 32.6	6 22 26.4	82 51 18.5	"
"	6 15 37.2	0 53 54.6	57 13 25	19 23.1	12 48.3	R	10	"	"	57 43 21.6	6 29 12.7	83 49 31.5	"
"	6 15 38.2	0 53 55.5	57 14 59	19 23.1	12 48.3	P	10	"	"	57 44 56	6 25 51.3	82 58 27	"
"	6 21 37.9	0 59 55.6	57 11 35.4	18 49.4	12 39.2	H	10	"	"	57 41 29.3	6 33 11.4	83 18 57	"
"	6 21 39.2	0 59 56.6	57 12 23	18 49.4	12 39.2	P	10	"	"	57 42 09.4	6 31 45.8	82 57 18	"
"	6 25 05.7	1 03 23.4	57 10 01.6	18 30.2	12 33.6	H	10	"	"	57 39 50	6 36 42.8	83 19 51	"
"	6 25 07.2	1 03 24.6	57 10 45	18 30.2	12 33.6	P	10	"	"	57 40 27.6	6 35 22	82 59 21	"
"	6 30 57.9	1 09 15.6	57 07 00.5	17 55.2	12 23.6	H	10	"	"	57 36 40.5	6 43 26.7	83 32 46.5	"
"	6 30 57.9	1 09 15.4	57 07 15.5	17 55.2	12 23.6	R	10	"	"	57 36 48.5	6 43 08.5	83 28 16.5	"

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION during the Winter of 1821—22, *continued.*

DATE. 1821.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Apparent Altitudes. Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	h ′ ″	h ′ ″	° ′ ″	° ′	° ′				°	° ′ ″	h ′ ″	° ′ ″	
Oct. 20	6 33 55.1	1 12 12.6	57 05 43.9	17 36.4	12 18.2	R	10	29.60	0	57 35 11	6 46 36	83 35 51	☉ from ☾ East
„	6 33 55.1	1 12 12.8	57 05 35.7	17 36.4	12 18.2	H	10	„	„	57 35 08.6	6 46 41	83 37 03	„
„	6 40 54.1	1 19 11.7	57 02 35	16 54.6	12 04.3	R	10	„	„	57 31 53	6 53 37	83 36 19.5	„
„	6 40 55.5	1 19 12.5	57 03 49.7	16 54.6	12 04.3	P	10	„	„	57 33 08.4	6 50 56.8	82 56 04.5	„
„	6 44 03.9	1 22 21.5	57 00 56.6	16 36.7	11 57.5	R	10	„	„	57 30 11.6	6 57 12.5	83 42 45	„
„	6 44 04.9	1 22 22.4	57 02 23.8	16 36.7	11 52.7	P	10	„	„	57 31 38	6 54 08.5	82 56 31.5	„
„	6 49 59.6	1 28 17.4	56 58 58.1	16 01.3	11 44.1	H	10	„	„	57 28 09.7	7 01 32.1	83 18 40.5	„
„	6 50 01	1 28 18.6	56 59 45.9	16 01.4	11 44.2	P	10	„	„	57 28 48.8	7 00 09	82 57 36	„
„	6 54 58.3	1 33 18.1	56 56 42.1	15 30.2	11 32.3	H	10	„	„	57 25 47.3	7 06 35.1	83 19 15	„
„	6 54 59.7	1 33 17.3	56 57 40.2	15 30.2	11 32.3	P	10	„	„	57 26 42.2	7 04 37.8	82 50 07.5	„
„	7 20 24.2	1 58 42.1	56 44 45.1	12 56.9	10 24.4	H	10	„	„	57 13 34.9	7 32 33.3	83 27 48	„
„	7 20 24.2	1 58 42.1	56 44 19.4	12 56.9	10 24.4	R	10	„	„	57 13 04	7 33 38.5	83 44 06	„
„	7 24 13.6	2 02 31.5	56 42 26	12 33.8	10 12.3	R	10	„	„	57 11 13.2	7 37 35	83 45 52.5	„
„	7 24 13.6	2 02 31.5	56 42 51.8	12 33.8	10 12.3	H	10	„	„	57 11 39.9	7 36 38.4	83 31 43.5	„
„	7 34 29	2 12 46.9	56 37 51.3	11 31.5	9 39.7	R	10	„	„	57 06 36.1	7 47 25	83 39 31.5	„
„	7 34 29.4	2 12 47.3	56 39 06.4	11 31.4	9 39.6	P	10	„	„	57 07 52	7 44 42.8	82 58 52.5	„
„	7 37 16.1	2 15 34	56 36 19.9	11 14.6	9 30.7	R	10	„	„	57 05 04.5	7 50 39.5	83 46 22.5	„
„	7 37 16.6	2 15 34.5	56 37 47	11 14.4	9 30.6	P	10	„	„	57 06 32.6	7 47 31.6	82 59 16.5	„
Nov. 4	12 48 52.1	7 27 20	59 08 37	14 16.3	33 31.5	P	10	30.11	„	58 25 35.2	12 58 20.7	82 45 10.5	α Arietis East ☾
„	12 48 52.7	7 27 20.7	59 07 48.5	14 16.3	33 31.5	R	10	„	„	58 24 47.8	12 59 39	83 04 33.7	„
„	12 54 48.8	7 33 16.7	59 05 30	14 21.8	34 05	P	10	„	„	58 21 58.4	13 04 33.1	82 49 06	„
„	12 54 49.3	7 33 17.3	59 04 33	14 21.8	34 05.1	R	10	„	„	58 21 03	13 06 05	83 11 54.9	„
„	13 05 19.5	7 43 47.6	58 58 57.3	14 29.2	35 02.3	H	10	„	„	58 14 42.9	13 17 01	83 18 21	„
„	13 05 19.8	7 43 47.7	59 00 01.1	14 29.2	35 02.3	P	10	„	„	58 15 39	13 15 27.3	82 54 54	„
„	13 11 39.8	7 50 07.9	58 55 34	14 32.5	35 34.8	H	10	„	„	58 10 50.7	13 23 41	83 23 16.5	„
„	13 11 40.2	7 50 08.1	58 56 38	14 32.5	35 34.8	[illegible]	10	„	„	58 11 46.1	[illegible]	[illegible]	„
„	13 23 19.8	8 01 47.7	58 49 31.2	14 36.3	36 36.9	R	10	„	„	[illegible]	[illegible]	83 23 33.7	„
„	13 28 24.7	8 06 52.7	58 46 57.5	14 36.8	37 04.8	R	10	„	„	58 00 44.8	13 41 05	83 33 03.7	„
„	13 47 05.3	8 25 33.3	58 38 10	14 32.7	38 41.3	R	10	„	„	57 58 33.8	13 58 37.5	83 16 03	„
„	13 47 05.4	8 25 33.3	58 39 11	14 32.7	38 41.3	P	10	„	„	57 51 26.8	13 57 09	82 53 55.5	„
„	13 51 23.6	8 29 51.7	58 36 35	14 30.7	39 03.3	P	10	„	„	57 48 29.4	14 02 13.8	83 05 31.5	„

"	13 23 19.8	8 01 47.7	58 49 51.2	14 36.3	36 36.9	R	10	"	"	58 01 04	13 35 22	83 23 33.7	"
"	13 28 24.7	8 06 52.7	58 46 57.5	14 36.8	37 04.8	R	10	"	"	58 00 44.8	13 41 05	83 33 03.7	"
"	13 47 05.3	8 25 33.3	58 38 10	14 32.7	38 41.3	R	10	"	"	57 58 33.8	13 58 37.5	83 16 03	"
"	13 47 05.4	8 25 33.3	58 39 11	14 32.7	38 41.3	P	10	"	"	57 51 26.8	13 57 09	82 53 55.5	"
"	13 51 23.6	8 29 51.7	58 36 35	14 30.7	39 03.3	P	10	"	"	57 48 29.4	14 02 13.8	83 05 31.5	"
"	13 51 23.6	8 29 51.7	58 35 41.1	14 30.7	39 03.3	R	10	"	"	57 47 38.5	14 03 38.5	83 26 42.9	"
"	13 58 59.7	8 37 27.8	58 31 42.5	14 25.3	39 39.3	H	10	"	"	57 43 09.6	14 11 23	83 28 48	"
"	13 59 00.1	8 37 27.9	58 32 54.6	14 25.3	39 39.3	P	10	"	"	57 44 14	14 09 31.8	83 00 58.5	"
"	14 04 23.7	8 42 51.8	58 29 18.3	14 20.5	40 03.1	H	10	"	"	57 40 22.3	14 16 10.8	83 19 45	"
"	14 04 24.1	8 42 51.9	58 30 14.9	14 20.5	40 03.1	P	10	"	"	57 41 09.6	14 14 51.6	82 59 55.5	"
"	14 14 02.2	8 52 30.1	58 24 30.3	14 11.1	40 44.6	R	10	"	"	57 34 47.2	14 25 48.3	83 19 33.1	"
"	14 14 02.2	8 52 30.3	58 24 08.4	14 11.1	40 44.6	H	10	"	"	57 34 30.3	14 26 17	83 26 40.5	"
"	14 18 43.6	8 57 11.7	58 21 38.3	14 6.1	41 04.1	H	10	"	"	57 31 42	14 31 06.8	83 28 46.5	"
"	14 18 43.6	8 57 11.5	58 21 54.2	14 6.2	41 04.1	R	10	"	"	57 31 52.5	14 30 49.3	83 24 27.6	"
"	14 26 58.8	9 05 26.6	58 18 53.5	13 55.5	41 40.6	P	10	"	"	57 28 11	14 37 11	82 56 06	"
"	14 26 58.8	9 05 26.6	58 18 17.7	13 55.5	41 40.6	R	10	"	"	57 27 38.6	14 38 06.5	83 09 59.2	"
"	14 31 23.5	9 09 51.4	58 15 52.5	13 48.7	42 01.4	R	10	"	"	57 24 54	14 42 49.3	83 14 28.3	"
"	14 31 23.8	9 09 51.6	58 16 23.5	13 48.7	42 01.4	P	10	"	"	57 25 19.4	14 42 06	83 03 36	"
"	14 41 50.9	9 20 19	58 10 27.6	13 30.9	42 42.6	H	10	"	"	57 18 50.1	14 53 15.5	83 14 07.5	"
"	14 41 51.1	9 20 18.9	58 11 06.2	13 30.9	42 42.6	P	10	"	"	57 19 20	14 52 25	83 01 31.5	"
"	14 46 32.8	9 25 00.9	58 07 38.8	13 22.2	42 58	H	10	"	"	57 15 43.8	14 58 36	83 23 46.5	"
"	14 46 33	9 25 00.8	58 08 35.6	13 22.2	42 58	P	10	"	"	57 16 32.2	14 57 12.2	83 02 51	"
"	14 58 30.3	9 36 58.4	58 01 29.3	12 57.4	43 35.7	H	10	"	"	57 08 46.2	15 10 34.3	83 23 58.5	"
"	14 59 58.6	9 38 26.5	58 01 22	12 54.1	43 40.9	R	10	"	"	57 08 34.4	15 10 54.8	83 07 04.5	"
"	15 03 07.6	9 41 35.7	57 58 28	12 47.1	43 49.5	H	10	"	"	57 05 34.7	15 16 03.7	83 37 00	"
"	15 04 13.9	9 42 41.8	57 58 32.8	12 44.6	43 52.9	R	9	"	"	57 05 32.2	15 16 08.8	83 21 40.5	"
"	15 20 53.3	9 59 21	57 50 38.1	12 02.7	44 36.9	P	10	"	"	56 56 40.4	15 31 24.5	83 00 52.5	"
"	15 20 53.5	9 59 21.2	57 50 04.8	12 02.7	44 36.9	R	10	"	"	56 56 08.8	15 32 17	83 13 55.9	"
"	15 24 48.1	10 03 15.8	57 48 29.6	11 52.2	44 49.3	P	12	"	"	56 54 18	15 35 27.6	83 02 57	"
"	15 24 48.3	10 03 16.1	57 47 54.8	11 52 2	44 49.3	R	12	"	"	56 53 44.8	15 36 25	83 17 13.8	"
"	15 32 22.6	10 10 50.6	57 43 47.5	11 30.7	45 11.4	H	10	"	"	56 49 19	15 44 01.1	83 17 37.5	"
"	15 32 23.2	10 10 50.9	57 44 23.8	11 30.7	45 11.4	P	10	"	"	56 49 53.8	15 43 01.8	83 02 43.5	"

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION during the Winter of 1821—22, *continued.*

DATE. 1821.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Sun's centre, or Star.	Obser-ver.	No. of Obser-vations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ″	° ′ ″	° ′ ″	
Nov. 4	15 36 44.6	10 15 12.6	57 41 09	11 17.7	45 23.2	H	10	30 11	0	56 46 25.8	15 49 25.9	83 33 19.5	α Arietis E. of ☾
„	15 36 45.2	10 15 12.9	57 41 51	11 17.7	45 23.2	P	10	„	„	56 46 58.6	15 48 02.5	83 12 24	„
„	15 45 14.4	10 23 42.4	57 37 18.8	10 50.8	45 41	H	10	„	„	56 42 13.5	15 56 12.2	83 07 27	„
„	15 45 14.4	10 23 42.2	57 37 45	10 50.8	45 41	R	10	„	„	56 42 34.2	15 57 37	82 58 42.6	„
„	15 49 09.5	10 27 37.3	57 35 35	10 37.6	45 36.6	R	10	„	„	56 40 17.4	15 59 32	82 58 40.5	„
„	15 49 09.5	10 27 37.5	57 35 07.7	10 37.6	45 36.6	H	10	„	„	56 39 53.2	16 00 13.3	83 08 57	„
Dec. 1	10 23 20.3	4 54 23.8	64 22 48	11 47.8	29 32	P	10	29 81	-20	63 43 38	10 27 41.9	83 19 31.5	„
„	10 23 20.4	4 54 24.1	64 22 29.5	11 47.8	29 32	R	10	„	„	63 43 22.2	10 28 12	83 26 57.9	„
„	10 29 34.9	5 00 38.6	64 19 55.5	11 57.2	30 09.1	R	10	„	„	63 40 18.2	10 33 41	83 15 36.6	„
„	10 29 35.4	5 00 39.4	64 20 20	11 57.2	30 09	P	10	„	„	63 40 38	10 33 05.7	83 06 34.5	„
„	10 38 41	5 09 45.5	64 15 48.1	12 08.1	31 03.3	H	10	„	„	63 35 28.4	10 42 21.9	83 09 06	„
„	10 40 36	5 11 39.2	64 15 03.6	12 09.9	31 14.7	P	10	„	„	63 34 27.4	10 44 11.2	83 08 00	„
„	10 47 23.8	5 18 26.9	64 11 40	12 16.3	31 55.2	P	10	„	„	63 30 28.8	10 51 20.6	83 13 25.5	„
„	10 47 25.8	5 18 30.2	64 11 04.2	12 16.4	31 55.7	H	10	„	„	63 30 00.4	10 52 11.5	83 25 19.5	„
„	11 08 01.1	5 39 04.5	64 02 12	12 28.8	33 52.1	R	10	„	„	63 19 25.4	11 11 12.5	83 02 00.8	„
„	11 10 20.9	5 41 25	64 01 14.2	12 29.7	34 04.9	H	11	„	„	63 18 23.8	11 13 03	82 54 30	„
„	11 17 41.1	5 48 44.2	63 57 09.7	12 32.5	34 44.8	R	10	„	„	63 13 43	11 21 28.5	83 11 04.3	„
2	10 52 50.1	5 23 24.2	50 37 29.6	17 35.2	32 46.3	P	10	29 90	-25	49 56 51.8	10 56 12	83 11 57	„
„	10 52 50.1	5 23 24.2	50 38 14.7	17 35.2	32 46.3	R	10	„	„	49 57 40.6	10 54 48.5	82 51 04.5	„
„	11 00 36.6	5 31 10.6	50 34 04.5	17 50.8	33 31.1	R	10	„	„	49 52 51.2	11 03 16.5	83 01 27.9	„
„	11 00 36.6	5 31 10.6	50 33 21	17 50.8	33 31.1	P	10	„	„	49 52 05.6	11 04 34	83 20 51	„
„	11 17 18	5 47 51.7	50 25 15	18 16.7	35 02.7	P	10	„	„	49 42 38	11 21 10.7	83 19 45	„
„	11 20 44.3	5 51 17.9	50 23 14.6	18 21.3	35 21.2	H	8	„	„	49 40 22.8	11 24 50.2	83 23 04.5	„
„	11 24 43.7	5 55 17.3	50 21 47	18 26.7	35 42.6	P	10	„	„	49 38 34	11 27 43.2	83 06 28.5	„
„	11 31 16.7	6 01 50.1	50 18 39.6	18 35.5	36 17.7	H	8	„	„	49 35 07.8	11 34 20.5	83 07 36	„
„	11 36 27.6	6 07 01	50 16 32	18 40.1	36 45.1	R	10	„	„	49 32 29.1	11 38 59.5	82 59 37.2	„
„	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	R	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
„	11 45 42.2	6 16 15.4	50 11 55.8	18 45.8	37 33.9	H	10	„	„	49 27 14.2	11 48 10.8	82 58 51	„
„	12 32 33.8	7 03 06.4	52 43 38.5	18 48.3	19 49.3	R	10	„	„	52 50 35.8	12 34 36.5	82 52 31.1	α Aquila W. of ☾
„	12 32 34	7 03 06.6	52 44 12.5	18 48.3	19 49.2	P	10	„	„	52 51 03.4	12 35 41.5	83 08 43.5	„
„	12 39 51	7 10 23.5	52 46 34	18 43.2	19 09.4	P	10	„	„	52 54 09	12 42 50.8	83 06 49.5	„
[illegible]	[illegible]	[illegible]	[illegible]	18 43.2	19 09.4	R	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

,,	11 45 48.9	6 16 15.5	50 12 12.4	18 45.8	37 33.9	R	10	,,	,,	[illegible]	[illegible]	[illegible]	,,
,,	11 45 42.2	6 16 15.4	50 11 55.8	18 45.8	37 33.9	H	10	,,	,,	49 27 14.2	11 48 10.8	82 58 51	,,
,,	12 32 33.8	7 03 06.4	52 43 38.5	18 48.3	19 49.3	R	10	,,	,,	52 50 35.8	12 34 36.5	82 52 31.1	α Aquila W. of ☾
,,	12 32 34	7 03 06.6	52 44 12.5	18 48.3	19 49.2	P	10	,,	,,	52 51 03.4	12 35 41.5	83 08 43.5	,,
,,	12 39 51	7 10 23.5	52 46 34	18 43.2	19 09.4	P	10	,,	,,	52 54 09	12 42 50.8	83 06 49.5	,,
,,	12 39 51	7 10 23.6	52 46 08	18 43.2	19 09.4	R	10	,,	,,	52 53 43.6	12 41 50	82 51 36.3	,,
,,	12 52 57.6	7 23 29.7	52 50 51	18 30.8	17 56.9	P	10	,,	,,	52 59 44.4	12 55 44.1	83 03 36	,,
,,	12 54 09.4	7 24 41.5	52 50 47.1	18 29.3	17 49.1	H	10	,,	,,	52 59 53.4	12 56 03.3	82 50 27	,,
,,	13 00 49	7 31 20.9	52 53 34.5	18 22.1	17 11.3	H	10	,,	,,	53 03 20.5	13 04 00.8	83 09 58.5	,,
,,	13 00 49	7 31 21.1	52 53 29	18 22.1	17 11.4	P	10	,,	,,	53 03 11	13 03 41.2	83 05 01.5	,,
,,	13 11 42.7	7 42 14.4	52 57 15	18 06.9	16 07.7	H	10	,,	,,	53 08 07.6	13 15 03.4	83 12 15	,,
,,	13 11 42.7	7 42 14.5	52 57 02.5	18 06.8	16 07.7	R	10	,,	,,	53 07 52.2	13 14 27	83 02 58.2	,,
,,	13 18 36.3	7 49 08	53 00 17.5	17 55.1	15 26.1	R	10	,,	,,	53 11 43.6	13 23 21	83 34 05.2	,,
,,	13 18 36.3	7 49 07.9	52 59 36.5	17 55.1	15 26.1	H	10	,,	,,	53 11 12.8	13 22 09.6	83 15 25.5	,,
,,	13 29 13.5	7 59 45.5	53 03 03.4	17 35.3	14 23.6	P	10	,,	,,	53 15 38.6	13 32 25	83 09 58.5	,,
,,	13 29 13.8	7 59 45.5	53 02 43.2	17 35.3	14 23.6	R	10	,,	,,	53 15 17.6	13 33 41	83 28 52	,,
,,	13 35 28.2	8 05 59.7	53 05 11.5	17 22.8	13 47.5	P	10	,,	,,	53 18 22	13 38 40.4	83 10 10.5	,,
,,	13 35 28.7	8 06 00.3	53 04 47	17 22.8	13 47.5	R	10	,,	,,	53 17 58.2	13 37 42	82 55 25.4	,,
,,	13 52 42.6	8 23 13.7	49 08 44.2	16 41.6	45 27.6	P	10	,,	,,	48 14 28.8	13 55 38.7	83 06 15	α Arietis E. of ☾
,,	14 00 45.7	8 31 16.8	49 04 24.9	16 21.2	45 42.1	P	10	,,	,,	48 09 42	14 04 00.4	83 10 54	,,
,,	14 11 35.6	8 42 06.5	48 58 42.1	15 51	45 58.5	P	10	,,	,,	48 03 19.6	14 15 09.2	83 15 40.5	,,
,,	14 11 35.6	8 42 06.4	48 58 47	15 51	45 58.5	R	10	,,	,,	48 03 30.4	14 14 51.5	83 11 12	,,
,,	14 18 45	8 49 15.9	48 54 50.6	15 29.7	46 08	P	10	,,	,,	47 59 04	14 22 36.4	83 20 07.5	,,
,,	14 18 45.2	8 49 16.1	48 54 54.2	15 29.7	46 08	R	10	,,	,,	47 59 12.4	14 22 21.5	83 16 19.9	,,
,,	14 31 17.8	9 01 48.3	48 49 18	14 49.4	46 17	R	10	,,	,,	47 52 53.8	14 33 22.5	82 53 29.1	,,
,,	14 31 18.4	9 01 48.9	48 48 24.3	14 49.4	46 17	P	10	,,	,,	47 52 01	14 34 56	83 16 46.5	,,
,,	14 37 26	9 07 56.4	48 45 51.5	14 29	46 19.7	R	10	,,	,,	47 49 16.4	14 39 45.5	82 57 11.7	,,
,,	14 37 26.6	9 07 57.1	48 45 13.9	14 29	46 19.7	P	10	,,	,,	47 48 33.4	14 40 59	83 15 28.5	,,
3	10 43 54	5 13 58.4	62 59 12	21 39.7	27 59.8	P	10	30 00	—30	62 57 01.4	10 46 08.7	83 02 34.5	α Aquila, W. of ☾
,,	10 43 54.5	5 13 58.9	62 59 11.2	21 39.7	27 59.8	R	10	,,	,,	62 57 01.2	10 46 05.5	83 01 39	,,
,,	10 51 34.5	5 21 38.8	63 01 58.7	22 06.3	27 30.8	R	10	,,	,,	63 00 29.5	10 53 20	82 55 17.3	,,
,,	10 51 34.5	5 21 38.8	63 02 25	22 06.3	27 30.8	P	10	,,	,,	63 00 54.2	10 54 18.7	83 09 58.5	,,

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION during the Winter of 1821—22, *continued.*

DATE. 1821.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Sun's centre, or Star.	Obser-ver.	No. of Obser-vations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ″	° ′ ″	° ′ ″	
Dec. 3	11 03 25.1	5 33 29.1	63 06 41	22 43.1	26 42.9	H	10	30.00	−30	63 06 18.3	11 05 37.6	83 02 07.5	α Aquila W. of ☾
"	11 03 25.2	5 33 29.2	63 07 18	22 43.1	26 42.9	P	10	"	"	63 06 52	11 06 51.5	83 20 34.5	"
"	11 11 02.4	5 41 06.2	63 09 41.5	23 04.8	26 10.5	H	10	"	"	63 10 00.8	11 13 26	83 04 57	"
"	11 11 04.1	5 41 08.1	63 09 49	23 04.9	26 10.4	P	10	"	"	63 10 06.6	11 13 38	83 07 28.5	"
"	11 21 55.3	5 51 58.9	63 14 28.6	23 34.6	25 23.4	H	10	"	"	63 15 49.6	11 25 37.2	83 24 34.5	"
"	11 21 55.4	5 51 58.9	63 14 17	23 34.6	25 23.4	R	10	"	"	63 15 35.6	11 25 04.5	83 16 39.6	"
"	11 27 52	5 57 55.5	63 16 45.9	23 50	24 57.1	R	10	"	"	63 18 38.4	11 31 27.5	83 23 29.5	"
"	11 27 52	5 57 55.7	63 16 42.3	23 50	24 57	H	10	"	"	63 18 37.6	11 31 28.8	83 23 16.5	"
"	12 21 12.9	6 51 15.5	63 36 17	25 21.4	20 27.4	P	10	"	"	63 43 08	12 22 48.5	82 53 15	"
"	12 21 13.8	6 51 15.8	63 36 52.5	25 21.5	20 27.4	R	10	"	"	63 44 16.8	12 25 12.3	83 29 07	"
"	12 28 16.8	6 58 19.3	63 39 00	25 27.8	19 50.8	P	10	"	"	63 47 04	12 31 02.5	83 10 48	"
"	12 28 16.8	6 58 19.3	63 39 25	25 29.9	19 51.9	R	10	"	"	63 47 13.5	12 31 21	83 15 26.3	"
"	12 39 14.8	7 09 17.3	63 42 49.5	25 35.9	18 51.6	H	10	"	"	63 52 03.9	12 41 28.4	83 02 46.5	"
"	12 39 14.9	7 09 17.3	63 43 10	25 35.9	18 51.6	P	10	"	"	63 52 22.6	12 42 08	83 12 40.5	"
"	12 45 31.7	7 15 34	63 45 17	25 39.5	18 16.1	H	10	"	"	63 55 12.5	12 48 02.7	83 07 10.5	"
"	12 45 32	7 15 34.3	63 45 38	25 39.5	18 16 1	P	10	"	"	63 55 31	12 48 42	83 16 55.5	"
"	12 54 49.2	7 24 51.2	63 49 10.6	25 42.1	17 23.4	H	10	"	"	64 00 06.5	12 58 16.5	83 21 19.5	"
"	12 54 49.2	7 24 51.2	63 49 58.6	25 42.1	17 23.4	R	10	"	"	64 00 51.2	12 59 50	83 44 47.8	"
"	13 00 15.7	7 30 17.5	63 51 53.7	25 41.8	16 52.3	R	10	"	"	64 03 20.8	13 05 22	83 41 07.5	"
"	13 00 15.7	7 30 17.7	63 51 18.2	25 41.8	16 52.3	H	10	"	"	64 02 49.9	13 03 57.5	83 24 57	"
"	13 09 36.2	7 39 37.9	63 54 53.7	25 39.6	15 59.9	R	10	"	"	64 07 20	13 13 22	83 26 01	"
"	13 09 36.4	7 39 38.3	63 54 34	25 39.6	15 59.9	P	10	"	"	64 07 01.4	13 12 43.5	83 16 18	"
"	13 15 48.3	7 45 50.1	63 56 37	25 36.9	15 25.5	P	10	"	"	64 09 52.6	13 18 40.9	83 12 42	"
"	13 15 48.9	7 45 50.5	63 56 49.2	25 36.9	15 25.5	R	10	"	"	64 09 54.4	13 18 44	83 13 22.5	"
"	13 25 09	7 55 10.6	63 59 33	25 31	14 30.6	H	10	"	"	64 13 42.2	13 26 39.8	82 52 18	"
"	13 25 09.7	7 55 11.3	64 00 06	25 31	14 30.6	P	10	"	"	64 14 15.4	13 27 48.8	83 06 43.5	"
"	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	"	"	[illegible]	[illegible]	[illegible]	"
"	13 31 25.2	8 01 25.8	64 02 26	25 25.7	13 51.9	P	10	"	"	64 16 58.4	13 33 28.3	83 00 22.5	"
"	13 42 23.7	8 12 24.2	64 06 59.5	25 13.5	12 44.7	R	10	"	"	64 23 03.5	13 46 08.5	83 26 04.5	"
"	13 42 23.7	8 12 25	64 06 28.3	25 13.5	12 44.7	H	10	"	"	64 22 34.6	13 45 06.9	83 10 28.5	"
"	13 48 19.9	8 18 21.9	64 08 44.5	25 05.7	12 08.8	H	10	"	"	64 25 29.7	13 51 10.8	83 12 25.5	"

„	13 31 [illegible]	8 01 [illegible]	64 0[illegible]	25 [illegible]	13 [illegible]	H	10	„	„	[illegible]	13 [illegible]	[illegible]	„
„	13 31 25.2	8 01 23.6	64 02 26	25 25.7	13 51.9	P	10	„	„	64 16 58.4	13 33 28.3	83 00 22.5	„
„	13 42 23.7	8 12 24.2	64 06 59.5	25 13.5	12 44.7	R	10	„	„	64 23 03.5	13 46 08.5	83 26 04.5	„
„	13 42 23.7	8 12 25	64 06 28.3	25 13.5	12 44.7	H	10	„	„	64 22 34.6	13 45 06.9	83 10 28.5	„
„	13 48 19.9	8 18 21.9	64 08 44.5	25 05.7	12 08.8	H	10	„	„	64 25 29.7	13 51 10.8	83 12 25.5	„
„	13 48 19.9	8 18 20.3	64 09 11.2	25 05.7	12 08.8	R	10	„	„	64 25 56.6	13 52 08.5	83 27 02 5	„
4	10 02 55.6	4 32 30	74 31 39	21 37.4	29 58.2	P	10	„	20	74 24 57.2	10 05 08.9	83 09 43.5	„
„	10 02 56.2	4 32 30.5	74 31 19.7	21 37.4	29 58.2	R	10	„	„	74 24 41	10 04 37	83 01 36.9	„
„	10 10 05.6	4 39 39.9	74 34 52	22 15.2	29 38.5	P	10	„	„	74 28 39.4	10 12 28.9	83 12 14	„
„	10 10 05.9	4 39 40.1	74 34 48.9	22 15.2	29 38.5	R	10	„	„	74 28 42.2	10 12 33	83 13 14.1	„
„	10 20 37.3	4 50 11.2	74 39 32.1	23 07.9	29 07	H	10	„	„	74 34 06.7	10 23 14.5	83 15 49.5	„
„	10 20 37.4	4 50 11.4	74 39 40	23 07.9	29 07.1	P	10	„	„	74 34 04	10 23 10.2	83 14 42	„
„	10 28 19.9	4 57 53.8	74 42 44	23 45.2	28 42.2	P	10	„	„	74 37 41.4	10 30 19.5	83 06 20.5	„
„	10 28 20	4 57 53.8	74 43 00.2	23 45.2	28 42.2	H	10	„	„	74 38 07	10 31 09.5	83 18 55.5	„
„	10 38 11.2	5 07 44.8	74 47 09.5	24 31.5	28 07.9	R	10	„	„	74 42 53	10 40 34	83 12 18.1	„
„	10 38 11.2	5 07 44.9	74 47 33.5	24 32	28 07.9	H	10	„	„	74 43 23.1	10 41 33.3	83 27 06	„
„	10 43 22.5	5 12 55.9	74 49 34.6	24 56.3	27 48.4	R	10	„	„	74 45 41.4	10 46 07	83 17 46.6	„
„	10 43 22.5	5 12 56.1	74 49 16.8	24 56.3	27 48.4	H	10	„	„	74 45 31.6	10 45 47	83 12 43.5	„
„	10 52 57.8	5 22 31.2	74 53 05	25 39.5	27 10.8	P	10	„	„	74 49 54	10 54 26.4	82 58 48	„
„	10 52 57.9	5 22 31.1	74 53 24.7	25 39.5	27 10.8	R	10	„	„	74 50 16.6	10 55 12.5	83 10 20.8	„
„	11 00 00.7	5 29 33.8	74 56 18	26 10.3	26 42.2	R	10	„	„	74 53 44.2	11 02 00.5	83 06 40.8	„
„	11 00 00.9	5 29 34.1	74 56 11	26 10 2	26 42.2	P	10	„	„	74 53 33.6	11 01 47 4	83 04 19.5	„
„	11 08 33.4	5 38 06.6	75 00 32.4	26 46.1	26 06.4	H	10	„	„	74 58 47.6	11 11 57.8	83 27 48	„
„	11 08 33.9	5 38 07.3	75 00 22	26 46.1	26 06.4	P	10	„	„	74 58 28	11 11 20.8	83 18 22.5	„
„	11 13 39.3	5 43 12.4	75 02 28.2	27 06.7	25 44.7	H	10	„	„	75 01 07.1	11 16 33	83 20 09	„
„	11 13 39.5	5 43 12.8	75 02 13	27 06.8	25 44.7	P	10	„	„	75 00 43.4	11 15 47.8	83 08 45	„
„	11 20 29.5	5 50 02.3	75 05 33	27 33.4	25 14	R	10	„	„	75 04 46.2	11 23 46.5	83 26 03	„
„	11 20 29.5	5 50 02.5	75 05 16.4	27 33.4	25 14	H	10	„	„	75 04 32.8	11 23 18.4	83 18 58.5	„
„	11 24 51.9	5 54 24.8	75 07 04.5	27 49.9	24 53	H	10	„	„	75 06 46.8	11 27 42.8	83 19 30	„
„	11 24 51.9	5 54 24.7	75 07 30.2	27 49.9	24 53	R	10	„	„	75 07 04	11 28 18.5	83 28 27	„
9	12 59 29.4	7 26 20.5	55 10 21	27 46.1	44 24.8	P	10	29.68	„	54 23 39.4	12 58 55.6	83 08 46.5	α Arietis West of ☾
„	12 59 37.1	7 26 27 9	55 09 53.5	27 46.9	44 25.1	R	11	„	„	54 23 22.5	12 58 33	83 01 16.5	„

LUNAR OBSERVATIONS for DETERMINING the MERIDIAN of the FURY'S STATION during the Winter of 1821—22, *continued.*

DATE. 1821.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre.	Apparent Altitudes. Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″					° ′ ″	′ ″	° ′ ″	
Dec. 9	13 07 20.5	7 34 11.5	55 15 07.4	28 33.1	44 44.9	P	10	29 68	-20	54 28 36	13 07 03.7	83 13 03	α Arietis West of ☾
”	13 07 21.4	7 34 12.1	55 14 55.2	28 33.1	44 44.9	R	10	”	”	54 28 26.8	13 06 49	83 09 14.5	”
”	13 23 53.3	7 50 43.7	55 24 47	30 11.7	45 24.7	P	10	”	”	54 38 39.6	13 23 37	83 13 49.5	”
”	13 23 53.3	7 50 43.7	55 24 21.7	30 11.7	45 24.7	H	10	”	”	54 38 18.2	13 23 02	83 04 34.5	”
”	13 30 57.9	7 57 48.2	55 28 39.2	30 53.8	45 40.1	H	10	”	”	54 42 48.7	13 30 26.8	83 09 39	”
”	13 30 57.9	7 57 48.2	55 29 03	30 53.8	45 40.1	P	10	”	”	54 43.07.8	13 30 58.4	83 17 33	”
“	13 44 21.7	8 11 11.7	55 36.36.2	32 09.8	46 01.5	R	10	”	”	54 54 08	13 44 08	83 14 05	”
”	13 44 22.1	8 11 12.2	55 37 24	32 09.8	46 01.5	H	10	”	”	54 51 58.1	13 45 30.8	83 34 39	”
”	13 51 13.6	8 18 03.6	55 41 06.9	32 47.1	46 09.4	H	10	”	”	54 55 54	13 51 59.3	83 28 55.5	”
”	13 51 13.8	8 18 03.7	55 40 31.2	32 47.1	46 09.4	R	10	”	”	54 55 18.4	13 50 59	83 13 49	”
11	13 03 06.8	7 28 50.1	52 17 13.1	12 24.2	28 26	P	10	29 75	-24	51 37 54.6	13 01 58.4	83 17 04.5	Aldebaran West of the ☾
”	13 03 06.9	7 28 50.3	52 16 43.2	12 17.2	28 26	R	10	”	”	51 37 23.2	13 01 03	83 03 08.8	”
”	13 09 17.9	7 35 01.2	52 20 41.5	12 55.1	28 58.6	R	10	”	”	51 41 14.8	13 07 55	83 13 27.7	”
”	13 09 17.9	7 35 01.2	52 21 00	12 55.1	28 58.6	P	10	”	”	51 41 25	13 08 12.4	83 17 48	”
”	13 37 24	8 03 06.8	52 36 42.6	15 21.3	31 19.1	H	10	”	”	51 56 21.5	13 34 47.4	82 55 09	”
”	13 37 25.2	8 03 08	52 37 33.6	15 21.4	31 19.2	P	10	”	”	51 57 04	13 36 03.3	83 13 49.5	”
”	13 44 34.4	8 10 17.1	52 41 13	16 00.1	31 56.9	H	10	”	”	52 00 34.2	13 42 17.2	83 00 03 5	”
”	13 44 34.6	8 10 17.3	52 42 03.3	16 00.1	31 56.9	P	10	”	”	52 01 19.4	13 43 37.4	83 20 01.5	”
”	13 55 13.4	8 20 55.9	52 48 39.5	16 57.6	32 50.2	R	10	”	”	52 07 42	13 54 59	83 30 46.5	”
”	13 55 13.5	8 20 56	52 47 51.5	16 57.6	32 50.2	H	10	”	”	52 06 59	13 53 42	83 11 30	”
”	14 00 48.6	8 26 30.9	52 51 31	17 27.7	33 17	R	10	”	”	52 10 24.8	13 59 50	83 19 45.9	”
”	14 00 48.8	8 26 31.2	52 50 58.2	17 27.7	33 17	H	10	”	”	52 09 57.6	13 58 59.8	83 07 09	”
”	14 09 50.9	8 35 33	52 56 32.9	18 17.4	33 57.3	P	10	”	”	52 15 12.6	14 08 20.8	83 11 57	”
”	14 09 50.9	8 35 33	52 56 40.2	18 17.4	33 57.3	R	10	”	”	52 15 25.8	14 08 45.5	83 18 08.1	”
”	14 15 47.7	8 41 29.7	53 00 09.5	18 50.6	34 21.9	R	10	”	”	52 18 51.2	14 14 49	83 19 52.5	”
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
”	14 25 16.8	8 50 58.7	53 05 05	19 43.8	35 00.7	H	10	”	”	52 23 48.8	14 23 41.5	83 08 22.5	”
”	14 25 16.9	8 50 58.6	53 05 15.9	19 43.8	35 00.7	P	10	”	”	52 23 48	14 23 39.8	83 10 18	”
”	14 32 36.9	8 58 18.7	53 08 58.5	20 25	35 30.5	H	10	”	”	52 27 37.2	14 30 26.8	83 02 01.5	”
”	14 32 37	8 58 18.7	53 09 40.7	20 25	35 30.5	P	10	”	”	52 28 11.6	14 31 28.8	83 17 33	”
”	14 43 35.3	9 09 16.8	53 15 37.5	21 27	36 11.3	R	10	”	”	52 34 11	14 42 08	83 12 48.5	”

"	14 25 16.8	8 50 58.7	53 05 05	19 43.8	35 00.7	H	10	"	"	52 23 48.8	14 23 41.3	83 08 22.5	"
"	14 25 16.9	8 50 58.6	53 05 15.9	19 43.8	35 00.7	P	10	"	"	52 23 48	14 23 39.8	83 10 18	"
"	14 32 36.9	8 58 18.7	53 08 58.5	20 25	35 30.5	H	10	"	"	52 27 37.2	14 30 26.8	83 02 01.5	"
"	14 32 37	8 58 18.7	53 09 40.7	20 25	35 30.5	P	10	"	"	52 28 11.6	14 31 28.8	83 17 33	"
"	14 43 35.3	9 09 16.8	53 15 37.5	21 27	36 11.3	R	10	"	"	52 34 11	14 42 08	83 12 48.5	"
"	14 43 35.6	9 09 17.2	53 15 10.9	21 27	36 11.3	H	10	"	"	52 33 48.6	14 41 28.4	83 02 48	"
"	14 49 28	9 15 09.4	53 18 46	22 00.3	36 31.3	R	10	"	"	52 37 21.6	14 47 47.5	83 09 31.4	"
"	14 49 28.5	9 15 10	53 18 09.5	22 00.3	36 31.3	H	10	"	"	52 36 49	14 46 50.2	82 55 03	"
"	16 42 41.4	10 08 21.7	53 47 42.2	27 04.9	38 57.6	P	10	"	"	53 07 06	15 40 47.8	83 06 31.5	"
"	15 42 41.8	10 08 22.1	53 47 37.5	27 04.9	38 57.6	R	10	"	"	53 07 04.8	15 40 47	83 06 13.2	"
"	15 49 35.8	10 15 15.7	53 51 36	27 44.4	39 10.7	P	10	"	"	53 11 12	15 48 06.2	83 12 37.5	"
"	15 49 35.9	10 15 16	53 51 24.5	27 44.3	39 10.7	R	10	"	"	53 11 04.2	15 47 54	83 09 28.5	"
13	17 03 06.9	11 27 36.6	37 57 39	16 03.9	44 59.9	R	10	30.00	–29	36 59 43.4	17 00 03.5	83 06 41.5	Pollux West of ☾
"	17 03 10.2	11 27 40	37 58 05	16 04.3	45 00.2	P	10	"	"	37 00 02.8	17 00 39	83 14 45	"
"	17 10 21.4	11 34 51	38 02 20	16 44.7	45 34.2	R	10	"	"	37 04 33.8	17 09 06.5	83 07 07.5	"
"	17 11 04.9	11 35 34.5	38 02 27	16 48.4	45 37.8	P	10	"	"	37 04 32	17 09 02.8	83 22 04.5	"
"	17 23 17.2	11 47 46.6	38 09 10	17 56.4	46 33.9	P	10	"	"	37 11 28.4	17 22 02.2	83 33 54	"
"	17 31 44.7	11 56 13.9	38 13 15	18 42.6	47 12	P	10	"	"	37 15 42.4	17 32 09	83 23 27	"
"	17 41 42.5	12 06 11.5	38 18 05	19 36.9	47 53.8	P	10	"	"	37 20 51	17 39 36	83 21 07.5	"
"	17 41 43.3	12 05 29.2	38 18 13.5	19 36.9	47 53.8	R	10	"	"	37 21 07	17 40 05.5	83 28 06.9	"
"	17 48 09.5	12 12 38.4	38 21 40	20 12.3	48 19.3	P	11	"	"	37 24 38	17 46 41 5	83 30 46.5	"
"	17 48 10.2	12 12 38.9	38 20 45.5	20 12.3	48 19.3	R	11	"	"	37 23 52.2	17 45 13.5	83 08 39.6	"
"	17 57 04.3	12 21 33	38 25 47.6	21 00.4	48 52.8	P	10	"	"	37 29 05.4	17 55 01.2	83 22 03.5	"
"	17 57 04.9	12 21 33.5	38 25 42	21 00.4	48 52.8	R	10	"	"	37 29 06.8	17 55 05.5	83 23 00.3	"
"	18 02 26.8	12 26 55.4	38 28 35.2	21 28.9	49 11.8	P	10	"	"	37 32 04.8	18 00 38.8	83 25 51	"
"	18 02 27.1	12 26 55.6	38 28 32	21 28.9	49 11.8	R	10	"	"	37 32 10	18 00 48	83 28 06.5	"
"	18 12 02.4	12 36 30.8	38 33 02.2	22 19.2	49 42.5	P	10	"	"	37 36 58.4	18 09 47.9	83 09 43.5	"
"	18 12 02.4	12 36 30.8	38 33 07	22 19.2	49 42.5	R	10	"	"	37 37 10	18 10 11	83 25 03.8	"
"	18 17 50.8	12 42 19.2	38 36 12	22 49.5	49 59.6	P	10	"	"	37 40 24.8	18 16 16	83 29 12	"
"	18 17 50.8	12 42 19	38 35 58	22 49.5	49 59.6	R	10	"	"	37 40 16.4	18 16 00	83 25 15.5	"
30	10 08 52.9	4 23 45	40 40 12	23 12.1	38 32.7	P	10	30.00	–30	39 56 34.8	9 56 18	83 08 15	α Arietis East of ☾
"	10 08 52.9	4 23 45 1	40 39 53.5	23 12.1	38 32.7	R	10	"	"	39 56 21.8	9 56 43	83 14 28.5	"

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LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION, during the Winter of 1821, *continued*.

DATE. 1821.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Apparent Altitudes. Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ′	° ′ ″	° ′ ″	
Dec. 30	10 13 59	4 28 51.2	40 37 37	23 19	38 56.3	P	10	30.00	-30	39 53 38.2	10 01 29.2	83 09 30	α Arietis East of ☾
,,	10 13 59	4 28 51.1	40 37 26	23 19	38 56.3	R	10	,,	,,	39 53 47	10 01 15	83 05 58.2	,,
,,	10 28 07.3	4 42 59.1	40 30 46.6	23 32.6	39 59.7	P	10	,,	,,	39 45 46	10 15 20.6	83 05 22.5	,,
,,	10 28 07.3	4 42 59.1	40 30 33.8	23 32.6	39 59.7	H	10	,,	,,	39 45 39	10 15 35.8	83 09 10.5	,,
,,	10 35 09.3	4 50 01	40 27 22	23 38.3	40 30.9	P	10	,,	,,	39 41 48.6	10 22 18.8	83 04 27	,,
,,	10 35 09.4	4 50 01.1	40 27 08.5	23 38.3	40 30.9	H	10	,,	,,	39 41 43.4	10 22 30.9	83 07 27	,,
,,	10 44 13.4	4 59 04.9	40 23 36.2	23 42.9	41 10.1	H	10	,,	,,	39 37 27.9	10 30 00.9	82 44 00	,,
,,	10 44 13.4	4 59 05	40 23 02.5	23 42.9	41 10.1	R	10	,,	,,	39 36 51.6	10 31 04	82 59 45.3	,,
,,	10 49 22.9	5 04 14.3	40 20 48	23 44.1	41 31.8	H	10	,,	,,	39 34 14.9	10 35 40.6	82 51 34.5	,,
,,	10 49 23	5 04 14.4	40 20 07	23 44.1	41 31.8	R	10	,,	,,	39 33 31.6	10 36 56	83 10 24	,,
,,	10 57 06.8	5 11 56.1	40 16 25.6	23 44.5	42 04.5	P	10	,,	,,	39 29 05.4	10 44 42	83 10 58.5	,,
,,	10 57 07	5 11 56.3	40 15 48	23 44.5	42 04.5	R	10	,,	,,	39 28 34.2	10 45 42	83 25 54.7	,,
,,	11 01 57.7	5 16 48.9	40 13 53.7	23 44	42 25.2	P	11	,,	,,	39 26 09	10 49 52.6	83 15 55.5	,,
,,	11 01 57.8	5 16 49	40 13 23.6	23 44	42 25.2	R	11	,,	,,	39 25 45.4	10 50 39	83 27 29.7	,,
,,	11 10 06.8	5 24 59.8	40 10 14.7	23 41.5	42 55.7	H	10	,,	,,	39 21 59.3	10 57 16.5	83 04 10.5	,,
,,	11 10 08.8	5 24 59.9	40 10 12.6	23 41.5	42 55.8	P	10	,,	,,	39 21 49.2	10 57 28.5	83 07 09	,,
,,	11 15 12.4	5 30 03.3	40 07 31.7	23 39.2	43 12.2	H	10	,,	,,	39 18 55.9	11 02 39.4	83 09 01.5	,,
,,	11 15 12.4	5 30 03.3	40 07 50.1	23 39.2	43 12.2	P	10	,,	,,	39 19 04.8	11 02 18.5	83 03 48	,,
,,	11 22 58.6	5 37 49.4	40 03 43.7	23 34.3	43 37.5	H	10	,,	,,	39 14 32.3	11 10 36	83 11 39	,,
,,	11 22 58.6	5 37 49.4	40 03 27	23 34.3	43 37.5	R	10	,,	,,	39 14 11	11 11 01.5	83 18 02.2	,,
,,	11 27 38.4	5 42 29.1	40 01 32.8	23 30.8	43 52.7	H	10	,,	,,	39 11 59.1	11 14 53.4	83 06 04.5	,,
,,	11 27 38.5	5 42 29.1	40 01 08	23 30.8	43 52.7	R	10	,,	,,	39 11 32	11 15 41.5	83 18 06.5	,,
,,	11 35 22.2	5 50 12.7	39 57 10.5	23 23.4	44 16	R	10	,,	,,	39 06 58.4	11 23 44	83 22 49.2	,,
,,	11 35 22.2	5 50 12.9	39 57 59.1	23 23.4	44 16	P	10	,,	,,	39 07 41.4	11 22 21	83 02 03.5	,,
,,	11 39 13.8	5 54 04.2	39 55 43.9	23 19.1	44 26.9	P	10	,,	,,	39 05 09	11 26 49	83 11 14	,,
,,	11 39 13.8	5 54 04.2	39 54 51.5	23 19.1	44 26.8	R	10	,,	,,	39 04 [illegible]	11 [illegible]	[illegible]	,,
,,	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,,	,,	[illegible]	[illegible]	83 01 33	,,
,,	12 34 26.9	6 49 16	39 28 34.6	21 37.9	46 11.1	P	10	,,	,,	38 34 13.6	12 21 22.[illegible]	83 11 39	,,
,,	12 34 27.3	6 49 16.4	39 28 08	21 37.9	46 11.1	H	10	,,	,,	38 33 50.8	12 22 03	82 58 57	,,
,,	12 41 46.1	6 56 35.1	39 24 56.4	21 18.5	46 17.1	H	10	,,	,,	38 30 09.9	12 28 30.9	83 11 30	,,
,,	12 42 47.5	6 57 36.7	39 24 09.1	21 15.8	46 18	P	10	,,	,,	38 29 06.4	12 30 22.7	83 13 58	,,
,,	12 53 25.2	7 08 24.1	39 18 31.5	20 45.8	46 24.3	R	10	,,	,,	38 22 53.2	12 41 20	[illegible]	,,

,,	12 34 20.9	6 49 16	39 28 34.6	21 37.9	46 11.1	P	10	,,	,,	38 34 13.6	12 21 22.2	83 01 33	,,
,,	12 34 27.3	6 49 16.4	39 28 08	21 37.9	46 11.1	H	10	,,	,,	38 33 50.8	12 22 03	83 11 39	,,
,,	12 41 46.1	6 56 35.1	39 24 56.4	21 18.5	46 17.1	H	10	,,	,,	38 30 09.9	12 28 30.9	82 58 57	,,
,,	12 42 47.5	6 57 36.7	39 24 09.1	21 15.8	46 18	P	10	,,	,,	38 29 06.4	12 30 22.7	83 11 30	,,
,,	12 53 25.2	7 08 24.1	39 18 31.5	20 45.8	46 24 3	R	10	,,	,,	38 22 53.2	12 41 20	83 13 58	,,
,,	12 53 35.4	7 08 24.2	39 18 39	20 45.8	46 24.3	H	10	,,	,,	38 23 06.4	12 40 56.4	83 08 03	,,
,,	12 57 56.9	7 12 45.7	39 15 27	20 33	46 25.5	R	10	,,	,,	38 19 34	12 47 10	83 36 03.6	,,
,,	12 57 57	7 12 45.7	39 15 53.3	20 33	46 25.5	H	10	,,	,,	38 20 04.4	12 46 16.4	83 22 40.5	,,
,,	13 09 45.3	7 24 34	39 10 26.5	19 55.5	46 25.1	P	10	,,	,,	38 13 41.4	12 57 30.4	83 14 06	,,
,,	13 09 45.9	7 24 34.5	39 09 43	19 55.4	46 25.1	R	10	,,	,,	38 13 05.4	12 58 34	83 29 52.8	,,
,,	13 16 06.5	7 30 55.1	39 07 21.4	19 33.9	46 23.5	P	10	,,	,,	38 10 17.6	13 03 29.1	83 08 30	,,
,,	13 16 07	7 30 55.5	39 06 30.2	19 33.9	46 23.5	R	10	,,	,,	38 09 30.3	13 04 52	83 29 07.5	,,
,,	13 27 05.7	7 41 54	39 01 52.5	18 55.1	46 18	P	10	,,	,,	38 04 06.4	13 14 22.3	83 07 04.5	,,
,,	13 27 06.4	7 41 54.5	39 01 36.2	18 55.1	46 18	H	10	,,	,,	38 04 07.3	13 14 20.5	83 06 30	,,
,,	13 32 52	7 47 40.2	38 58 48	18 33.8	46 13.9	P	10	,,	,,	38 00 43	13 20 31.3	83 12 48	,,
,,	13 32 52.5	7 47 40.5	38 58 32.3	18 33.8	46 13.9	H	10	,,	,,	38 00 35.1	13 20 28.6	83 12 01.5	,,
,,	13 41 28.1	7 56 16.1	38 53 33.2	18 00.7	46 03.6	R	10	,,	,,	37 55 19.6	13 29 48	83 22 58.5	,,
,,	13 41 28.2	7 56 16	38 53 34.8	18 00.7	46 03.6	H	10	,,	,,	37 55 24.5	13 29 40.1	83 21 00	,,
,,	13 47 36.4	8 02 24.2	38 50 40.5	17 36.1	45 53.9	R	10	,,	,,	37 52 00	13 35 40	83 18 56.2	,
,,	13 47 36.4	8 02 24.1	38 50 47	17 36.1	45 53.8	H	10	,,	,,	37 52 12.5	13 35 18	83 13 28.5	,,
,,	13 56 45.1	8 11 32.7	38 46 11.3	16 58.5	45 37.1	P	10	,,	,,	37 47 00.8	13 44 26.2	83 13 22.5	,,
,,	13 56 45.5	8 11 33.2	38 45 57.5	16 58.5	45 37.1	R	10	,,	,,	37 46 52	13 44 46	83 18 11.2	,,
,,	14 03 06	8 17 53.5	38 42 37.2	16 31.6	45 23.9	P	10	,,	,,	37 43 11.4	13 51 09.8	83 19 04.5	,,
,,	14 03 06.1	8 17 53.7	38 42 17	16 31.6	45 23.9	R	10	,,	,,	37 42 56.4	13 51 34	83 25 04.5	,,
,,	14 13 55.2	8 28 42.6	38 36 59.5	15 44.5	44 58.4	H	10	,,	,,	37 37 22	14 01 24.3	83 10 25.5	,,
,,	14 13 55.2	8 28 42.6	38 37 06	15 44.5	44 58.4	P	10	,,	,,	37 37 13	14 01 40.9	83 14 25.5	,,
,,	14 20 03.1	8 34 50.4	38 33 29	15 17.4	44 42.7	H	10	,,	,,	37 33 41.1	14 07 52.7	83 15 34.5	,,
,,	14 20 03.1	8 34 50.4	38 33 36.7	15 17.4	44 42.9	P	10	,,	,,	37 32 31.4	14 08 10.2	83 19 57	,,
,,	14 30 16.8	8 45 03.6	38 27 45.1	14 30.3	44 15.6	R	10	,,	,,	37 27 34	14 18 38.5	83 23 44	,,
,,	14 30 16.8	8 45 03.6	38 27 52	14 30.3	44 15.6	H	10	,,	,,	37 27 47.1	14 18 15.4	83 17 57	,,
,,	14 35 17.9	8 50 03.9	38 24 46.7	14 06.6	44 01.7	R	10	,,	,,	37 24 26	14 24 08.5	83 31 11.1	,,
,,	14 35 17.3	8 50 04	38 25 02.9	14 06.6	44 01.7	H	10	,,	,,	37 24 46.9	14 23 32.4	83 22 06	,,

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION, during the Winter of 1821, *continued.*

DATE. 1821.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Apparent Altitudes. Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″					° ′ ″	° ′ ″	° ′ ″	
Dec. 31	10 01 40.3	4 15 59.3	27 01 21.8	27 56.3	38 10.4	P	10	29.72	-30	26 20 23.2	9 49 16.7	83 20 36	α Arietis East of ☾
„	10 01 40.5	4 15 59.1	27 01 40	27 56.3	38 10.4	R	10	„	„	26 20 45	9 48 41	83 10 28.5	„
„	10 06 10	4 20 28.9	26 59 15	28 08.7	38 33.1	P	10	„	„	26 17 56.8	9 53 33 4	83 16 09	„
„	10 06 10.1	4 20 29	26 58 46.5	28 08.7	38 33.1	R	10	„	„	26 17 32.2	9 54 19	83 27 30.6	„
„	10 15 46.9	4 30 05.6	26 53 33.5	28 33.3	39 21.1	H	10	„	„	21 11 36.4	10 04 40.3	83 38 40.5	„
„	10 15 46.9	4 30 05.6	26 54 27.3	28 33.3	39 21.1	P	10	„	„	26 12 15.4	10 03 32	83 21 36	„
„	10 20 58.8	4 35 17.4	26 51 51.8	28 46	39 46.8	P	10	„	„	26 09 33.4	10 08 15.9	83 14 37.5	„
„	10 20 58.8	4 35 17.4	26 51 16.7	28 46	39 46.7	H	10	„	„	26 08 55.5	10 09 22.4	83 31 15	„
„	10 29 07	4 43 25.4	26 47 27.8	29 04.2	40 24.5	H	10	„	„	26 04 30.2	10 17 07.4	83 25 30	„
„	10 29 07.1	4 43 25.4	26 48 19	29 04.2	40 24.5	R	10	„	„	26 05 20.8	10 15 41	83 03 52.6	„
„	10 33 16.2	4 47 34.5	26 45 01.6	29 12.7	40 42.4	H	10	„	„	26 01 45.6	10 21 55.9	83 35 21	„
„	10 33 16.3	4 47 34.6	26 45 48.5	29 12.7	40 42.4	R	10	„	„	26 02 32.4	10 20 36	83 15 15.6	„
„	10 42 54.4	4 57 12.5	26 40 41.7	29 30.1	41 21.7	R	12	„	„	25 56 45.2	10 30 44	83 22 52.9	„
„	10 42 54.6	4 57 12.7	26 41 10	29 30.1	41 21.7	P	12	„	„	25 57 09.6	10 29 59.7	83 11 45	„
„	10 48 00.7	5 02 18.8	26 38 21	29 38.6	41 41.5	R	10	„	„	25 54 03.6	10 35 27	83 17 02.3	„
„	10 48 00.8	5 02 18.8	26 38 36.5	29 38.6	41 41.5	P	10	„	„	25 54 16	10 35 04	83 11 18	„
„	10 56 22	5 10 39.9	26 33 53.2	29 49.2	42 09.6	H	10	„	„	25 49 04.7	10 44 09.4	83 22 22.5	„
„	10 56 22.3	5 10 40.1	26 34 03.6	29 49.2	42 09.6	P	10	„	„	25 49 09.6	10 44 01.3	83 18 48	„
„	11 01 44.8	5 16 02.6	26 31 24.7	29 54.5	42 25.3	H	10	„	„	25 46 17.3	10 49 02.4	83 14 57	„
„	11 01 45.1	5 16 02.8	26 31 32.7	29 54.5	42 25.3	P	10	„	„	25 46 23	10 48 53.3	83 12 37.5	„
„	11 12 24.3	5 26 41.9	26 26 15	30 09.2	43 11.9	H	10	„	„	25 40 11	10 59 45.4	83 15 52.5	„
„	11 12 24.4	5 26 41.9	26 26 36.5	30 09.2	43 11.9	R	10	„	„	25 40 32.2	10 59 10.5	83 07 09	„
„	11 16 45.9	5 31 03.4	26 23 52.1	30 12.9	43 25.5	H	10	„	„	25 37 30.5	11 04 26.8	83 20 51	„
„	11 16 46	5 31 03.5	26 24 12.5	30 12.9	43 25.5	R	10	„	„	25 37 50	11 03 54	83 12 52.5	„
„	11 24 48.4	5 39 05.6	26 20 22.9	30 18.2	43 50.8	P	10	„	„	25 33 21.2	11 11 43.8	83 09 33	„
„	11 24 48.5	5 39 05.8	26 20 24	30 18.2	43 50.8	R	10	„	„	25 33 27.8	11 11 33	83 06 48	„
„	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	„
„	11 29 22.3	5 43 39.4	26 17 58.4	30 20.5	44 05.3	P	10	„	„	25 30 47.2	11 16 13.2	83 08 27	„
„	11 33 34.5	5 47 51.6	26 15 28.1	30 22.5	44 18.7	H	10	„	„	25 27 51.2	11 21 22.2	83 22 39	„
„	11 33 34.6	5 47 51.6	26 16 13	30 22.5	44 18.7	R	10	„	„	25 28 33	11 20 08.5	83 04 09	„
1822. Jan. 2.	10 11 43.9	4 24 56.5	31 04 21.3	33 44.6	19 59.3	P	10	29.63	„	31 05 25.4	9 58 06.1	83 17 24	Aldebaran East of the ☾

„	11 29 22.5	5 43 39.4	26 17 58.4	30 20.5	44 05.3	P	10	„	„	25 30 47.2	11 16 13.2	83 08 27	„
„	11 33 34.5	5 47 51.6	26 15 28.1	30 22.5	44 18.7	H	10	„	„	25 27 51.2	11 21 22.2	83 22 39	„
„	11 33 34.6	5 47 51.6	26 16 13	30 22.5	44 18.7	R	10	„	„	25 28 33	11 20 08.5	83 04 09	„
1822. Jan. 2.	10 11 43.9	4 24 56.5	31 04 21.3	33 44.6	19 59.3	P	10	29.63	„	31 05 25.4	9 58 06.1	83 17 24	Aldebaran East of the ☾
„	10 16 05.4	4 29 18	31 02 26	34 05.8	20 25.6	P	10	„	„	31 03 08.6	10 02 07.3	83 12 19.5	„
„	10 20 06.1	4 33 18.6	31 00 34.9	34 25.3	20 49.9	P	10	„	„	31 01 00.2	10 05 57.9	83 09 49.5	„
„	10 28 21	4 41 33.4	30 55 29.7	35 04.8	21 39.3	H	10	„	„	30 55 17.2	10 16 09.1	83 38 55.5	„
„	10 32 31.5	4 45 43.8	30 53 28.2	35 22.2	22 01.2	H	10	„	„	30 53 00.6	10 20 12.8	83 37 15	„
„	10 36 13.7	4 49 25	30 51 41.9	35 39.8	22 23.2	H	10	„	„	30 50 59.1	10 23 49.4	83 35 51	„
„	10 44 04.5	4 57 16.3	30 48 46.9	36 16.6	23 13.1	P	10	„	„	30 47 14	10 30 31.1	83 18 37.5	„
„	10 47 29.4	5 00 41.3	30 47 10.9	36 30.5	23 33.5	P	10	„	„	30 45 32	10 33 33	83 12 55.5	„
„	10 50 38.1	5 02 49.9	30 45 42	36 42.7	23 56.3	P	10	„	„	30 43 37	10 36 58.4	83 32 07.5	„
„	10 58 31.5	5 11 43.1	30 42 02.3	37 15.1	24 38.7	P	10	„	„	30 39 26.4	10 44 25.2	83 10 31.5	„
„	11 02 31.5	5 15 43.1	30 39 57.7	37 31.1	25 01.9	P	10	„	„	30 37 01	10 48 45	83 15 28.5	„
„	11 05 53.7	5 19 05.2	30 38 19.4	37 44.6	25 21.4	P	10	„	„	30 35 06.2	10 52 10	83 16 12	„
„	11 15 05.7	5 28 17.2	30 33 17	38 19.7	26 13.5	H	10	„	„	30 29 20.1	11 02 26.5	83 32 19.5	
„	11 20 11.5	5 33 22.9	30 30 48	38 38.3	26 41.7	H	10	„	„	30 26 26.7	11 07 36	83 33 30	„
„	11 24 24.8	5 37 36.1	30 28 33.8	38 53.8	27 05.1	H	10	„	„	30 23 51.9	11 12 12.8	83 39 10.5	„
„	11 32 21.2	5 45 32.4	30 25 04.7	39 21.7	27 49.8	H	10	„	„	30 19 41.4	11 19 39.6	83 31 48	„
„	11 35 47	5 48 58.1	30 23 37.3	39 33.4	28 09.3	H	10	„	„	30 17 56.2	11 22 47.4	83 27 19.5	„
„	11 39 06.5	5 52 08.5	30 21 57.2	39 44.7	28 28.3	H	10	„	„	30 15 57.6	11 26 19.4	83 32 43.5	„
6	12 39 52.9	6 50 55.6	62 31 35.9	32 31.1	46 25.3	P	10	29.82	−26	62 17 51	12 24 21.5	83 21 28.5	α Arietis West of ☾
„	12 39 53.2	6 50 55.7	62 30 58.8	32 31.1	46 25.3	H	10	„	„	62 17 00.2	12 22 56.4	83 00 10.5	„
„	12 46 56.3	6 57 58.9	62 35 28.4	33 11.2	46 23.9	P	10	„	„	62 21 40.8	12 30 46.7	83 11 57	„
„	12 46 56.6	6 57 59	62 34 53.2	33 11.2	46 23.9	H	11	„	„	62 21 12.1	12 29 58.6	82 59 54	„
„	12 56 57.1	7 07 59.5	62 41 00.2	34 07 9	46 19.9	P	10	„	„	62 27 38.6	12 40 46.5	83 11 45	„
„	12 56 57.4	7 07 59.6	62 40 45.5	34 07.9	46 19.9	H	10	„	„	62 27 29	12 40 30.5	83 07 43.5	„
„	13 03 00.3	7 14 02.5	62 44 00.7	34 42.1	46 15.8	P	10	„	„	62 30 56.6	12 46 18.2	83 03 55.5	„
„	13 03 00.6	7 14 02.7	62 43 44.5	34 42.1	46 15.8	H	10	„	„	62 30 46.4	12 46 01.4	82 59 40.5	„
„	13 10 54.6	7 21 56.7	62 48 30.1	35 25.6	46 08.8	P	10	„	„	62 35 50.4	12 54 31	83 08 34.5	„
„	13 10 54.7	7 21 56.7	62 48 21.3	35 25.6	46 08.8	H	10	„	„	62 35 46.3	12 54 24.3	83 06 54	„

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION, during the Winter of 1821—22, *continued*.

DATE. 1822.	Time by 259.	Apparent Time.	Observed Distance of Limbs	Apparent Altitude. Moon's centre	Apparent Altitude. Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
Jan. 6	13 16 20.2	7 27 22.2	62 51 23.5	35 54.7	46 02.9	P	10	29.82	26	63 38 58.4	12 59 46.3	83 06 01.5	α Arietis W. of ☾
„	13 16 20.3	7 27 22.2	62 51 12.5	35 54.7	46 02.9	H	10	„	„	62 38 53.6	12 59 38.2	83 04 00	„
„	13 25 02.9	7 36 04.8	62 55 49.5	36 40.6	45 48.4	P	10	„	„	62 43 52	13 07 58.7	82 58 28.5	„
„	13 25 02.9	7 36 04.6	62 55 56.7	36 40.6	45 48.4	H	10	„	„	62 44 06.1	13 08 22.3	83 04 25.5	„
„	13 30 16.5	7 41 18.1	62 58 41.7	37 07.7	45 36.8	H	10	„	„	62 47 11.2	13 13 32.6	83 03 37.5	„
„	13 30 16.6	7 41 18.4	62 58 58.3	37 07.7	45 36.8	P	10	„	„	62 47 20	13 13 47.3	83 07 13.5	„
„	13 39 12.5	7 50 14	63 03 30.5	37 56	45 17.2	H	10	„	„	62 52 33.7	13 22 33.8	83 04 57	„
„	13 39 12.6	7 50 14.2	63 03 29.3	37 56	45 17.2	P	10	„	„	62 52 25	13 22 18.8	83 01 09	„
„	13 45 07.9	7 56 09.3	63 06 41.7	38 29.2	45 04.3	H	11	„	„	62 56 10.3	13 28 36.8	83 06 52.5	„
„	13 45 08	7 56 09.5	63 06 49.2	38 29.2	45 04.3	P	11	„	„	62 56 08	13 28 32.8	83 05 48	„
„	13 54 10.4	8 05 11.6	63 12 00.2	39 18.7	44 42.2	H	10	„	„	63 02 00.4	13 38 23.9	83 18 04.5	„
„	13 54 10.5	8 05 11.9	63 11 42.2	39 18.7	44 42.2	P	10	„	„	63 01 37.4	13 37 45.5	83 08 24	„
„	13 59 31.2	8 10 32.3	63 14 53	39 47.4	44 28	H	10	„	„	63 05 16.6	13 43 52	83 19 55.5	„
„	13 59 31.4	8 10 32.7	63 14 31.7	39 47.4	44 28	P	10	„	„	63 04 48.8	13 43 06.3	83 08 24	„
„	14 07 20.5	8 18 21.5	63 18 39.7	40 27.8	44 04.9	H	10	„	„	63 09 37.3	13 51 10.2	83 12 10.5	„
„	14 07 20.5	8 18 21.6	63 18 49.2	40 27.8	44 04.9	P	10	„	„	63 09 40.6	13 51 16.2	83 13 39	„
„	14 12 44	8 23 44.9	63 21 22.5	40 54.8	43 47.3	H	10	„	„	63 12 43.9	13 56 23	83 09 31.5	„
„	14 12 44.1	8 23 45.1	63 21 23.6	40 54.7	43 47.3	P	10	„	„	63 12 38	13 56 13.7	83 07 09	„
„	14 20 51.5	8 31 52.3	63 25 58.3	41 34	43 20.1	H	10	„	„	63 17 55.8	14 05 06.6	83 18 34.5	„
„	14 20 51.6	8 31 52.5	63 25 35.9	41 34	43 20.1	P	10	„	„	63 17 19.8	14 04 05.3	83 03 27	„
„	14 25 45.8	8 36 46.5	63 28 51.2	41 56.8	43 03.1	H	10	„	„	63 21 10.7	14 10 33.8	83 26 49.5	„
„	14 25 46	8 36 45.8	63 28 41.9	41 56.8	43 03.2	P	10	„	„	63 20 53.4	14 10 04.7	83 19 28.5	„
„	14 33 44.9	8 44 45.4	63 32 39.1	42 33.9	42 35.1	H	10	„	„	63 25 33.4	14 17 54.8	83 17 21	„
„	14 33 45.2	8 44 45.9	63 32 27.8	42 33.9	42 35.1	P	10	„	„	63 25 15.6	14 17 24.7	83 09 42	„
„	14 39 35.5	8 50 45.9	63 35 29	43 02	42 13.7	H	10	„	„	63 28 50.9	14 23 26	83 10 01.5	„
„	[illegible]	[illegible]	[illegible]	43 02	42 13.7	P	10	„	„	[illegible]	[illegible]	[illegible]	„
„	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	„	„	[illegible]	[illegible]	[illegible]	„
„	14 47 52.4	8 58 [illegible]	63 39 52.4	43 37.9	41 41.9	P	10	„	„	63 33 46	14 31 41.2	83 12 06	„
„	14 53 11.6	9 04 11.8	63 42 50	44 00.1	41 19.2	H	10	„	„	63 37 07.4	14 37 19.2	83 16 51	„
„	14 53 11.8	9 04 12.1	63 42 45.1	44 00.1	41 19.2	P	10	„	„	63 37 00.4	14 37 07.4	83 13 49.5	„
18	21 48 59.3	15 56 16.1	48 05 03.8	12 33.7	34 05.5	P	10	29.80	-33	47 22 11	21 28 02.3	82 56 33	Regulus W. of ☾

,,	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,,	,,	[illegible]	[illegible]	[illegible]	,,
,,	14 47 52.4	8 58 52.8	63 39 52.4	45 37.9	41 41.9	P	10	,,	,,	63 33 46	14 31 41.2	83 12 06	,,
,,	14 53 11.6	9 04 11.8	63 42 50	44 00.1	41 19.2	H	10	,,	,,	63 37 07.4	14 37 19.2	83 16 51	,,
,,	14 53 11.8	9 04 12.1	63 42 45.1	44 00.1	41 19.2	P	10	,,	,,	63 37 00.4	14 37 07.4	83 13 49.5	,,
18	21 48 59.3	15 56 16.1	48 05 03.8	12 33.7	34 05.5	P	10	29.80	-33	47 22 11	21 28 02.3	82 56 33	Regulus W. of ☾
,,	21 48 59.3	15 56 16.2	48 04 56	12 34.7	34 05.5	R	10	,,	,,	47 22 07	21 27 54	82 54 27	,,
,,	21 54 50.5	16 02 07	48 07 41.2	12 42.7	33 47.7	P	10	,,	,,	47 25 10.6	21 34 01.5	82 58 39	,,
,,	21 54 50.6	16 02 07.1	48 07 28.5	12 42.7	33 47.7	R	10	,,	,,	47 25 02.2	21 33 45	82 54 28.8	,,
,,	22 10 28.3	16 17 44.7	48 14 32	13 01.1	32 54	P	10	,,	,,	47 33 11.6	21 50 04	83 04 49.5	,,
,,	22 10 28.6	16 17 45	48 14 09.2	13 01.1	32 54	H	10	,,	,,	47 32 57.7	21 49 36.1	82 57 46.5	,,
,,	22 17 07.1	16 24 23.4	48 17 41.7	13 07.4	32 29.9	P	10	,,	,,	47 36 50.6	21 57 22	83 14 44	,,
,,	22 17 07.3	16 24 23.6	48 17 13	13 07.4	32 29.9	H	10	,,	,,	47 36 32.3	21 56 45.4	83 05 27	,,
,,	22 28 04.8	16 35 21	48 21 51.3	13 15.2	31 47.9	H	10	,,	,,	47 42 00.2	22 07 41.5	83 05 07.5	,,
,,	22 28 04.8	16 35 20.8	48 21 59	13 15.2	31 47.9	R	10	,,	,,	47 42 00.2	22 07 42	83 05 18.6	,,
,,	22 35 38.1	16 42 54	48 24 35.5	13 18.9	31 17.8	R	10	,,	,,	47 45 11.2	22 14 05	82 47 44.7	,,
,,	22 35 38.1	16 42 54.2	48 24 41	13 18.9	31 17.8	H	10	,,	,,	47 45 24	22 14 29.4	82 53 48	,,
,,	22 46 23.6	16 53 39.6	48 29 35	13 22.1	30 32.6	P	10	,,	,,	47 50 55.4	22 25 33	82 58 21	,,
,,	22 46 23.8	16 53 39.6	48 29 18	13 22.1	30 32.6	R	10	,,	,,	47 50 42.2	22 25 06.5	82 51 44.4	,,
,,	22 52 37.4	17 00 53.3	48 32 33.2	13 22.5	30 04.8	P	10	,,	,,	47 54 24	22 32 30.5	82 54 18	,,
,,	22 52 37.5	16 59 53.2	48 31 54	13 22.6	30 04.9	R	10	,,	,,	47 53 47.4	22 31 17	82 50 56.7	,,
,,	23 04 08.7	17 11 24.4	48 37 33.5	13 20.2	29 12.3	P	10	,,	,,	48 00 18	22 44 19.4	83 13 45	,,
,,	23 04 08.9	17 11 24.5	48 37 00.1	13 20.2	29 12.3	H	10	,,	,,	47 59 49.8	22 43 22.4	82 59 28.5	,,
,,	23 11 08.3	17 18 23.8	48 40 37	13 17.6	28 39.9	P	10	,,	,,	48 03 54.4	22 51 32.4	83 17 10.5	,,
,,	23 11 08.3	17 18 23.8	48 40 00	13 17.6	28 39.9	H	10	,,	,,	48 03 29.3	22 50 41.9	83 04 51.5	,,
,,	23 20 28.9	17 27 44.1	48 43 51	13 13.1	27 55.3	R	10	,,	,,	48 07 59.6	22 59 43.5	82 59 50.1	,,
,,	23 20 29	17 27 44.4	48 44 50.3	13 12.1	27 55.3	H	10	,,	,,	48 09 02.2	23 01 48.5	83 31 01.5	,,
,,	23 26 14.1	17 33 29.2	48 46 23.5	13 07.4	27 26.9	R	10	,,	,,	48 10 59.4	23 05 42.5	83 03 13.3	,,
,,	23 26 14.2	17 33 29.5	48 46 58.7	13 07.3	27 26.9	H	10	,,	,,	48 11 38.2	23 07 00.8	83 22 49.5	,,
31	12 42 14.8	6 43 16.3	46 28 35.2	49 10.8	38 24.7	P	10	30.00	-22	46 05 26	12 15 25.8	83 02 24	Pollux East of ☾
,,	12 42 14.8	6 43 16.1	46 28 26.3	49 10.8	38 24.7	R	10	,,	,,	46 05 17.4	12 15 40.5	83 06 06	,,
,,	12 47 06.1	6 48 07.6	46 25 36	49 13.3	38 52.8	R	10	,,	,,	46 01 58.4	12 21 19	83 17 54	,,
,,	12 47 06.1	6 48 07.6	46 25 56.4	49 [illegible].3	38 52.8	P	10	,,	,,	46 02 15	12 20 50.9	83 10 49.5	,,

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION, during the Winter of 1821–22, *continued*.

DATE. 1822.	Time by 259.	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Apparent Altitudes. Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ″	° ′ ″	° ′ ″	
Jan. 31	12 55 11	6 56 12.4	46 22 00.3	49 16.7	39 38.5	P	10	30.00	–22	45 57 29	12 28 57.7	83 11 19.5	Pollux East of ☾
„	12 55 11	6 56 12.2	46 21 52.3	49 16.7	39 38.5	H	10	„	„	45 57 34.2	12 28 48.7	83 09 07.5	„
„	13 00 34.6	7 01 35.8	46 19 20	49 18.4	40 08.5	H	10	„	„	45 54 29.9	12 34 02.5	83 06 40.5	„
„	13 00 34.7	7 01 36	46 22 00.3	49 18.4	40 08.5	P	10	„	„	45 54 35	12 33 53.7	83 04 25.5	„
„	13 08 11.6	7 09 12.7	46 14 54.5	49 20.3	40 50.7	R	10	„	„	45 49 16.8	12 42 55	83 25 34.8	„
„	13 08 11.7	7 09 12.9	46 14 59.1	49 20.3	40 50.7	H	10	„	„	45 49 25.8	12 42 38.4	83 21 22.5	„
„	13 12 23.9	7 13 25.1	46 12 57.7	49 21	41 13.7	H	10	„	„	45 47 01.3	12 46 46	83 20 13.5	„
„	13 12 23.9	7 13 25	46 12 53.7	49 21	41 13.7	R	10	„	„	45 46 51.2	12 47 03	83 24 30.7	„
„	13 19 51.8	7 20 52.8	46 09 46.5	49 21.1	41 54.5	R	10	„	„	45 43 01.2	12 53 34.5	83 10 24.7	„
„	13 19 51.9	7 20 52.9	46 09 57.9	49 21.1	41 54.6	P	10	„	„	45 43 15	12 53 11	83 04 33	„
„	13 24 48.5	7 25 49.5	46 07 15	49 20.4	42 21.3	R	10	„	„	45 40 02.3	12 58 38	83 12 07.5	„
„	13 24 48.6	7 25 49.6	46 07 11.4	49 20.4	42 21.3	P	10	„	„	45 40 00	12 58 42.9	83 13 19.5	„
„	13 31 58.3	7 32 59.4	46 03 16.3	49 18	42 59.2	H	10	„	„	45 35 27.8	13 06 26.4	83 21 45	„
„	13 31 58.4	7 32 59.4	46 03 44.1	49 18	42 59.2	P	10	„	„	45 35 52.8	13 05 43.5	83 11 01.5	„
„	13 36 55.2	7 37 56.3	46 01 10	49 15.3	43 24.7	H	10	„	„	45 32 54.5	13 10 47.3	83 12 45	„
„	13 36 55.4	7 37 56.3	46 01 32	49 15.3	43 24.7	P	10	„	„	45 33 14.8	13 10 12.3	83 04 01.5	„
„	13 44 03.4	7 45 04.4	45 57 35.6	49 08.4	44 01	H	10	„	„	45 28 39.6	13 18 01.3	83 14 13.5	„
„	13 44 03.4	7 45 04.4	45 57 20	49 08.4	44 01	R	10	„	„	45 28 18.6	13 18 36.5	83 23 01.3	„
„	13 48 34	7 49 35	45 55 28.8	49 02.1	44 23.6	R	10	„	„	45 25 58.2	13 22 34	83 14 45	„
„	13 48 34	7 49 35	45 55 32.1	49 02.1	44 23.6	H	10	„	„	45 26 09.5	13 22 16.5	83 10 22.6	„
„	13 56 34	7 57 34.8	45 51 34.2	48 49.7	45 02.9	R	12	„	„	45 21 18.4	13 30 31	83 14 02.2	„
„	13 57 10.5	7 58 11.3	45 51 29.1	48 48.8	45 05.8	P	10	„	„	45 21 12	13 30 42.5	83 07 48	„
„	14 01 17.4	8 02 18.1	45 49 31.9	48 41.9	45 25.8	P	10	„	„	45 18 52	13 34 40.7	83 05 39	„
„	14 01 17.4	8 02 18.3	45 49 29	48 41.9	45 25.8	R	10	„	„	45 18 46.2	13 34 50	83 07 55.5	„
„	14 08 53.9	8 09 54.8	45 45 59.9	48 28.7	46 02.2	H	10	„	„	45 14 39.7	13 41 50.9	82 59 01.5	„
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
„	14 [illegible] 13.9	8 15 [illegible]	45 42 31.4	48 19.2	46 27.5	H	10	„	„	45 10 40.4	13 48 38	83 21 00	„
„	14 14 14.1	8 15 14.7	45 42 55.1	48 19.2	46 27.5	P	10	„	„	45 11 04	13 47 57.3	83 10 39	„
„	14 23 02.4	8 24 03.2	45 38 48.3	48 00.3	47 06	H	10	„	„	45 06 07.4	13 56 23	83 04 57	„
„	14 23 02.4	8 24 03.1	45 38 44.5	48 00.3	47 06	R	10	„	„	45 06 04	13 56 29	83 06 25	„
„	14 28 18.2	8 29 19	45 36 28	47 47.5	47 27.4	R	10	„	„	45 03 17.8	14 01 11.5	82 58 08.2	„

"	14 14 13.9	8 15 14.8	45 42 31.4	48 19.2	46 27.5	H	10	"	"	45 10 40.4	13 48 58	83 21 00	"
"	14 14 14.1	8 15 14.7	45 42 55.1	48 19.2	46 27.5	P	10	"	"	45 11 04	13 47 57.3	83 10 39	"
"	14 23 02.4	8 24 03.2	45 38 48.3	48 00.3	47 06	H	10	"	"	45 06 07.4	13 56 23	83 04 57	"
"	14 23 02.4	8 24 03.1	45 38 44.5	48 00.3	47 06	R	10	"	"	45 06 04	13 56 29	83 06 25	"
"	14 28 18.2	8 29 19	45 36 28	47 47.5	47 27.4	R	10	"	"	45 03 17.8	14 01 11.5	82 58 08.2	"
"	14 28 18.3	8 29 19.1	45 36 20.2	47 47.5	47 27.4	H	10	"	"	45 03 10.4	14 01 24.6	83 01 22.5	"
"	14 37 27	8 38 27.4	45 31 34.1	47 23.6	48 04.3	P	10	"	"	44 57 32	14 11 00.4	83 08 15	"
"	14 37 27.1	8 38 27.7	45 31 34.5	47 23.6	48 04.3	R	10	"	"	44 57 35	14 10 54.5	83 06 42.1	"
"	14 42 09.7	8 43 10.3	45 29 17.5	47 10.6	48 23.2	R	10	"	"	44 54 51.8	14 15 32.5	83 05 33.3	"
"	14 42 09.7	8 43 10.1	45 29 20.9	47 10.6	48 23.2	P	10	"	"	44 54 51	14 15 34.3	83 06 03.5	"
"	14 49 34.4	8 50 35.1	45 25 31.1	46 48.6	48 51.2	P	10	"	"	44 50 19.6	14 23 16.3	83 10 19.5	"
"	14 49 34.4	8 50 35	45 25 27.1	46 48.6	48 51.2	H	10	"	"	44 50 19.2	14 23 16.6	83 10 24	"
"	14 54 27.1	8 55 27.7	45 23 12.9	46 33.2	49 08.4	H	10	"	"	44 47 38.3	14 27 50.8	83 05 46.5	"
"	14 54 27.1	8 55 27.8	45 23 14.9	46 33.2	49 08.4	P	10	"	"	44 47 37.2	14 27 52.7	83 06 13.5	"
"	15 02 31.9	9 03 32.4	45 19 34.2	46 06.9	49 35.3	H	10	"	"	44 43 16.5	14 35 16.5	82 56 01.5	"
"	15 02 31.9	9 03 32.4	45 19 28.5	46 06.9	49 35.3	R	10	"	"	44 43 12.8	14 35 22.5	82 57 31.2	"
"	15 07 23.8	9 08 24.3	45 17 16.7	45 50.6	49 50.6	R	10	"	"	44 40 36.2	14 39 50.5	82 51 36.6	"
"	15 07 23.8	9 08 24.3	45 17 18.2	45 50.6	49 50.6	H	10	"	"	44 40 36.1	14 39 49.5	82 51 18	"
"	15 14 41.9	9 15 42	45 12 47.3	45 24.5	50 12.5	P	10	"	"	44 35 24.4	14 48 40.2	83 14 34.5	"
"	15 14 42.1	9 15 42.4	45 12 50.5	45 24.5	50 12.5	R	10	"	"	45 35 32.2	14 48 27	83 11 09	"
"	15 18 54.7	9 19 54.8	45 11 05.5	45 08.2	50 24.5	P	10	"	"	44 33 20	14 52 11.8	83 04 15	"
"	15 18 54.9	9 19 55.2	45 10 53.5	45 08.3	50 24.5	R	10	"	"	44 33 12.8	14 52 25	83 07 27	"
"	15 22 52.7	9 23 53.2	45 09 23.2	44 53	50 35.7	P	10	"	"	44 31 16.4	14 55 42.5	82 57 21	"
"	15 22 52.7	9 23 53.1	45 09 16.5	44 53	50 35.7	R	10	"	"	44 31 06.6	14 56 02.5	83 02 24.3	"
"	15 29 11.8	9 30 12.2	45 05 57.2	44 26.9	50 52.7	H	10	"	"	44 27 20.3	15 02 24.2	83 03 00	"
"	15 29 11.8	9 30 12.3	45 06 01.6	44 26.9	50 52.7	P	10	"	"	44 27 22.8	15 02 19.9	83 01 53.5	"
"	15 33 15.7	9 34 16.1	45 04 02	44 09.2	51 03.1	H	10	"	"	44 25 02.6	15 06 18.7	83 00 39	"
"	15 33 15.8	9 34 16.2	45 04 08	44 09.2	51 03.1	P	10	"	"	44 24 59.4	15 06 24.7	83 02 07.5	"
"	15 37 15.1	9 38 15.4	45 02 11.7	43 51.9	51 13.4	H	10	"	"	44 22 49.9	15 10 04.7	82 57 19.5	"
"	15 37 15.3	9 38 15.6	45 02 06.3	43 51.9	51 13.4	P	10	"	"	44 22 43	15 10 16.3	83 00 10.5	"
"	15 44 21.8	9 45 22.1	44 57 51	43 21.1	51 28.7	H	10	"	"	44 17 52.2	15 18 31.4	83 17 19.5	"
"	15 44 21.8	9 45 22	44 57 41	43 21.1	51 28.7	R	10	"	"	44 17 46.8	15 18 40.5	83 19 36.6	"

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION, during the Winter of 1821–22, *continued*.

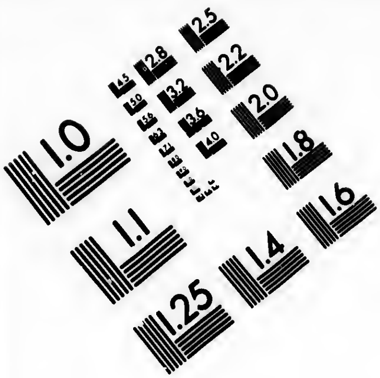
DATE. 1822.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Apparent Altitudes. Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ″	° ′ ″	° ′ ″	
Jan. 31	15 48 16.9	9 49 17.1	44 55 54	43 04.2	51 35.3	R	10	30.00	−22	44 15 41	15 22 15	83 14 43.5	Pollux East of ☾
„	15 48 16.9	9 49 17.2	44 56 06.4	43 04.2	51 35.3	H	10	„	„	44 15 49.8	15 21 59.8	83 10 39	„
„	15 52 29.1	9 53 29.3	44 54 08.4	42 46.1	51 42.2	H	10	„	„	44 13 32.8	15 25 53	83 05 55.5	„
„	15 52 29.1	9 53 29.3	44 54 08.7	42 46.1	51 42.2	R	10	„	„	44 13 37	15 25 46	83 04 10.2	„
Feb. 4	12 51 29.8	6 51 40.9	53 54 46	30 31.1	39 50.7	R	10	29.80	−35	53 47 36.4	12 23 18	82 54 16.5	Aldebaran West of ☾
„	12 51 29.9	6 51 41.1	53 55 17.9	30 31.1	39 50.7	P	10	„	„	53 48 03.4	12 24 06.7	83 06 24	„
„	12 56 05.8	6 56 17	53 58 07.7	30 56.3	39 53.5	P	10	„	„	53 51 02.2	12 29 28	83 17 46.5	„
„	12 56 05.8	6 56 16.9	53 57 30	30 56.3	39 53.5	R	10	„	„	53 50 32.6	12 28 34.5	83 04 24	„
„	13 00 18.6	7 00 29.8	54 00 11.5	31 19.5	39 56.1	P	10	„	„	53 53 21.4	12 33 37.7	83 16 58.5	„
„	13 00 18.7	7 00 29.8	53 59 52	31 19.5	39 56.1	R	10	„	„	53 53 05.6	12 33 09.5	83 09 55.5	„
„	13 07 46.9	7 07 57.9	54 02 35.6	31 59.4	39 58.1	H	10	„	„	53 56 15.1	12 38 50	82 43 01.5	„
„	13 07 47	7 07 58.2	54 03 44.4	31 59.4	39 58.1	P	10	„	„	53 57 14	12 40 35.7	83 09 22.5	„
„	13 12 46.2	7 12 57.1	54 06 13.1	32 25.7	39 58.3	H	10	„	„	54 00 05.5	12 45 44	83 11 43.5	„
„	13 12 46.4	7 12 57.4	54 06 13.2	32 25.6	39 58.3	P	10	„	„	54 00 00	12 45 34	83 09 12.5	„
„	13 17 56.4	7 18 07.3	54 08 51.3	32 52.8	39 58.6	H	10	„	„	54 02 59.6	12 50 56.7	83 12 21	„
„	13 17 56.4	7 18 07.5	54 08 50.9	32 52.8	39 58.6	P	10	„	„	54 02 53	12 50 44.8	83 09 19.5	„
„	13 26 12.1	7 26 23.1	54 13 16.5	33 35.8	39 56.2	R	10	„	„	54 07 48	12 59 35	83 17 58.5	„
„	13 26 12.3	7 26 23.2	54 13 38.1	33 35.8	39 56.2	H	10	„	„	54 08 16.6	13 00 26	83 30 42	„
„	13 31 11.9	7 31 22.9	54 15 41	34 01.5	39 53.1	R	10	„	„	54 10 30.1	13 04 26	83 15 46.5	„
„	13 31 12	7 31 22.9	54 15 48.8	34 01.6	39 53.1	H	10	„	„	54 10 41	13 04 45.5	83 20 39	„
„	13 36 24.7	7 36 35.6	54 18 13	34 28.4	39 50	R	10	„	„	54 13 20.4	13 09 31	83 14 20.2	„
„	13 36 24.7	7 36 35.6	54 18 21.3	34 28.4	39 50	H	10	„	„	54 13 31.7	13 09 52.3	83 19 10.5	„
„	13 55 42.4	7 55 53.4	54 27 20.1	36 03.1	39 27	P	10	„	„	54 23 38.4	13 28 02.6	83 02 18	„
„	13 55 43.3	7 55 54.2	54 27 08.5	36 03.1	39 27	R	10	„	„	54 23 31.6	13 27 51	82 59 12	„
„	14 00 18.6	8 00 29.6	54 30 07.6	36 25.3	39 21.3	P	10	„	„	54 26 43.6	13 33 35.4	83 16 27	„
„	14 00 19.4	8 00 30.3	54 29 51	36 25.3	39 21.3	R	10	„	„	54 26 30.8	[illegible]	[illegible]	„
„	14 04 34.5	8 04 45.5	54 32 07.0	36 45.8	39 16.1	P	10	„	„	[illegible]	[illegible]	[illegible]	„
„	14 04 34.8	8 04 45.7	54 32 14	36 45.8	39 16.1	R	10	„	„	54 29 08.6	13 38 06	83 20 04.5	„
„	14 12 05.1	8 12 17.1	54 35 45.1	37 21	39 03.2	P	10	„	„	54 33 07.4	13 45 05.4	83 12 06	„
„	14 12 06.1	8 12 16.8	54 35 47.1	37 21	39 03.2	H	10	„	„	54 33 16	13 45 20.7	83 15 58.5	„
„	14 16 38.2	8 16 48.9	54 37 53.3	37 41.7	38 53.4	H	10	„	„	54 35 43.2	13 49 45	83 14 01.5	„

,,	14 04 34.5	8 04 45.5	54 32 07.8	36 45.8	39 16.1	P	10	,,	,,	54 29 00	[illegible]	[illegible]	,,
,,	14 04 34.8	8 04 45.7	54 32 14	36 45.8	39 16.1	R	10	,,	,,	54 29 08.6	13 38 06	83 20 04.5	,,
,,	14 12 03.1	8 12 17.1	54 35 45.1	37 21	39 03.2	P	10	,,	,,	54 33 07.4	13 45 05.4	83 12 06	,,
,,	14 12 06.1	8 12 16.8	54 35 47.1	37 21	39 03.2	H	10	,,	,,	54 33 16	13 45 20.7	83 15 58.5	,,
,,	14 16 38.2	8 16 48.9	54 37 53.3	37 41.7	38 53.4	H	10	,,	,,	54 35 43.2	13 49 45	83 14 01.5	,,
,,	14 16 38.5	8 16 49.4	54 38 01.5	37 41.7	38 53.4	P	10	,,	,,	54 35 43.6	13 49 46	83 14 09	,,
,,	14 21 25.4	8 21 36.1	54 40 12.3	38 03.5	38 43	H	10	,,	,,	54 38 24	13 54 34.2	83 14 31.5	,,
,,	14 21 25.8	8 21 36.6	54 40 24.8	38 03.5	38 42.9	P	10	,,	,,	54 38 30.4	13 54 45.5	83 17 13.5	,,
,,	14 30 02.1	8 30 12.8	54 45 08.5	38 40.4	38 22.1	H	10	,,	,,	54 43 58.4	14 04 35	83 35 33	,,
,,	14 30 02.2	8 30 13	54 44 51	38 40.4	38 22.1	R	10	,,	,,	54 43 37.2	14 03 57.5	83 26 07.5	,,
,,	14 34 11.7	8 34 22.4	54 47 02.5	38 57.4	38 11.1	H	10	,,	,,	54 46 11.7	14 08 34.8	83 33 06	,,
,,	14 34 11.9	8 34 22.7	54 46 48.5	38 57.4	38 11.1	R	10	,,	,,	54 45 53.6	14 08 02.5	83 24 57	,,
,,	14 39 21.3	8 39 32	54 49 05.2	39 18.4	37 57.6	H	10	,,	,,	54 48 39.1	14 13 00	83 22 00	,,
,,	14 39 21.4	8 39 32.2	54 48 55.5	39 18.3	37 57.6	R	10	,,	,,	54 48 24.4	14 12 32.5	83 15 04.5	,,
5	12 46 41.1	6 46 42	67 16 23	20 48.2	39 50	P	10	,,	−34	67 02 42.4	12 18 45.5	83 00 52.5	,,
,,	12 46 41.2	6 46 41.8	67 15 46	20 48.3	39 50	R	10	,,	,,	67 02 13.6	12 17 53	82 47 48	,,
,,	12 51 20.4	6 51 21.5	67 18 49.5	21 15.3	39 53.8	R	10	,,	,,	67 05 22.4	12 23 36	83 03 59.2	,,
,,	12 51 20.4	6 51 21.3	67 19 17.3	21 15.3	39 53.8	P	10	,,	,,	67 05 40.6	12 24 09.4	83 12 03	,,
,,	12 55 18	6 55 18.9	67 21 26.7	21 38.4	39 57	P	10	,,	,,	67 07 55.4	12 28 14	83 13 46.5	,,
,,	12 55 18.1	6 55 18.7	67 21 13	21 38.4	39 57	R	10	,,	,,	67 07 51	12 28 06	83 11 49.5	,,
,,	13 03 34.5	7 03 35.3	67 25 50.6	22 24.8	39 59.2	P	10	,,	,,	67 12 34.6	12 36 41.5	83 16 33	,,
,,	13 03 34.5	7 03 35.1	67 25 22.3	22 24.8	39 59.2	H	10	,,	,,	67 12 11.4	12 35 59.4	83 06 04.5	,,
,,	13 08 25.7	7 08 26.3	67 28 26.5	22 51.4	39 58.7	H	10	,,	,,	67 15 25	12 41 51.2	83 21 13.5	,,
,,	13 08 25.8	7 08 26.6	67 28 47.1	22 51.4	39 58.7	P	10	,,	,,	67 15 39.6	12 42 17.8	83 27 48	,,
,,	13 13 32.5	7 13 33.1	67 31 11.2	23 19.3	39 58.1	H	10	,,	,,	67 18 18.9	12 47 07.4	83 23 34.5	,,
,,	13 13 32.6	7 13 33.3	67 31 05.2	23 19.3	39 58.1	P	10	,,	,,	67 18 06.4	12 46 44.7	83 17 51	,,
,,	13 22 14.6	7 22 15.2	67 36 04	24 07.3	39 55.2	H	10	,,	,,	67 23 28.7	12 56 30.3	83 33 46.5	,,
,,	13 22 14.7	7 22 15.2	67 35 59.5	24 07.3	39 55.2	R	10	,,	,,	67 23 24.8	12 56 24.5	83 32 12.3	,,
,,	13 26 37.7	7 26 38.2	67 37 54.5	24 31.7	39 53	R	10	,,	,,	67 25 30.1	13 00 11	83 23 12.3	,,
,,	13 26 37.7	7 26 38.2	67 37 53.6	24 31.7	39 53	H	10	,,	,,	67 25 29.3	13 00 09.7	83 22 52.5	,,
,,	13 31 38.2	7 31 38.7	67 40 09.2	24 59.6	39 50.5	H	10	,,	,,	67 27 56.3	13 04 36.9	83 14 33	,,
,,	13 31 38.2	7 31 38.7	67 40 02.5	24 59.7	39 50.5	R	10	,,	,,	67 27 48	13 04 21	83 10 34.5	,,

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION
during the Winter of 1821—22, *continued.*

DATE. 1822.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre.	Apparent Altitudes. Sun's centre, or Star.	Observer.	No. of Observations.	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich.	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	° ′	° ′					° ′ ″	° ′ ″	° ′ ″	
Feb. 5	13 40 13.2	7 40 13.9	67 44 35.5	25 47.6	39 43.4	P	10	29.80	-34	67 32 36.4	13 13 06.1	83 13 04.5	Aldebaran W. of ☾
,,	13 40 13.2	7 40 13.7	67 44 12.5	25 47.6	39 43.4	R	10	,,	,,	67 32 19	13 12 35	83 05 19.9	,,
,,	13 44 22	7 44 22.7	67 47 00.6	26 10.9	39 38.4	P	10	,,	,,	67 35 13	13 17 15.8	83 07 03.5	,,
,,	13 44 22	7 44 22.5	67 46 35	26 10.9	39 38.4	R	10	,,	,,	67 34 54.6	13 17 18	83 13 52.5	,,
,,	13 52 40.3	7 52 40.7	67 51 14.5	26 55.1	39 27.9	H	10	,,	,,	67 39 54.5	13 26 22.5	83 25 27	,,
,,	13 52 40.4	7 52 41.1	67 51 18.3	26 55	39 27.9	P	10	,,	,,	67 39 54.6	13 26 22.4	83 25 19.5	,,
,,	13 57 17.4	7 57 17.8	67 53 35	27 18.6	39 21.8	H	10	,,	,,	67 42 28.5	13 31 02.4	83 26 09	,,
,,	13 57 17.6	7 57 18	67 53 31	27 18.5	39 21.8	P	10	,,	,,	67 42 18.4	13 30 44	83 21 30	,,
,,	14 05 06.9	8 05 07.3	67 57 39.8	27 58.8	39 09.6	H	10	,,	,,	67 46 56.7	13 39 10	83 30 40.5	,,
,,	14 05 07	8 05 07.4	67 57 27.5	27 58.8	39 09.6	R	10	,,	,,	67 46 42.4	13 38 45	83 24 24	,,
,,	14 09 33.8	8 09 34.2	67 59 31.5	28 22	39 01.6	H	10	,,	,,	67 49 01.7	13 42 56.8	83 20 39	,,
,,	14 09 33.9	8 09 34.3	67 59 26	28 22	39 01.6	R	10	,,	,,	67 48 55	13 42 46	83 17 55.5	,,
24	29 24 36.3	23 23 41.6	51 08 09	26 46.5	14 28.7	P	10	30.00	-28	51 44 46	28 56 17.7	83 09 00	☉ West of ☾
,,	29 24 36.8	23 23 42.1	51 08 27.5	26 46.5	14 28.7	R	10	,,	,,	51 45 07	28 56 57	83 18 36	,,
,,	29 27 08.4	23 26 13.7	51 09 24.7	27 00	14 31	P	10	,,	,,	51 45 15	28 58 57.5	83 10 57	,,
,,	29 27 08.8	23 26 14.1	51 09 43	27 00	14 31	R	10	,,	,,	51 46 28.1	28 59 22	83 16 58.5	,,
,,	29 29 40.5	23 28 45.8	51 10 26.7	27 13.6	14 33.3	P	10	,,	,,	51 47 18	29 00 50.4	83 01 09	,,
,,	29 29 40.8	23 28 46.1	51 10 45.2	27 13.6	14 33.3	R	10	,,	,,	51 47 38	29 01 26.5	83 10 05.7	,,
,,	29 34 18.1	23 33 23.4	51 13 16	27 38.7	14 36.8	H	10	,,	,,	51 50 29.1	29 06 32.5	83 17 16.5	,,
,,	29 34 24.2	23 33 29.5	51 12 53.5	27 39.3	14 36.9	P	10	,,	,,	51 49 58.4	29 05 37.8	83 01 48	,,
,,	29 37 08.9	23 36 14.3	51 14 19	27 54.4	14 38.6	H	10	,,	,,	51 51 41.2	29 08 41.5	83 06 48	,,
,,	29 37 27.1	23 36 32.4	51 14 17.4	27 56.1	14 38.8	P	10	,,	,,	51 51 34	29 08 29	82 59 07.9	,,
,,	29 40 24.4	23 39 29.8	51 16 02.3	28 12.3	14 40.6	H	11	,,	,,	51 53 34	29 12 03.6	83 08 27	,,
,,	29 40 33.4	23 39 38.8	51 16 03.5	28 13.2	14 40.7	P	10	,,	,,	51 53 28.6	29 11 54.3	83 03 51.7	,,
,,	29 45 07.5	23 44 12.9	51 19 12.2	28 37.3	14 43.1	H	10	,,	,,	51 56 57.8	29 18 08.8	83 28 58.5	,,
,,	29 45 07.5	23 44 13	51 19 10	28 37.3	14 43.1	R	10	,,	,,	51 56 18	29 17 52.5	83 24 52.5	,,
,,	29 47 34.2	23 46 39.7	[illegible]	28 49.6	[illegible]	R	10	,,	,,	[illegible]	[illegible]	[illegible]	,,
,,	29 47 34.2	23 46 39.6	51 20 31.6	28 49.6	14 44.1	H	10	,,	,,	51 58 27.7	29 20 18.0	83 32 15	,,
,,	29 49 53.1	23 48 58.5	51 21 50.7	29 01.3	14 45.1	H	10	,,	,,	51 59 50.3	29 23 18	83 34 52.5	,,
,,	29 49 53.1	23 48 58.6	51 21 41	29 01.3	14 45.1	R	10	,,	,,	51 59 34.6	29 22 52.5	83 27 58.2	,,
,,	29 55 08	23 54 13.5	51 24 15	29 28.6	14 46.6	R	11	,,	,,	52 02 25.2	29 27 56.5	83 25 45.6	,,

"	29 47 34.2	23 46 39.7	51 20 [illegible]	28 49.6	[illegible]	R	10	..	..	[illegible]	[illegible]	[illegible]	..
..	29 47 34.2	23 46 39.6	51 20 34.6	28 49.6	14 44.1	H	10	..	..	51 58 27.7	29 20 18.6	83 32 15	"
..	29 49 53.1	23 48 58.5	51 21 50.7	29 01.3	14 45.1	H	10	"	"	51 59 50.3	29 23 18	83 34 52.5	"
..	29 49 53.1	23 48 58.6	51 21 41	29 01.3	14 45.1	R	10	..	..	51 59 34.6	29 22 52.5	83 27 58.2	"
"	29 55 08	23 54 13.5	51 24 15	29 28.6	14 46.6	R	11	..	..	52 02 25.2	29 27 56.5	83 25 45.6	"
"	29 55 16.4	23 54 21.9	51 23 36.5	29 29.4	14 46.6	P	10	..	..	52 01 47.4	29 26 48	83 06 31.5	"
"	29 57 20.9	23 56 26.4	51 24 45.6	29 40.6	14 46.9	P	10	..	..	52 03 05.4	29 29 09.4	83 10 45.1	"
"	29 57 20.9	23 56 26.4	51 25 16.5	29 40.6	14 46.9	R	10	..	..	52 03 35.2	29 30 01.5	83 23 46.5	"
"	29 59 20.4	23 58 25.9	51 25 58.5	29 51.4	14 47.1	R	10	"	..	52 04 25.6	29 31 33.5	83 16 54	..
..	29 59 20.4	23 58 25.9	51 25 33.5	29 51.4	14 47.1	P	10	..	..	52 04 01	29 30 47.6	83 05 25.5	"
25	6 11 09.7	0 10 15.3	51 31 39.9	30 46.4	14 45.5	P	10	..	..	52 10 47	5 42 55	83 09 54 1	"
..	6 11 09.8	0 10 15.4	51 31 22	30 46.4	14 45.5	H	10	..	..	52 10 33.1	5 42 29.5	83 03 31.5	"
"	6 13 37.1	0 12 42.7	51 32 46.2	30 57.9	14 44.7	P	10	..		52 12 03.4	5 45 12	83 07 19.5	"
..	6 13 37.3	0 12 42.9	51 32 42	30 57.9	14 44.7	H	10	..		52 12 01.8	5 45 08.4	83 06 22.5	"
"	6 16 10.8	0 15 16.4	51 34 04.3	31 09.9	14 43.9	P	10	"	"	52 13 31	5 47 49	83 08 10	..
..	6 16 10.9	0 15 16.5	51 33 53.8	31 09.9	14 43.9	H	10	..	..	52 13 25	5 47 37.6	83 05 16.5	"
"	6 20 54.1	0 19 59.8	51 36 30	31 32	14 41.7	R	10	..	..	52 16 13	5 52 41.5	83 10 25.5	..
..	6 20 54.4	0 20 00.1	51 36 16.5	31 32	14 41.7	H	10	..	..	52 16 05.4	5 52 24 8	83 06 10.5	"
..	6 23 10.9	0 22 16.6	51 37 55.2	31 42.6	14 40.4	R	10	..	"	52 17 46.4	5 55 27.5	83 17 43.8	"
"	6 23 11.2	0 22 16.9	51 37 39.5	31 42.6	14 40.4	H	10	..	..	52 17 37.1	5 55 09.5	83 13 09	..
..	6 25 28.5	0 24 34.2	51 39 08	31 53.2	14 39.1	R	10	..	..	52 19 07.8	5 57 54	83 19 56.2	"
..	6 25 28.9	0 24 34.6	51 38 53.5	31 53.2	14 39.1	H	10	..	..	52 19 00.1	5 57 38.2	83 15 54	"
..	6 29 55.8	0 29 01.5	51 41 29.6	32 13.3	14 35.1	R	13	..	..	52 21 48.8	6 02 41	83 24 52.5	"
..	6 30 02.3	0 29 08	51 40 47.6	32 13.9	14 35	P	12	..	..	52 21 07.4	6 01 26.3	83 04 35	"
..	6 32 22.4	0 31 28.1	51 41 58.9	32 24.3	14 34.2	P	10	..	..	52 22 26.4	6 03 48.3	83 05 03	"
..	6 32 22.5	0 31 28.2	51 42 33.5	32 24.3	14 34.2	R	10	..	..	52 23 01	6 04 49.8	83 20 23.5	"
"	6 34 24.6	0 33 30.3	51 42 49.7	32 33.3	14 32.7	P	10	..	..	52 23 26.8	6 05 36.8	83 01 37.5	"
..	6 34 24.7	0 33 30.4	51 43 17.5	32 33.3	14 32.7	R	10	..	..	52 33 54.4	6 06 28	83 14 24.9	"
..	6 38 32.1	0 37 37.9	51 45 02.3	32 51.6	14 28.8	P	10	"	..	52 25 55.6	6 10 03	83 06 16.5	"
"	6 38 32.6	0 37 38.4	51 44 57.7	32 51.6	14 28.8	H	10	..	..	52 26 00	6 10 11	83 08 09	"
"	6 41 02.5	0 40 08.3	51 46 34.3	33 02.6	14 26.2	P	10	..	..	52 27 40.4	6 13 11	83 15 32.5	..
..	6 41 03	0 40 08.8	51 46 19.2	33 02.6	14 26.2	H	10	..	..	52 27 34	6 12 59.5	83 12 40.5	..



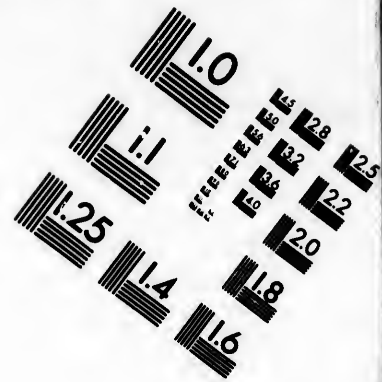
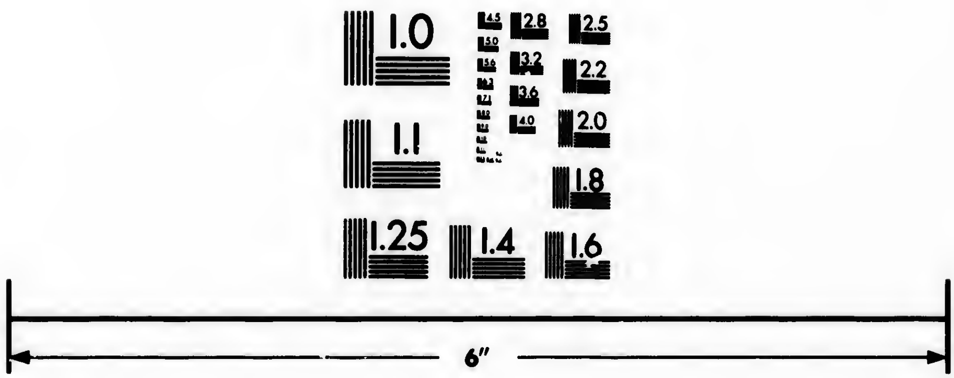
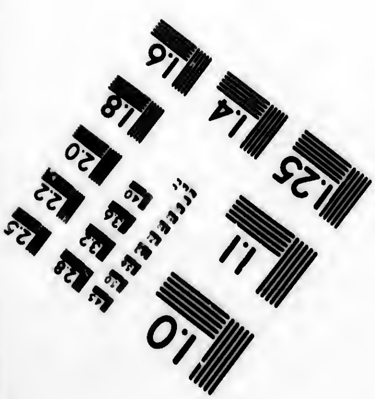


IMAGE EVALUATION TEST TARGET (MT-3)





LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION during the Winter of 1821—22, *continued.*

DATE. 1822.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Apparent Altitudes. Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ″	° ′ ″	° ′ ″	
Feb. 25	6 43 39.2	0 42 45	51 47 49.7	33 14.2	14 23.4	P	10	30.00	-28	52 29 08	6 15 48	83 15 45	☉ West of ☾
,,	6 43 39.6	0 42 45.4	51 47 40	33 14.2	14 23.4	H	10	,,	,,	52 29 06.4	6 15 45.1	83 14 55.5	,,
,,	6 48 10.1	0 47 15.9	51 50 31.5	33 33.2	14 18.1	R	10	,,	,,	52 32 07.2	6 21 09	83 28 16.3	,,
,,	6 48 10.5	0 47 16.3	51 50 16	33 33.2	14 18.1	H	10	,,	,,	52 32 02.6	6 21 00.8	83 26 04.5	,,
,,	6 50 23.6	0 49 29.5	51 51 34	33 42.2	14 15.1	R	10	,,	,,	52 33 20.5	6 23 20.3	83 27 41.7	,,
,,	6 50 24.1	0 49 29.9	51 51 08	33 42.2	14 15.1	H	10	,,	,,	52 33 05.7	6 22 53.9	83 21 00	,,
,,	6 52 30.9	0 50 36.8	51 52 26	33 50.7	14 12.4	R	10	,,	,,	52 34 22.2	6 25 11	83 23 32.8	,,
,,	6 52 31.5	0 51 37.4	51 52 05.3	33 50.7	14 12.4	H	10	,,	,,	52 34 12.1	6 24 52.9	83 18 52.5	,,
,,	6 58 54.6	0 58 00.5	51 54 53.2	34 15.2	14 03.3	P	10	,,	,,	52 37 20.8	6 30 31.2	83 07 40.5	,,
,,	6 58 54.7	0 58 00.6	51 54 49.5	34 15.2	14 03.3	R	10	,,	,,	52 37 15.6	6 30 20	83 05 21.3	,,
,,	7 00 53.9	0 59 59.8	51 55 51	34 21.3	14 00.2	P	10	,,	,,	52 38 25	6 32 26.1	83 06 34.5	,,
,,	7 00 53.9	0 59 59.8	51 55 48	34 21.3	14 00.2	R	10	,,	,,	52 38 22.2	6 32 21.5	83 05 25.3	,,
,,	7 02 56.1	1 02 02	51 56 47.7	34 29.6	13 57	R	11	,,	,,	52 39 31.2	6 34 25	83 05 44.4	,,
,,	7 02 56.2	1 02 02.1	51 56 50	34 29.6	13 57	P	11	,,	,,	52 39 31	6 34 24.4	83 05 34.5	,,
,,	7 08 06	1 07 12	51 59 58	34 49.6	13 48.1	H	10	,,	,,	52 43 17.7	6 41 10.6	83 29 39	,,
,,	7 08 11.6	1 07 17.5	51 59 25	34 50	13 47.9	P	10	,,	,,	52 42 35.6	6 39 55.3	83 09 27	,,
,,	7 10 36.7	1 09 42.5	52 00 40.4	34 59.8	13 43.5	P	10	,,	,,	52 44 08.4	6 42 41.7	83 14 47	,,
,,	7 10 37	1 09 43	52 00 26.9	35 00.8	13 43.5	H	10	,,	,,	52 44 10.5	6 42 45.2	83 15 33	,,
,,	7 13 28.3	1 12 34.3	52 01 49.7	35 11.5	13 38.3	P	10	,,	,,	52 45 29.6	6 45 07.3	83 08 15	,,
,,	7 13 28.6	1 12 34.6	52 01 41.5	35 11.5	13 38.3	H	10	,,	,,	52 45 29.7	6 45 07.1	83 08 07.5	,,
,,	7 20 48.1	1 19 54.2	52 05 25.5	35 38.1	13 23.8	R	10	,,	,,	52 49 40.4	6 52 36.5	83 10 37.5	,,
,,	7 20 48.5	1 19 54.5	52 05 31.3	35 38.1	13 23.8	H	10	,,	,,	52 49 58.6	6 53 09.1	83 18 39	,,
,,	7 22 59.6	1 22 05.7	52 06 29.5	35 45.1	13 19.3	R	10	,,	,,	52 50 55.6	6 54 51	83 11 18.5	,,
,,	7 23 00	1 22 06.1	52 06 26.4	35 45.1	13 19.3	H	10	,,	,,	52 51 03.6	6 55 05.5	83 14 51	,,
,,	7 25 12.4	1 24 18.5	52 07 32.5	35 52.1	13 14.6	R	10	,,	,,	52 52 08.8	6 57 03	83 11 08.1	,,
,,	7 25 12.8	1 24 18.9	52 07 30.7	35 52.1	13 14.6	H	10	,,	,,	[illegible]	[illegible]	[illegible]	,,
,,	7 31 01.1	1 30 07.1	52 10 17	36 11.1	13 01.7	P	10	,,	,,	52 55 26	7 02 55.7	83 12 01.2	,,
,,	7 32 53.9	1 31 59.9	52 11 36	36 17.5	12 57.1	R	10	,,	,,	52 56 54	7 05 34	83 23 31.2	,,
,,	7 32 54	1 32 00.1	52 11 13	36 17.5	12 57.1	P	10	,,	,,	52 56 34	7 04 57.7	83 14 24	,,
,,	7 34 53.7	1 33 59.8	52 12 22	36 24.3	12 52.2	R	10	,,	,,	52 57 51	7 07 16	83 19 02.2	,,

,,	7 31 01.1	1 30 07.1	52 10 17	36 11.1	13 01.7	P	10	,,	,,	52 55 26	7 02 55.7	83 12 01.2	,,
,,	7 32 53.9	1 31 59.9	52 11 36	36 17.5	12 57.1	R	10	,,	,,	52 56 54	7 05 34	83 23 31.2	,,
,,	7 32 54	1 32 00.1	52 11 13	36 17.5	12 57.1	P	10	,,	,,	52 56 34	7 04 57.7	83 14 24	,,
,,	7 34 53.7	1 33 59.8	52 12 22	36 24.3	12 52.2	R	10	,,	,,	52 57 51	7 07 16	83 19 02.2	,,
,,	7 34 54	1 34 00.1	52 12 00.5	36 24.3	12 52.2	P	10	,,	,,	52 57 31.6	7 06 41	83 10 13.5	,,
,,	7 40 07.1	1 39 13.3	52 14 43.9	36 39.9	12 38.9	H	10	,,	,,	53 00 51	7 12 38.2	83 21 13.5	,,
,,	7 40 07.2	1 39 13.3	52 14 32	36 39.9	12 38.9	P	10	,,	,,	53 00 30.8	7 12 01.9	83 12 09	,,
,,	7 42 50.7	1 41 56.9	52 15 38.3	36 47.2	12 31.9	H	10	,,	,,	53 02 00.4	7 14 43	83 11 31.5	,,
,,	7 42 50.9	1 41 57	52 15 48	36 47	12 31.9	P	10	,,	,,	53 02 05.6	7 14 51.9	83 13 43.5	,,
,,	7 45 44.8	1 44 51	52 16 53	36 54.9	12 24.4	H	10	,,	,,	53 03 30.8	7 17 24.5	83 08 22.5	,,
,,	7 45 45.5	1 44 51.7	52 17 11.9	36 54.9	12 24.5	P	10	,,	,,	53 03 43.6	7 17 47.7	83 14 00	,,
,,	7 52 43.4	1 51 49.7	52 20 40	37 13.4	12 05.4	R	10	,,	,,	53 07 50.4	7 25 10	83 19 49.9	,,
,,	7 52 43.6	1 51 49.9	52 20 50	37 13.4	12 05.4	H	10	,,	,,	53 08 07	7 25 39.5	83 27 24	,,
,,	7 54 58.7	1 54 05	52 21 40.5	37 19.3	11 59.1	R	10	,,	,,	53 09 03.4	7 27 21	83 18 59.2	,,
,,	7 54 59	1 54 05.3	52 21 51.8	37 19.3	11 59.1	H	10	,,	,,	53 09 21.7	7 27 53.5	83 27 03	,,
,,	7 57 21.2	1 56 27.5	52 22 43.5	37 25.5	11 52.3	R	10	,,	,,	53 10 20.4	7 29 39	83 17 52	,,
,,	7 57 21.5	1 56 27.8	52 22 52	37 25.5	11 52.3	H	10	,,	,,	53 10 37.7	7 30 09.8	83 25 30	,,
27	27 32 30.6	21 31 47.8	90 05 44.7	11 44.6	11 09.4	P	10	29.71	-30	90 28 44	27 04 43	83 13 48	,,
,,	27 32 30.7	21 31 47.9	90 05 44.5	11 44.6	11 09.4	R	10	,,	,,	90 28 45.4	27 04 45.6	83 14 24.7	,,
,,	27 34 34.4	21 33 51.6	90 06 49	11 53.4	11 16.9	R	10	,,	,,	90 29 43	27 06 31.5	83 09 57.9	,,
,,	27 34 34.4	21 33 51.6	90 07 04	11 53.4	11 16.9	P	10	,,	,,	90 29 56	27 06 55.5	83 15 58.5	,,
,,	27 36 32.7	21 35 50	90 08 17.8	12 01.8	11 24	P	10	,,	,,	90 31 01	27 08 55	83 16 15	,,
,,	27 36 32.7	21 35 50	90 08 02.5	12 01.8	11 24	R	10	,,	,,	90 30 48	27 08 31	83 10 14.7	,,
,,	27 44 42.6	21 43 59.9	90 12 01.9	12 39.1	11 51.5	H	10	,,	,,	90 34 26.3	27 15 12.3	82 48 06	,,
,,	27 44 42.7	21 44 00	90 12 55.9	12 39.1	11 51.5	P	10	,,	,,	90 35 11	27 16 34.5	83 08 37	,,
,,	27 47 27.9	21 46 45.2	90 13 43	12 52	12 00.4	H	10	,,	,,	90 35 59.2	27 18 03	82 49 27	,,
,,	27 47 28.1	21 46 45.5	90 14 34.1	12 52	12 00.4	P	10	,,	,,	90 36 39	27 19 16.2	83 07 40.5	,,
,,	27 50 00.9	21 49 18.2	90 16 03.7	13 04.1	12 08.7	H	10	,,	,,	90 38 10.1	27 22 03.9	83 06 25.5	,,
,,	27 50 01.1	21 49 18.5	90 16 20	13 04.1	12 08.7	P	10	,,	,,	90 38 16	27 22 14.5	83 14 00	,,
,,	27 54 58.1	21 54 15.5	90 18 52.8	13 27.9	12 24.9	H	10	,,	,,	90 40 43.1	27 26 44.9	83 07 21	,,
,,	27 54 58.1	21 54 15.4	90 18 52	13 27.9	12 24.9	R	10	,,	,,	90 40 33	27 26 26.3	83 02 43.5	,,

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION during the Winter of 1821—22, *continued*.

DATE. 1822.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Apparent Altitudes. Sun's centre, or Star.	Obser-ver.	No. of Obser-vations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ' "	° ' "	° ' "	' "	' "				°	° ' "	° ' "	° ' "	
Feb. 27	27 57 06	21 56 23.3	90 20 07	13 38.4	12 31.9	R	10	29 71	−30	90 41 42	27 28 33.3	83 02 30	⊙ West of ☾
,,	27 57 06	21 56 23.4	90 20 11	13 38.4	12 31.9	H	10	,,	,,	90 41 54.2	27 28 55.6	83 08 03	,,
,,	27 59 27.7	21 58 45.1	90 21 39.5	13 50.1	12 39.7	H	11	,,	,,	90 43 15	27 31 24.2	83 09 46.5	,,
,,	27 59 27.8	21 58 45.1	90 21 32	13 50.1	12 39.7	R	11	,,	,,	90 42 58	27 30 49	83 00 59.1	,,
,,	28 05 25.5	22 04 42.9	90 25 14.5	14 19.2	12 58.4	R	10	,,	,,	90 46 22	27 37 08	83 06 16.9	,,
,,	28 05 25.6	22 04 43.1	90 25 46.8	14 19.1	12 58.4	P	10	,,	,,	90 46 50	27 37 59.5	83 19 05	,,
,,	28 07 57	22 07 14.4	90 26 27	14 31.3	13 05.8	R	10	,,	,,	90 47 25.6	27 39 03	82 57 08.7	,,
,,	28 07 57.1	22 07 14.6	90 27 02.3	14 31.3	13 05.8	P	10	,,	,,	90 47 58	27 40 04.4	83 12 29	,,
,,	28 10 05.2	22 09 22.8	90 27 39	14 41.6	13 12	R	9	,,	,,	90 48 31.2	27 41 05.5	82 55 42.9	,,
,,	28 10 05.4	22 09 23	90 28 18.8	14 41.6	13 12	P	10	,,	,,	90 49 08	27 42 13.2	83 12 33	,,
,,	28 15 56.2	22 15 13.7	90 31 24.1	15 10.5	13 27.8	H	10	,,	,,	90 52 08.5	27 47 45.2	83 07 52.5	,,
,,	28 15 56.4	22 15 14	90 32 00.4	15 10.5	13 27.8	P	10	,,	,,	90 52 31	27 48 26.4	83 18 05	,,
,,	28 18 19	22 17 36.6	90 32 50.6	15 22.5	13 34	H	10	,,	,,	90 53 28.8	27 50 12.7	83 09 01.5	,,
,,	28 18 19.2	22 17 36.8	90 33 00.5	15 22.5	13 34	P	10	,,	,,	90 53 25	27 50 05.8	83 07 14	,,
,,	28 20 39.3	22 19 56.9	90 34 08.7	15 34.2	13 40	H	10	,,	,,	90 54 40.4	27 52 24.4	83 06 52.5	,,
,,	28 20 39.5	22 19 57.2	90 34 19.2	15 34.2	13 40	P	10	,,	,,	90 54 38	27 52 20	83 05 41	,,
,,	28 25 24.6	22 24 42.2	90 36 28.4	15 58.9	13 52	H	10	,,	,,	90 56 47.3	27 56 17.4	82 53 51	,,
,,	28 25 24.7	22 24 42.3	90 36 42	15 58.9	13 52	R	10	,,	,,	90 56 51.4	27 56 25.5	82 55 18.6	,,
,,	28 27 44.8	22 27 02.4	90 37 59.7	16 11.2	13 57.8	H	10	,,	,,	90 58 11.9	27 58 53.2	82 57 42	,,
,,	28 27 44.9	22 27 02.5	90 38 00	16 11.2	13 57.8	R	10	,,	,,	90 58 04	27 58 38	82 53 52.5	,,
,,	28 31 24.7	22 30 42.4	90 40 09.7	16 30.6	14 06.9	H	10	,,	,,	91 00 12.5	28 02 35.1	82 58 10.5	,,
,,	28 31 24.8	22 30 42.4	90 39 53	16 30.6	14 06.9	R	10	,,	,,	90 59 45.8	28 01 48	82 46 24.4	,,
,,	28 36 45.2	22 36 03	90 42 50.5	16 58.3	14 19.4	R	10	,,	,,	91 02 30	28 06 48	82 41 15	,,
,,	28 36 45.3	22 36 03	90 43 53.2	16 58.3	14 19.4	P	10	,,	,,	91 03 29	28 08 36.4	83 08 20	,,
,,	28 39 15.3	22 38 33.1	90 44 17.5	17 11	14 24.9	R	10	,,	,,	91 03 50.8	28 09 17	82 40 56.2	,,
,,	[illegible]	[illegible]	[illegible]	17 11	14 24.9	P	10	,,	,,	[illegible]	[illegible]	[illegible]	,,
,,	28 41 45.8	22 41 03.6	90 45 47.5	17 23.7	14 30.4	R	10	,,	,,	91 05 14	28 11 40.2	82 41 21	,,
,,	28 41 45.9	22 41 03.7	90 46 43.4	17 23.7	14 30.4	P	10	,,	,,	91 06 06	28 13 25.3	83 05 23	,,
,,	28 48 59.4	22 48 17.2	90 51 05.5	18 01.6	14 44.7	H	10	,,	,,	91 10 27.2	28 21 25.5	83 17 04.5	,,
,,	28 48 59.5	22 48 17.4	90 51 07.7	18 01.6	14 44.7	P	10	,,	,,	91 10 19	28 21 10.5	83 13 16	,,
,,	28 51 27.5	22 50 45.4	90 52 16.7	18 14.9	14 49.2	H	10	,,	,,	91 11 33.7	28 23 24.9	83 09 52.5	,,

"	28 41 45.8	22 41 03.6	90 45 47.5	17 23.7	14 30.4	R	10	"	"	91 05 14	28 11 40.2	82 41 21	"
"	28 41 45.9	22 41 03.7	90 46 43.4	17 23.7	14 30.4	P	10	"	"	91 06 06	28 13 25.3	83 05 23	"
"	28 48 59.4	22 48 17.2	90 51 05.5	18 01.6	14 44.7	H	10	"	"	91 10 27.2	28 21 25.5	83 17 04.5	"
"	28 48 59.5	22 48 17.4	90 51 07.7	18 01.6	14 44.7	P	10	"	"	91 10 19	28 21 10.5	83 13 16	"
"	28 51 27.5	22 50 45.4	90 52 16.7	18 14.9	14 49.2	H	10	"	"	91 11 33.7	28 23 24.9	83 09 52.5	"
"	28 51 27.7	22 50 45.6	90 52 29.8	18 14.9	14 49.2	P	10	"	"	91 11 34	28 23 28.6	83 10 44	"
"	28 54 51.2	22 54 09.1	90 54 19	18 33.2	14 55.4	H	10	"	"	91 13 28.7	28 26 59.3	83 12 33	"
"	28 54 51.4	22 54 09.4	90 54 23.3	18 33.3	14 55.4	P	10	"	"	91 13 22	28 26 48.5	83 09 52.5	"
"	29 00 47.8	23 00 05.7	90 57 15.6	19 05.5	15 05.4	H	10	"	"	91 16 14.1	28 31 50.9	82 56 18	"
"	29 00 47.9	23 00 05.8	90 56 58	19 05.5	15 05.4	R	10	"	"	91 15 47	28 31 12	82 46 32.1	"
"	29 03 50.1	23 03 08.1	90 58 52.9	19 22.2	15 10.2	H	10	"	"	91 17 46.2	28 34 53.2	82 56 16.5	"
"	29 03 50.2	23 03 08.2	90 58 34	19 22.2	15 10.2	R	10	"	"	91 17 18.2	28 34 00	82 42 57.4	"
"	29 08 01.8	23 07 19.7	91 01 19.3	19 45.1	15 16.8	H	10	"	"	91 20 05.5	28 39 09.4	82 57 24	"
"	29 08 02.1	23 07 20	91 00 53	19 45.1	15 16.8	R	10	"	"	91 19 28.4	28 38 02	82 40 30	"
"	29 16 17.7	23 15 35.7	91 06 44	20 31.1	15 27.7	R	10	"	"	91 25 11.4	28 48 32	83 14 04.8	"
"	29 16 17.7	23 15 35.7	91 06 53	20 31.1	15 27.7	P	10	"	"	91 25 14	28 48 36.7	83 15 14	"
"	29 18 24.5	23 17 42.5	91 08 02	20 43.1	15 29.8	R	10	"	"	91 26 22.2	28 50 42.5	83 15 00.5	"
"	29 18 24.6	23 17 42.7	91 08 02	20 43.1	15 29.8	P	10	"	"	91 26 21	28 50 39.8	83 14 16.2	"
"	29 20 27.5	23 19 45.5	91 09 16	20 54.7	15 31.8	R	10	"	"	91 27 33	28 52 52	83 16 37.5	"
"	29 20 27.6	23 19 45.7	91 09 17.5	20 54.7	15 31.8	P	10	"	"	91 27 34	28 52 54.3	83 17 09	"
"	29 27 13.3	23 26 31.5	91 12 59.7	21 32.8	15 38.9	H	10	"	"	91 31 18.3	28 59 47	83 18 52.5	"
"	29 27 13.4	23 26 31.5	91 12 59.5	21 32.8	15 38.9	P	10	"	"	91 31 06	28 59 24.4	83 13 13	"
"	29 29 35.2	23 28 53.4	91 14 09.2	21 46.1	15 41.4	H	10	"	"	91 32 25.2	29 01 50	83 14 09	"
"	29 29 35.4	23 28 53.6	91 14 13	21 46.1	15 41.4	P	10	"	"	91 32 16	29 01 33	83 09 24	"
"	29 31 57	23 31 15.2	91 15 23.6	21 59.3	15 43.9	H	10	"	"	91 33 36.9	29 04 02	83 11 42	"
"	29 31 57.2	23 31 15.4	91 15 28.5	21 59.3	15 43.9	P	10	"	"	91 33 28	29 08 45.7	83 07 34.5	"
"	29 37 20.3	23 36 38.4	91 18 25	22 31	15 48	R	10	"	"	91 36 24	29 09 10.5	83 08 00.9	"
"	29 37 28.9	23 36 47.2	91 18 22.1	22 31.8	15 48	H	10	"	"	91 36 27.9	29 09 16.7	83 09 52.5	"
"	29 39 52	23 39 10.1	91 19 50	22 46.3	15 49.2	R	10	"	"	91 37 48.4	29 11 43.5	83 05 50.1	"
"	29 40 06.6	23 39 24.9	91 19 54.5	22 47.8	15 49.3	H	10	"	"	91 37 57.9	29 12 02.2	83 09 19.5	"
"	29 42 14.3	23 41 32.4	91 21 06.5	23 00.9	15 50.4	R	10	"	"	91 39 02	29 14 01.5	83 07 16.5	"
"	29 42 29.6	23 41 47.9	91 21 15.8	23 02.2	15 50.5	H	10	"	"	91 39 20.8	29 14 34.8	83 11 43.5	"

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION, during the Winter of 1821--22, *continued.*

DATE. 1822.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ″	° ′ ″	° ′ ″	
Feb. 28	6 09 39.2	0 08 57.6	91 35 48	25 42.8	15 54.2	R	10	29.71	-30	91 53 34.8	5 40 45.5	82 56 58.5	⊙ West of ☾
,,	6 09 39.3	0 08 57.6	91 35 52.4	25 42.8	15 54.2	P	10	,,	,,	91 53 35	5 40 45.7	82 56 58.5	,,
,,	6 11 35.3	0 10 53.7	91 36 55	25 53.8	15 53.1	R	10	,,	,,	91 54 42.2	5 42 48.5	82 58 39.9	,,
,,	6 11 35.4	0 10 53.8	91 36 59.1	25 53.8	15 53.1	P	10	,,	,,	91 54 43	5 42 50.8	82 59 45	,,
,,	6 13 21.1	0 12 39.5	91 37 48.7	26 03.8	15 52.1	P	10	,,	,,	91 55 33	5 44 23	82 55 52	,,
,,	6 13 28.7	0 12 47.1	91 37 55	26 04.6	15 52.1	R	10	,,	,,	91 55 43	5 44 41.5	82 58 35.7	,,
,,	6 18 48.8	0 18 07.4	91 40 56.6	26 35.3	15 49.3	H	10	,,	,,	91 58 56.5	5 50 38	83 07 39	,,
,,	6 18 49.5	0 18 08.1	91 40 57.8	26 35.3	15 49.3	P	10	,,	,,	91 58 48	5 50 22.2	83 03 31	,,
,,	6 21 10.4	0 20 35	91 42 14	26 49.5	15 48	H	10	,,	,,	92 00 15.2	5 53 03	83 07 00	,,
,,	6 21 18	0 20 36.6	91 42 08.3	26 49.5	15 48	P	10	,,	,,	91 59 54	5 52 23.8	82 56 48	,,
,,	6 23 29.3	0 22 47.9	91 43 22.2	27 02.3	15 46.9	H	10	,,	,,	92 01 23.8	5 55 09	83 05 16.5	,,
,,	6 23 31.4	0 22 50.1	91 43 17.9	27 02.3	15 46.9	P	10	,,	,,	92 01 05	5 54 34.5	82 56 06	,,
,,	6 29 39.1	0 28 57.8	91 46 48.8	27 38.5	15 43	H	10	,,	,,	92 04 54.2	6 01 36.1	83 09 34.5	,,
,,	6 29 40.2	0 28 58.9	91 46 19	27 38.5	15 43	R	10	,,	,,	92 04 12	6 00 18.5	82 49 54.5	,,
,,	6 31 56.5	0 31 15.2	91 47 44.5	27 52.2	15 41.1	H	10	,,	,,	92 05 51.9	6 03 22.4	83 01 48	,,
,,	6 31 57.6	0 31 16.2	91 47 21	27 52.2	15 41.1	R	10	,,	,,	92 05 16.3	6 02 17	82 45 12	,,
,,	6 34 06	0 33 24.7	91 48 49.2	28 05.1	15 39.3	H	10	,,	,,	92 06 58.1	6 05 24.2	82 59 52.5	,,
,,	6 34 07	0 33 25.6	91 48 34	28 05.1	15 39.3	R	10	,,	,,	92 06 30.8	6 04 34	82 47 06	,,
,,	6 38 02.5	0 37 21.2	91 51 20.6	28 28.4	15 36	P	10	,,	,,	92 09 14.5	6 09 35.5	83 03 34.5	,,
,,	6 38 02.9	0 37 21.6	91 51 15.5	28 28.4	15 35.8	R	10	,,	,,	92 09 14	6 09 34	83 03 12	,,
,,	6 40 05	0 39 23.7	91 52 25	28 40.4	15 34.1	R	10	,,	,,	92 10 25.2	6 11 45.3	83 05 23.2	,,
,,	6 40 05	0 39 23.7	91 52 19.1	28 40.4	15 34.1	P	10	,,	,,	92 10 15	6 11 26.7	83 00 45	,,
,,	6 41 58.1	0 41 16.8	91 53 18	28 51.6	15 32.4	R	10	,,	,,	92 11 19.8	6 13 26	82 59 48	,,
,,	6 41 58.2	0 41 17	91 53 09.8	28 51.6	15 32.4	P	10	,,	,,	92 11 10	6 13 08	82 57 44	,,
,,	6 46 05.5	0 45 24.4	91 55 32.6	29 14.5	15 28	P	10	,,	,,	92 13 37	6 17 38.5	83 03 31	,,
,,	6 46 05.8	0 45 24.6	91 55 41.5	29 14.5	15 28	H	10	,,	,,	92 14 00	6 18 20.9	83 14 04.5	,,
,,	6 47 58	0 47 17	91 56 30.8	29 24.6	15 25.9	P	10	,,	,,	92 14 36	6 19 27.2	83 02 33	,,
,,	6 47 58.6	0 47 17.4	91 56 27.7	29 24.6	15 25.9	H	10	,,	,,	92 14 48.5	6 19 50.2	83 08 12	,,
,,	6 49 33.5	0 48 52.5	91 57 15.3	29 33.2	15 24	P	10	,,	,,	92 15 27	6 21 01.1	83 02 07	,,
,,	6 49 34.2	0 48 53	91 57 15.8	29 33.2	15 24	H	10	,,	,,	92 15 38.8	6 21 22.7	83 07 25.5	,,
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	H	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

"	6 47 58	0 47 17	91 56 30.8	29 24.6	15 25.9	P	10	"	"	92 14 36	6 19 27.2	83 02 33	"
"	6 47 58.6	0 47 17.4	91 56 27.7	29 24.6	15 25.9	H	10	"	"	92 14 48.5	6 19 50.2	83 08 12	"
"	6 49 33.5	0 48 52.5	91 57 15.3	29 33.2	15 24	P	10	"	"	92 15 27	3 21 01.1	83 02 07	"
"	6 49 34.2	0 48 53	91 57 15.8	29 33.2	15 24	H	10	"	"	92 15 38.8	6 21 22.7	83 07 25.5	"
"	6 54 44.4	0 54 03.3	92 00 11.5	30 04	15 16.7	H	10	"	"	92 18 40.7	6 26 57.7	83 13 36	"
"	6 54 44.4	0 54 03.3	91 59 46	30 04	15 16.7	R	10	"	"	92 18 02.6	6 25 48	82 56 10.5	"
"	6 56 58.1	0 56 17	92 01 00	30 18	15 13.2	R	10	"	"	92 19 17.4	6 28 05.5	82 57 07.5	"
"	6 56 58.3	0 56 17.2	92 01 07.8	30 18	15 13.2	H	10	"	"	92 19 40.7	6 28 48.2	83 07 45	"
"	6 59 15.7	0 58 34.6	92 02 07	30 32.4	15 09.6	R	10	"	"	92 20 29.8	6 30 18.5	82 55 58.5	"
"	6 59 15.9	0 58 34.8	92 02 15.8	30 32.4	15 09.6	H	10	"	"	92 20 52.4	6 31 00.2	83 06 21	"
Mar. 1	6 18 39.8	0 18 04.1	104 43 15.5	21 16.6	16 11.6	P	10	29.90	−24	104 55 35	5 49 26	82 50 34	"
"	6 18 39.9	0 18 04.1	104 42 54.5	21 16.6	16 11.6	R	10	"	"	104 55 20	5 48 58.5	82 43 35.7	"
"	6 20 51.6	0 20 15.8	104 44 26.7	21 28.7	16 10.4	P	10	"	"	104 56 46	5 51 38.2	82 50 36	"
"	6 20 51.7	0 20 15.9	104 44 05.5	21 28.7	16 10.4	R	10	"	"	104 56 28	5 51 04	82 42 01.5	"
"	6 22 51.4	0 22 15.6	104 45 35.7	21 39.6	16 09.4	P	10	"	"	104 57 49	5 53 35.8	82 50 02	"
"	6 22 51.5	0 22 15.6	104 45 13	21 39.6	16 09.4	R	10	"	"	104 57 34	5 53 08	82 43 04.8	"
"	6 25 19.2	0 24 43.4	104 47 01.2	21 53.2	16 08.1	P	10	"	"	104 59 14	5 56 14.2	82 52 42	"
"	6 25 19.3	0 24 43.5	104 46 37	21 53.2	16 08.1	R	10	"	"	104 58 56	5 55 40	82 44 08.1	"
"	6 29 51.5	0 29 15.8	104 49 26	22 17.7	16 04.7	P	10	"	"	105 01 33.6	6 00 34.5	82 49 40.5	"
"	6 29 51.5	0 29 15.7	104 49 21.8	22 17.7	16 04.7	H	10	"	"	105 01 50.5	6 01 06.2	82 57 37.5	"
"	6 32 11.9	0 31 36.2	104 50 42.9	22 30.2	16 02.6	P	10	"	"	105 02 52	6 03 00.7	82 51 08	"
"	6 32 11.9	0 31 36.1	104 50 39.5	22 30.2	16 02.6	H	10	"	"	105 03 07.2	6 03 29.3	82 58 18	"
"	6 34 33.6	0 33 57.8	104 51 45.9	22 42.8	16 00.5	H	10	"	"	105 04 13.4	6 05 32.7	82 53 43.5	"
"	6 34 33.7	0 33 58	104 51 55	22 42.8	16 00.5	P	10	"	"	105 04 04	6 05 15.3	82 49 19.5	"
"	6 37 09.3	0 36 33.7	104 53 09.9	22 56.6	15 58.2	P	10	"	"	105 05 16	6 07 29.5	82 43 57	"
"	6 37 09.3	0 36 33.6	104 53 04.3	22 56.6	15 58.2	H	10	"	"	105 05 29.4	6 07 54.3	82 50 10.5	"
"	6 42 34.6	0 41 58.8	104 55 57.5	23 27.3	15 52.4	R	10	"	"	105 08 06	6 12 48	82 42 18 4	"
"	6 42 34.7	0 41 59	104 56 00.8	23 27.3	15 52.4	H	10	"	"	105 08 25.1	6 13 22	82 50 45	"
"	6 44 39	0 44 03.2	104 57 02	23 39.5	15 50	R	10	"	"	105 09 10	6 14 45.8	82 40 38.2	"
"	6 44 39.2	0 44 03.5	104 57 09.2	23 39.5	15 50	H	10	"	"	105 09 33.1	6 15 28.9	82 51 21	"
"	6 46 53	0 46 17.3	104 58 26.5	23 52.6	15 47.3	R	10	"	"	105 10 33.6	6 17 22	82 45 55	"
"	6 46 53.2	0 46 17.5	104 58 30.8	23 52.6	15 47.3	H	10	"	"	105 10 54.3	6 18 00.3	82 55 42	"

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION, during the Winter of 1821—22, *continued.*

DATE. 1822.	Time by 259.	Apparent Time.	Observed Distance of Limbs.	Apparent Altitude. Moon's centre	Apparent Altitude. Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ″	° ′ ″	° ′ ″	
Mar. 1	6 49 05.9	0 48 30.2	104 59 42.5	24 05.6	15 44.7	R	10	29.90	-24	105 11 49.2	6 19 42.5	82 47 49.5	⊙ West of ☾
,,	6 49 06.1	0 48 30.5	104 59 49	24 05.6	15 44.7	H	10	,,	,,	105 12 11.5	6 20 24.3	82 58 27	,,
,,	6 53 05.6	0 52 30.2	105 02 06	24 29	15 39.5	R	10	,,	,,	105 14 13.6	6 24 12.3	82 55 31	,,
,,	6 53 05.6	0 52 30.1	105 02 06.4	24 29	15 39.5	P	10	,,	,,	105 14 10	6 24 05.2	82 53 46	,,
,,	6 55 26.8	0 54 51.4	105 03 26.5	24 42.8	15 36.1	R	10	,,	,,	105 15 34	6 26 42.3	82 57 13.2	,,
,,	6 55 26.8	0 54 51.3	105 03 18.5	24 42.8	15 36.1	P	10	,,	,,	105 15 22	6 26 19.4	82 52 01.5	,,
,,	6 57 25.4	0 56 49.9	105 04 23	24 54.3	15 33.3	P	10	,,	,,	105 16 27	6 28 20.7	82 52 41	,,
,,	6 57 25.4	0 56 50	105 04 28.5	24 54.3	15 33.3	R	10	,,	,,	105 16 35.6	6 28 37	82 56 45	,,
,,	7 01 03	1 00 27.5	105 06 37.4	25 14.4	15 27.9	P	10	,,	,,	105 18 18	6 31 47.7	82 50 03	,,
,,	7 01 03.1	1 00 27.5	105 06 28	25 14.4	15 27.9	H	10	,,	,,	105 18 51.5	6 32 50.5	83 05 45	,,
,,	7 03 04.3	1 02 28.8	105 07 28	25 25.2	15 24.7	H	10	,,	,,	105 19 52.6	6 34 44.3	83 03 52.5	,,
,,	7 03 04.3	1 02 28.9	105 07 32.5	25 25.2	15 24.7	P	10	,,	,,	105 19 37	6 34 15	82 56 31.5	,,
,,	7 05 04.3	1 04 28.9	105 08 41.8	25 35.8	15 21.6	P	10	,,	,,	105 20 47	6 36 25.6	82 59 10	,,
,,	7 05 04.3	1 04 28.8	105 08 34.9	25 35.9	15 21.6	H	10	,,	,,	105 21 00.7	6 36 51.4	83 05 39	,,
,,	7 09 17	1 08 41.6	105 10 35	25 59.9	15 14.1	R	10	,,	,,	105 22 47	6 40 09.5	82 51 57.4	,,
,,	7 09 17.2	1 08 41.8	105 10 48.5	25 59.9	15 14.1	H	10	,,	,,	105 23 17.1	6 41 05.8	83 06 00	,,
,,	7 11 15.7	1 10 40.4	105 11 45	26 11.6	15 10.3	R	10	,,	,,	105 23 58.6	6 42 23.5	82 55 46.5	,,
,,	7 11 15.9	1 10 40.5	105 11 48.3	26 11.6	15 10.3	H	10	,,	,,	105 24 18.1	6 42 59.5	83 04 55	,,
,,	7 13 20.5	1 12 45.2	105 12 49.5	26 24	15 06.3	R	10	,,	,,	105 25 04.3	6 44 26	82 55 11.5	,,
,,	7 13 20.8	1 12 45.4	105 12 45.5	26 24.1	15 06.3	H	10	,,	,,	105 25 16.7	6 44 49.1	83 00 55.5	,,
25	13 42 48	7 45 24.9	68 18 08.5	20 34.5	52 00	P	10	30.35	-19½	67 21 14	13 17 50.3	82 51 21	Pollux East of ☾
,,	13 42 48	7 46 25	68 17 49.5	20 34.5	52 00	R	10	,,	,,	67 21 02	13 18 11	82 56 30	,,
,,	13 47 19.1	7 50 56	68 15 17.6	20 08.9	51 53 7	P	10	,,	,,	67 18 18	13 22 36.6	82 55 09	,,
,,	13 47 19.1	7 50 56	68 14 59	20 08.9	51 53.7	R	10	,,	,,	67 18 08	13 22 54	82 59 27.9	,,
,,	13 51 07.8	7 54 44.8	68 12 45.8	19 47.3	51 48.4	P	10	,,	,,	67 15 44	13 26 47.1	83 00 34.5	,,
,,	13 51 07.8	7 54 44.9	68 12 33	19 47.3	51 48.4	R	10	,,	,,	67 15 30.4	13 26 55	[illegible]	,,
,,	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	,,	,,	[illegible]	[illegible]	[illegible]	,,
,,	13 57 58.8	8 01 35.9	68 08 43.7	19 08.7	51 37.2	P	10	,,	,,	67 11 37.6	13 33 27.7	82 57 57	,,
,,	14 03 39.3	8 07 16.5	68 05 22.9	18 36.9	51 27.1	P	10	,,	,,	67 08 15.6	13 38 56.4	82 54 58.5	,,
,,	14 03 39.3	8 07 16.5	68 05 27.5	18 36.9	51 27.1	H	10	,,	,,	67 08 33.1	13 38 28.3	82 47 57	,,
,,	14 08 22.8	8 12 00.1	68 02 31	18 10.4	51 18.6	H	10	,,	,,	67 05 34.2	13 43 19.2	82 49 46.5	,,

,,	13 57 58.8	8 01 35.9	68 08 43.7	19 08.7	51 37.2	P	10	,,	,,	67 11 37.6	13 33 27.7	82 57 57	,,
,,	14 03 39.3	8 07 16.5	68 05 22.9	18 36.9	51 27.1	P	10	,,	,,	67 08 15.6	13 38 56.4	82 54 58.5	,,
,,	14 03 39.3	8 07 16.5	68 05 27.5	18 36.9	51 27.1	H	10	,,	,,	67 08 33.1	13 38 28.3	82 47 57	,,
,,	14 08 22.8	8 12 00.1	68 02 31	18 10.4	51 18.6	H	10	,,	,,	67 05 34.2	13 43 19.2	82 49 46.5	,,
,,	14 08 22.8	8 12 00.1	68 02 15.3	18 10.4	51 18.6	P	10	,,	,,	67 05 06.8	13 44 03.4	83 00 49.5	,,
,,	14 15 29.3	8 20 06.8	67 56 47.7	17 25.1	51 01.8	H	10	,,	,,	66 59 50.1	13 52 39	83 08 03	,,
,,	14 16 29.3	8 20 06.7	67 56 47	17 25.1	51 01.8	R	10	,,	,,	66 59 46	13 52 46	83 09 50.1	,,
,,	14 20 54	8 24 31.5	67 54 06	17 00.5	50 51.3	R	10	,,	,,	66 57 06.3	13 57 06.5	83 08 44.7	,,
,,	14 20 54.1	8 24 31.6	67 54 24.3	17 00.5	50 51.3	H	10	,,	,,	66 57 26.9	13 56 31.8	83 06 03	,,
,,	14 25 24.2	8 29 01.8	67 51 30.3	16 35.4	50 40.6	H	10	,,	,,	66 54 33.7	14 01 13.7	83 02 58.5	,,
,,	14 25 24.2	8 29 01.8	67 51 15.5	16 35.4	50 40.6	R	10	,,	,,	66 54 16	14 01 41.5	83 09 55.2	,,
,,	14 34 24.7	8 38 02.3	67 46 11	15 45.4	50 15.1	P	10	,,	,,	66 49 08.4	14 10 02.2	82 59 58.5	,,
,,	14 34 24.7	8 38 02.4	67 45 40	15 45.4	50 15.1	R	10	,,	,,	66 48 45.6	14 10 40.5	83 09 30.9	,,
,,	14 39 49.4	8 43 27.2	67 42 08.5	15 15.6	49 57.5	R	10	,,	,,	66 45 20	14 16 13.5	83 11 34.5	,,
,,	14 39 49.4	8 43 27.1	67 42 34.5	15 15.6	49 57.5	P	10	,,	,,	66 45 35	14 15 49	83 05 28.5	,,
30	14 21 07	8 25 42.1	33 10 46	45 19.2	35 48.3	R	10	29.34	–13	32 57 08.4	13 57 58.5	83 04 05.7	Regulus East of ☾
,,	14 21 07.1	8 25 42.2	33 10 37	45 19.2	35 48.3	P	10	,,	,,	32 57 02.6	13 58 08.8	83 06 39	,,
,,	14 24 59.8	8 29 34.9	33 08 30.5	45 08.3	35 54.9	R	10	,,	,,	32 54 32.4	14 02 37.5	83 15 39	,,
,,	14 24 59.9	8 29 35	33 08 25.8	45 08.3	35 54.9	P	10	,,	,,	32 54 32.6	14 02 36.7	83 15 25.5	,,
,,	14 28 13.6	8 32 48.8	33 06 49.7	44 59.2	36 00.4	P	10	,,	,,	32 52 39.4	14 05 50.4	83 15 24	,,
,,	14 28 13.6	8 32 48.8	33 06 54.5	44 59.2	36 00.4	R	10	,,	,,	32 52 40	14 05 51	83 15 33.3	,,
,,	14 34 44.4	8 39 19.6	33 03 50.5	44 39.3	36 09.6	H	10	,,	,,	32 49 08.8	14 12 15.3	83 13 55.5	,,
,,	14 34 44.5	8 39 19.7	33 03 48.8	44 39.3	36 09.6	P	10	,,	,,	32 49 04.6	14 12 25.4	83 16 25.5	,,
,,	14 40 44.1	8 45 19.5	33 01 16.1	44 20.2	36 17.4	P	10	,,	,,	32 46 00	14 17 53	83 08 21	,,
,,	14 40 44.1	8 45 19.4	33 01 19.3	44 20.2	36 17.4	H	10	,,	,,	32 46 06.4	14 17 41.2	83 05 27	,,
,,	14 45 13.9	8 49 49.2	32 59 05.5	44 06	36 23.2	H	10	,,	,,	32 43 30.7	14 22 19.8	83 07 39	,,
,,	14 45 14	8 49 49.3	32 59 14.5	44 06	36 23.2	P	10	,,	,,	32 43 36	14 22 10	83 05 10.5	,,
,,	14 53 27.4	8 58 03	32 55 22	43 38.8	36 30.5	R	10	,,	,,	32 39 03.4	14 30 14.5	83 02 52.8	,,
,,	14 53 27.5	8 58 02.9	32 55 26.3	43 38.8	36 30.5	H	10	,,	,,	32 39 12.5	14 30 01	82 59 31.5	,,
,,	14 58 23.3	9 02 58.8	32 53 03.8	43 22	36 33.4	H	10	,,	,,	32 36 27.2	14 34 56.4	82 59 24	,,
,,	14 58 23.3	9 02 58.8	32 53 13	43 22	36 33.4	R	10	,,	,,	32 36 32.4	14 34 43	82 56 02.7	,,

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION, during the Winter of 1821—22, *continued.*

DATE. 1822.	Time by 259.	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Apparent Altitudes. Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ″	° ′ ″	° ′ ″	
Mar. 30	15 03 23.3	9 07 58.9	32 51 01	43 04.9	36 36.3	R	10	29.34	−13	32 33 59	14 39 17	82 49 32.8	Regulus East of ☾
,,	15 03 23.4	9 07 59	32 50 58.5	43 04.9	36 36.3	H	10	,,	,,	32 33 59.4	14 39 20.8	82 50 27	,,
,,	15 11 06.8	9 15 42.5	32 46 30.3	42 35.7	36 38.8	P	10	,,	,,	32 28 52.2	14 48 29.2	83 11 40.5	,,
,,	15 11 06.8	9 15 42.6	32 46 36	42 35.7	36 38.8	R	10	,,	,,	32 29 02.4	14 48 10.5	83 06 58	,,
,,	15 15 38.4	9 20 14.1	32 44 07	42 17	36 39.3	P	10	,,	,,	32 26 10	14 53 19.3	83 16 18	,,
,,	15 15 38.5	9 20 14.2	32 44 14.5	42 17	36 39.3	R	10	,,	,,	32 26 16	14 53 05.5	83 12 33.3	,,
,,	15 20 20.8	9 24 56.6	32 41 58.5	41 57.7	36 39.8	P	10	,,	,,	32 23 39	14 57 49.5	83 13 13.5	,,
,,	15 20 20.9	9 24 56.7	32 42 15	41 57.7	36 39.8	R	10	,,	,,	32 23 54.5	14 57 19.5	83 05 41.8	,,
,,	15 28 20.1	9 32 56	32 38 13	41 23.4	36 37.5	P	10	,,	,,	32 19 19	15 05 34.3	83 09 34.5	,,
,,	15 28 20.1	9 32 56	32 38 29.3	41 23.4	36 37.5	H	10	,,	,,	32 19 41	15 04 55	82 59 45	,,
,,	15 33 38.4	9 38 14.4	32 35 17	41 00.1	36 34.7	H	10	,,	,,	32 16 06.1	15 11 19.3	83 16 13.5	,,
,,	15 33 38.4	9 38 14.3	32 35 25.8	41 00.1	36 34.7	P	10	,,	,,	32 16 09.6	15 11 13	83 14 40.5	,,
,,	15 38 45.2	9 43 21.2	32 32 57.3	40 37.7	36 32	P	10	,,	,,	32 13 19	15 16 18.1	83 14 13.5	,,
,,	15 38 45.2	9 43 21.3	32 32 52.5	40 37.7	36 32	H	10	,,	,,	32 13 21	15 16 14.5	83 13 18	,,
,,	15 46 49.4	9 51 25.6	32 29 36	40 00.6	36 25.6	H	10	,,	,,	32 09 30.1	15 23 07.4	82 55 27	,,
,,	15 46 49.4	9 51 25.6	32 29 39	40 00.6	36 25.6	R	10	,,	,,	32 09 27.2	15 23 12	82 56 36.7	,,
,,	15 51 20.9	9 55 57.1	32 27 20.5	39 38.9	36 20.9	R	10	,,	,,	32 06 50	15 27 54	82 59 13.3	,,
,,	15 51 20.9	9 55 57.2	32 27 07	39 38.9	36 20.9	H	10	,,	,,	32 06 44.4	15 28 03.7	83 01 37.5	,,
,,	15 55 36	10 00 12.3	32 25 06.3	39 18.5	36 16.5	H	10	,,	,,	32 04 25.4	15 32 12	82 59 55.5	,,
,,	15 55 36	10 00 12.2	32 25 23	39 18.5	36 16.5	R	10	,,	,,	32 04 36.6	15 31 52.5	82 54 49.5	,,
,,	16 07 49.9	10 12 26.4	32 18 35	38 17.8	35 58.6	P	10	,,	,,	31 57 03.4	15 45 22.9	83 14 09	,,
,,	16 07 49.9	10 12 26.4	32 18 55.2	38 17.8	35 58.6	R	10	,,	,,	31 57 24.2	15 44 46	83 04 53.8	,,
,,	16 12 18.7	10 16 55.2	32 16 31	37 55.2	35 51.1	R	10	,,	,,	31 54 43.8	15 49 33	83 09 27	,,
,,	16 12 18.8	10 16 55.3	32 16 20.7	37 55.2	35 51.1	P	10	,,	,,	31 54 32.2	15 49 53.4	83 14 33	,,
,,	16 16 01.2	10 20 37.7	32 14 32.5	37 36.5	35 44.9	P	10	,,	,,	31 52 32	15 53 28.5	83 12 42	,,
,,	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
,,	16 32 32.3	10 28 08.9	32 10 44.5	36 57.6	35 29.9	H	10	,,	,,	31 48 27	16 00 46.8	83 09 23.5	,,
,,	16 27 54.4	10 32 31	32 08 40.3	36 34.7	35 20.4	P	10	,,	,,	31 46 01.6	16 05 07.1	83 09 01.5	,,
,,	16 27 54.5	10 32 31.2	32 08 19.5	36 34.7	35 20.4	H	10	,,	,,	31 45 47.4	16 05 32.4	83 15 18	,,
,,	16 32 32.2	10 37 08.9	32 05 57.8	36 10.4	35 10.4	H	10	,,	,,	31 43 10.2	16 10 13.7	83 16 12	,,
,,	[illegible]	[illegible]	[illegible]	36 10.4	35 10.4	R	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

,,	16 32 32.3	10 28 08.9	32 10 44.5	36 57.6	35 29.9	H	10	,,	,,	31 48 27	16 00 46.8	83 09 23.5		,,
,,	16 27 54.4	10 32 31	32 08 40.3	36 34.7	35 20.4	P	10	,,	,,	31 46 01.6	16 05 07.1	83 09 01.5		,,
,,	16 27 54.5	10 32 31.2	32 08 19.5	36 34.7	35 20.4	H	10	,,	,,	31 45 47.4	16 05 32.4	83 15 18		,,
,,	16 32 32.2	10 37 08.9	32 05 57.8	36 10.4	35 10.4	H	10	,,	,,	31 43 10.2	16 10 13.7	83 16 12		,,
,,	16 32 32.2	10 37 08.9	32 06 08	36 10.4	35 10.4	P	10	,,	,,	31 43 13.4	16 10 08.2	83 14 51		,,
,,	16 40 53.5	10 45 30.5	32 02 30	35 25.7	34 50.4	R	10	,,	,,	31 39 11	16 17 21	82 57 37.3		,,
,,	16 40 53.6	10 45 30.4	32 02 25.5	35 25.7	34 50.4	H	10	,,	,,	31 39 13	16 17 18.4	82 57 00		,,
,,	16 44 32.1	10 49 09.1	32 00 23	35 06	34 41	R	10	,,	,,	31 36 50.4	16 21 27	83 04 29.4		,,
,,	16 44 32.2	10 49 09.1	32 00 17.5	35 06	34 40.9	H	10	,,	,,	31 36 53.2	16 21 28.6	83 04 52.5		,,
,,	16 48 25.5	10 53 02.5	31 58 24.5	34 44.8	34 30.7	R	10	,,	,,	31 34 43.6	16 25 19	83 04 08.1		,,
,,	16 48 25.7	10 53 02.6	31 58 09.5	34 44.8	34 30.7	H	10	,,	,,	31 34 36.2	16 25 33.7	83 07 46.5		,,
,,	16 55 11.3	10 59 48.5	31 54 29.5	34 07.6	34 12.2	R	10	,,	,,	31 30 31.6	16 32 51	83 15 37.5		,,
,,	16 55 11.4	10 59 48.4	31 54 30.2	34 07.6	34 12.2	P	10	,,	,,	31 30 31	16 32 52.7	83 16 06		,,
,,	16 58 25.9	11 03 03.1	31 52 55.5	33 49.6	34 02.9	R	10	,,	,,	31 28 48.2	16 35 57.5	83 13 36.7		,,
,,	16 58 25.9	11 03 03	31 52 42.5	33 49.6	34 02.9	P	10	,,	,,	31 28 32.8	16 36 24.5	83 20 24		,,
,,	17 01 40.2	11 06 17.4	31 51 27	33 31.6	33 53.6	R	10	,,	,,	31 27 10	16 38 52	83 08 39		,,
,,	17 01 40.3	11 06 17.4	31 51 15.3	33 31.6	33 53.6	P	10	,,	,,	31 26 56.6	16 39 16.5	83 14 46.5		,,
,,	17 09 49.1	11 14 26.3	31 47 01.5	32 44.1	33 27.2	P	10	,,	,,	31 22 22.6	16 47 27	83 15 10.5		,,
,,	17 09 49.2	11 14 26.4	31 46 59.5	32 44.1	33 27.2	H	10	,,	,,	31 22 27.6	16 47 18.2	83 12 57		,,
,,	17 14 58.6	11 19 35.9	31 44 50.2	32 13.2	33 09.5	P	10	,,	,,	31 19 58.6	16 51 45.7	83 02 28.5		,,
,,	17 14 58.6	11 19 35.9	31 44 44	32 13.2	33 09.5	H	10	,,	,,	31 19 56.4	16 51 49	83 03 16		,,
,,	17 21 08.7	11 25 46.1	31 41 50.3	31 36.2	32 48.3	P	10	,,	,,	31 16 30.6	16 57 57.5	83 02 52.5		,,
,,	17 21 08.7	11 25 46.1	31 42 00.5	31 36.2	32 48.3	H	10	,,	,,	31 16 57.4	16 57 09.7	82 50 54		,,
,,	17 30 52.7	11 35 30.3	31 36 24	30 39.5	32 13	R	10	,,	,,	31 10 56.6	17 07 54	83 05 55.5		,,
,,	17 30 52.9	11 35 30.4	31 36 15.6	30 39.5	32 13	H	10	,,	,,	31 10 51.3	17 08 05	83 08 39		,,
,,	17 34 22.3	11 38 59.9	31 34 25.5	30 20	31 59.2	R	10	,,	,,	31 08 53.6	17 11 32	83 08 01.5		,,
,,	17 34 22.5	11 39 00.1	31 34 20	30 20	31 59.2	H	10	,,	,,	31 08 50.5	17 11 41.6	83 10 22.5		,,
,,	17 38 41.2	11 43 18.8	31 32 14.5	29 55.9	31 42.3	R	10	,,	,,	31 06 36.4	17 15 41.5	83 05 40		,,
,,	17 38 41.4	11 43 19	31 32 05	29 55.9	31 42.3	H	10	,,	,,	31 06 31.4	17 15 50.7	83 07 55.5		,,
,,	18 01 54.3	12 06 32.4	31 20 03.5	27 40.9	30 02.6	R	10	,,	,,	30 54 00	17 38 16	82 55 54		,,
,,	18 01 54.4	12 06 32.3	31 19 53.8	27 40.9	30 02.6	P	10	,,	,,	30 53 48.6	17 38 37.2	83 01 13.5		,,

LUNAR OBSERVATIONS FOR DETERMINING THE MERIDIAN OF THE FURY'S STATION, during the Winter of 1821—22, *concluded.*

DATE. 1822.	Time by 259	Apparent Time.	Observed Distance of Limbs.	Apparent Altitudes. Moon's centre	Sun's centre, or Star.	Observer.	No. of Observations	Barometer.	Thermometer.	True distance.	Apparent Greenwich Time.	Longitude West of Greenwich	PHENOMENA.
	° ′ ″	° ′ ″	° ′ ″	′ ″	′ ″				°	° ′ ″	° ′ ″	° ′ ″	
Mar.30	18 04 59.2	12 09 37.3	31 18 22	27 22.9	29 49.2	R	10	29.34	-13	30 52 15.4	17 41 25.5	82 57 03	Regulus East of ☾
„	18 04 59.3	12 09 37.2	31 18 13.5	27 22.9	29 49.2	P	10	„	„	30 52 04.6	17 41 43.8	83 01 39	„
„	18 07 53.8	12 12 31.9	31 16 32	27 04.9	29 36.6	R	10	„	„	30 50 20.4	17 44 48	83 04 01.5	„
„	18 07 53.9	12 12 31.9	31 16 26.8	27 04.9	29 36.6	P	10	„	„	30 50 15	17 45 02	83 07 04.5	„
„	18 14 10.7	12 18 48.8	31 13 09.5	26 27	29 06.7	H	10	„	„	30 46 55.2	17 50 58.3	83 02 22.5	„
„	18 14 10.7	12 18 48.8	31 13 07.8	26 27	29 06.7	P	10	„	„	30 46 50	17 51 07.5	83 04 42	„
„	18 17 30.8	12 22 08.9	31 11 27.5	26 06.8	28 49.8	P	10	„	„	30 45 04.6	17 54 16.5	83 01 54	„
„	18 17 30.8	12 22 09	31 11 18.5	26 06.8	28 49.8	H	10	„	„	30 45 01.2	17 54 22.8	83 03 27	„
„	18 21 00.3	12 25 38.5	31 09 27	25 45.7	28 32.1	H	10	„	„	30 43 08	17 57 45.7	83 01 48	„
„	18 21 00.3	12 25 38.5	31 09 29	25 45.7	28 32.1	P	10	„	„	30 43 10.2	17 57 41.7	83 00 48	„
„	18 28 26	12 33 04.3	31 05 27	25 01.4	27 55.2	H	10	„	„	30 39 04.8	18 05 01.5	82 59 18	„
„	18 28 26	12 33 04.3	31 05 46	25 01.4	27 55.2	R	10	„	„	30 39 25.8	18 04 25	82 50 11.3	„
„	18 31 43.8	12 36 22.1	31 03 53.5	24 42	27 39.2	R	11	„	„	30 37 31.4	18 07 48	82 51 29.2	„
„	18 31 43.8	12 36 22.1	31 03 36.5	24 42	27 39.2	H	10	„	„	30 37 13.6	18 08 20.4	82 59 34.5	„
„	18 35 06.5	12 39 44.9	31 01 41	24 22.2	27 22.8	H	10	„	„	30 35 17.8	18 11 48.7	83 00 57	„
„	18 35 06.5	12 39 44.8	31 01 49	24 22.2	27 22.8	R	10	„	„	30 35 25.8	18 11 34	82 57 18	„

ABSTRACT OF OBSERVATIONS,

FOR DETERMINING THE MERIDIAN OF THE OBSERVATORY

AT WINTER ISLAND, 1821—22.

NOTE.—A number of Observations, by Mr. Fisher, of the difference of Right Ascensions of the Stars and Moon, and of the Sun and Moon, and by occultations of fixed Stars, are not taken into this account, as being subject to a comparison with corresponding Observations at Greenwich.

	Sets.		Lunar Distances.			° ′ ″	
By the Mean of	504	containing	5057	⊙ and * West of ☾	The Longitude of the Fury's Station is . . .	83 09 26.7	West.
„	440	„	4403	„ East „		83 11 34.33	„
„	944	„	9460	„		83 10 26.19	„

By trigonometrical measurement, the Observatory was found to be 24″ East of the Fury.

Mean Longitude of the Observatory by the above Lunar Distances	83 10 02.16	„
Do. obtained by Mr. Fisher, from 12 eclipses of Jupiter's satellites . . .	82 53 21.5	„
Difference between these last	16 40.66	Lunars to the Westward.
Mean Longitude of the Observatory at Winter Island, by the above Observations, considering each eclipse of the same value as one set of Lunar Observations	83 09 49.6*	
Ditto. ditto. being the Mean between the Longitudes deduced from each separate method	83 01 41.83**	
	8 07.77	

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* The Charts made under my inspection, on board the Fury, are constructed with this Longitude. Should the last method of deducing the Mean (**) be considered more just, the Longitudes in the Charts, for this part of the coast will be subject to a correction of −8′ 07.8″.

[illegible]

N°. IV.

OBSERVATIONS

FOR

THE VARIATION OF THE MAGNETIC NEEDLE.

Table I.—OBSERVATIONS for the VARIATION of the MAGNETIC NEEDLE, made *on Shore* or *upon the Ice*, 1821.

1821.	Latitude, N.	Longitude, W.	Compass No.	Observer.	Westerly Variation.	Mean Variation.	REMARKS.
	° ′	° ′			° ′ ″	° ′ ″	
May 19 ..	58 48½	2 55½	1	P	27 13 51	27 32 08.5	South Point of the entrance into Widewall Harbour, Orkney Islands.
			5	R	27 50 26		
„ 23 ..	58 49	3 00½	1	P	26 54 53	26 58 30	Hackness Point, Long Hope ditto.
			1	H	27 09 35		
			5	R	26 49 37		
			5	R	26 59 55		
July 4 ...	61 13	64 43	1	F	52 00 00	52 44 45	On a floe of Ice 150 yards from the Ship.
			1	F	53 08 00		
			2	F	52 59 00		
			2	F	52 52 00		
„ 8 ...	61 10½	65 21	1	P	52 40 18	52 55 45	On a floe of Ice at a distance from the Ship.
			1	P	53 02 50		
			1	H	53 25 41		
			1	R	53 01 41		
			2	R	53 08 20		
			2	P	52 42 06		
			2	P	52 39 34		
			2	H	52 45 31		
„ 18...	61 36	66 41	2	F	52 14 00	51 39 11	On a floe of Ice 200 yards from the Ship.
			2	F	51 59 00		
			2	P	52 52 57		
			2	H	51 44 34		
			2	H	51 54 34		
			2	R	51 04 51		
			2	B	51 35 21		
			2	B	51 14 25		
			2	B	51 04 12		
			3	P	51 39 08		
			3	R	50 42 56		
			3	H	52 43 43		

OBSERVATIONS FOR THE VARIATION OF THE MAGNETIC NEEDLE, made *on Shore* or *upon the Ice*, 1821, *continued*.

1821.	Latitude, N.	Longitude, W.	Compass No.	Observer.	Westerly Variation.	Mean Variation.	REMARKS.
	° ′	° ′			° ′ ″	° ′ ″	
July 24	62 31½	69 57	3	H	52 21 23	52 37 04	On shore near the SE. point of the larger of the Upper Savage Islands.
			3	B	52 45 29		
			3	B	50 27 24		
			5	R	50 57 42		
			2	P	52 38 31		
			2	R	52 22 59		
			2	F	52 52 00		
			2	H	52 51 19		
			2	B	52 20 30		
29 ..	63 45	71 04	4	P	53 42 52	54 51 57.7	These Observations were taken at the distance of 132 yards from the Ship, upon a floe of Ice to which the Ship was attached, and which had a slow motion in Azimuth. They are here inserted according to the order of time in which they were taken, in order to shew the regularity of the Ships' influence upon the Needles even at that distance according to the angle at which it acted on them. The three last Observations were taken half an hour after the rest, when the motion of the floe was not noted. The true variation appears (by comparing those of the 24th July and 3d August) to have been about 52°.
			1	H	53 10 23		
			1	F	53 26 00		
			4	R	53 50 21		
			2	H	54 05 42		
			2	F	53 56 00		
			1	P	54 08 56		
			1	R	54 47 44		
			2	B	54 55 32		
			5	P	55 34 13		
			5	R	55 48 46		
			5	F	56 08 00		
			5	H	56 14 10		
			2	P	55 13 45		
			2	R	55 29 32		
			4	H	55 15 11		
			4	F	55 11 00		
			5	B	56 09 42		
			4	B	54 33 48		
			1	B	55 37 38		

OBSERVATIONS FOR THE VARIATION OF THE MAGNETIC NEEDLE, made *on Shore* or *upon the Ice*, 1821, *continued.*

1821.	Latitude, N.	Longitude, W.	Compass No.	Observer.	Westerly Variation.	Mean Variation.	REMARKS.
	° ′	° ′			° ′ ″	° ′ ″	
			1	P	51 02 59		
			1	P	49 08 25		
			1	H	50 28 19		
			4	R	52 45 48		
			4	F	49 07 00		
			4	B	51 42 43		
			5	R	52 13 36		
			5	F	55 31 00		
			5	P	53 39 00		
Aug. 3 ...	65 08	79 35	5	P	54 01 50	52 11 43.6	These observations were taken in two different places. Those above the double line were on a piece of ice 200 yards from the Fury, where it was supposed the compasses might have been affected by the ship's influence. We then removed to a piece of ice, a quarter of a mile distant from the ship, in which situation the subsequent observations were taken.
			5	H	53 09 39		
			5	H	55 02 24		
			1	F	52 22 00		
			1	B	52 14 51		
			1	R	50 54 55		
			4	P	51 44 00		
			4	R	52 28 55		
			4	B	52 20 54		
			4	H	52 51 14		
			4	F	51 05 00		
			2	R	54 51 43		
			2	B	55 38 34		
			2	H	54 28 29		
			3	P	53 25 42		
			3	R	54 10 41		
			3	H	53 56 30		
„ 5 ...	65 27	81 57	3	B	54 45 59	55 05 30.5	On a floe of ice.
			4	R	55 19 48		
			4	H	56 16 29		

OBSERVATIONS FOR THE VARIATION OF THE MAGNETIC NEEDLE, made *on Shore* or *upon the Ice*, 1821, *continued*.

1821.	Latitude, N.	Longitude, W.	Compass No.	Observer.	Westerly Variation.	Mean Variation.	REMARKS.
	° ′	° ′			° ′ ″	° ′ ″	
			4	B	54 18 12		
			5	H	51 27 21		
			5	R	58 07 41		
			5	B	57 28 35		
			1	B	53 29 56		
			2	B	53 22 48		
			3	H	52 46 28		
			3	P	53 12 31		
			3	R	54 35 35		
Aug. 10 ..	65 31	83 20	3	B	53 15 28	53 49 10.9	On a floe of ice.
			4	P	53 57 55		
			4	H	55 04 35		
			4	R	53 52 54		
			4	B	52 57 50		
			5	B	55 25 00		
			1	P	50 51 45		
			1	H	50 10 55		
			1	R	49 57 16		
„ 13 ..	65 34	84 18½	3	P	50 56 25	50 33 58.7	On a floe of ice
			3	H	51 01 51		
			3	R	50 25 40		
„ 15 ..	65 28¾	84 40	4	P	50 19 54	50 18 28	On shore, C. Welsford, Southampton Island.
			4	R	50 16 58		
„ 16 ..	65 27½	85 15	3	P	47 54 59	47 34 05	On shore, west side of Duke of York's Bay.
			3	H	47 13 11		
„ 19 ..	65 21	84 57	4	P	46 41 00	46 41 00	On a shoal, in Duke of York's Bay.
					Noon, Azimuth.		
			1	P	48 28 26		
			1	P	45 03 49		
			1	H	50 10 55		

OBSERVATIONS FOR THE VARIATION OF THE MAGNETIC NEEDLE, made *on Shore* or *upon the Ice*, 1821, *continued.*

1821.	Latitude, N.	Longitude, W.	Compass No.	Observer.	Westerly Variation.	Mean Variation.	REMARKS.
	° ′	° ′ ″			° ′ ″	° ′ ″	
Aug. 21 ..	66 31	86 30 20	1	R	47 17 29	48 32 57.5	On shore at the north side of Repulse Bay. These observations serve to shew the extreme sluggishness of the horizontal needles at this station.
			1	B	48 26 03		
			3	H	50 07 15		
			3	B	49 46 01		
			4	R	49 03 42		
„ 27 ..	66 13¾	84 11½	3	P	40 23 32	40 19 34.3	These observations were taken very steadily on shore; we were not aware of any disturbing influence. The rocks were of gneiss.
			3	P	40 25 47		
			3	R	40 09 24		
„ 29 ..	66 12½	84 44	2	H	48 58 31	52 19 47.8	On the sea-beach at Duckett Cove.
			4	H	50 16 25		
			2	P	53 41 34		
			2	P	53 52 38		
			2	H	54 37 32		
			5	R	52 29 07		
Sept. 9 ..	66 37½	84 11	1	H	57 12 25	57 03 22.2	On shore, east side of Lyon Inlet.
			3	H	57 01 02		
			3	H	57 01 58		
			3	H	56 58 04		
„ 17 .. „ 18 ..	66 41¾	84 18 22	2	H	53 17 10	50 09 21.5	On shore, at the mouth of the west branch of Lyon Inlet. No disturbing influence that we were aware of.
			2	H	47 15 07		
			2	H	47 10 04		
			2	H	50 37 11		
			2	H	51 29 43		
			2	B	51 00 54		
„ 19 ..	66 24½	84 40	3	P	56 11 34	56 19 52.5	On the beach at the Head of Gore Bay.
			3	R	56 28 11		
„ 28 ..	66 32	83 49	1	R	54 46 23	54 46 23	On shore, Safety Cove.

OBSERVATIONS FOR THE VARIATION OF THE MAGNETIC NEEDLE, made *on Shore* or *upon the Ice*, 1822.

1822.	Latitude, N.	Longitude, W.	Compass No.	Observer.	Westerly Variation.	Mean Variation.	REMARKS.
	° ′	° ′			° ′ ″	° ′ ″	
July 6 ...	66 56	81 39	2	P	62 17 00	62 17 00	By astronomical bearings of a cape.
„ 9 ...	67 02½	81 28	2	F	65 09 00	65 12 46	Do. do. do.
			2	H	65 16 33		
			2	P	70 24 23		
„ 11 ...	67 11½	81 24	2	F	70 26 00	70 28 12	On shore.
			2	H	70 34 12		
			2	F	78 53 00		
			5	F	78 50 00		
			5	P	79 21 19		
			2	P	79 38 19		
„ 19 ...	69 21	80 02	5	N	80 54 09	79 20 52.5	On a floe of ice.
			2	N	78 38 19		
			5	R	78 32 02		
			2	R	78 58 59		
			5	H	79 19 18		
			2	H	80 23 20		
			2	P	82 26 52		
„ 21 ...	69 33½	81 11	2	B	82 06 47	82 21 51	On a floe of ice.
			2	H	82 31 54		
„ 23 ...	69 21	81 33	5	R	80 29 25	80 29 25	Esquimaux tents, at Igloolik.
			5	F	85 34 00		
			2	F	87 13 00		
			5	P	86 13 06		
			5	P	86 37 24		
			2	P	86 13 57		
			2	H	86 01 28		
			5	H	85 30 19		
Aug. 5 ...	69 32	81 23	2	Re	86 43 00	86 05 43	On a floe of ice
			2	B	86 32 54		
			2	C	85 36 50		

OBSERVATIONS FOR THE VARIATION OF THE MAGNETIC NEEDLE, made *on Shore* or *upon the Ice*, 1822, *continued.*

1822.	Latitude, N.	Longitude, W.	Compass No.	Observer.	Westerly Variation.	Mean Variation.	REMARKS.
Aug. 5 ...	69° 32′	81° 23′	5	R	85° 21′ 56″	86° 05′ 43″	On a floe of ice.
			5	R	86 19 23		
			5	R	86 20 25		
„ 6 ...			5	R	85 45 20		
			5	R	85 52 08		
			5	R	85 36 20		
„ 11...	69 32	81 37	5	R	87 20 23	87 20 09	On a floe of ice near Tern Island.
			5	R	87 19 55		
„ 24...	69 36	81 55	5	R	88 36 33	88 50 46.5	On a floe of ice near the Bouverie Islands.
			5	R	89 05 00		
			2	P	87 56 17		
			2	P	87 42 26		
			2	N	88 08 51		
Sept. 8...	69 48	83 29	2	N	87 24 03	89 18 19.4	On a floe of ice, in the Strait of the Fury and Hecla.
„ 10...			2	F	90 48 07		
			2	P	90 41 43		
			2	C	91 40 50		
			2	H	90 04 18		

TABLE III.

The Observations contained in this Table were made with the azimuth compasses, on Captain Kater's construction, placed on a stool on shore, and directed to a meridian mark.

They were made at different times of the day, with the view of detecting, if possible by this method, any diurnal change in the variation of the magnetic needle.

The compass was invariably removed, and directed and levelled afresh, between each of the Observations, whose number is given in the proper column.

The range of each set of Observations is inserted, for the purpose of shewing the degree of sluggishness, or the contrary, with which the compasses traversed. No. 2 was the most used, as being the most sensible.

The initials of the observers are the same as usual.

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Winter Island.

DAY.	TIME. Hour.	TIME. A.M. or P.M.	Barometer.	Thermometers in the shade.	WIND.	WEATHER.		Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.	Mean variation observed near the same hour.
1821	H. M.		IN.	°							° ′	° ′ ″	° ′ ″
Nov. 13..	0 15	P.M.	29.81	+ 21	S.E.	Moderate	Hazy	P	10	2	1 38	56 41 20	
„	0 30	„	„	„	„	„	„	H	10	2	1 50	56 37 00	56 34 55
„	0 45	„	„	„	„	„	„	P	10	2	4 00	56 36 50	
„	1 00	„	„	„	„	„	„	H	10	2	1 50	56 21 30	
„ 17..	0 15	„	30.17	+ 2	North	Light	Fine	P	10	2	0 27	56 28 12	56 28 21
„	0 35	„	„	„	„	„	„	H	10	2	0 32	56 28 30	
1822 April 18..	4 45	A.M.	29.77	0	South	„	„	P	10	2	0 35	53 45 00	
„	5 00	„	„	„	„	„	„	R	10	2	0 50	53 51 30	
„	5 15	„	„	„	„	„	„	P	10	2	0 55	53 50 42	
„	5 30	„	„	„	„	„	„	R	10	2	0 40	53 55 42	54 03 58
„	5 45	„	„	„	„	„	„	P	10	2	1 10	54 10 30	
„	6 00	„	„	„	„	„	„	R	10	2	0 55	54 01 30	
„	6 15	„	„	„	„	„	„	P	10	2	1 18	54 31 54	
„	6 30	„	„	„	„	„	„	R	10	2	0 55	54 25 00	
June 3...	6 25	P.M.	29.79	+ 35	„	„	Cloudy	P	10	2	1 15	53 55 00	
„	6 35	„	„	„	„	„	„	H	10	2	1 25	54 08 00	
„	6 45	„	„	„	„	„	„	P	10	2	0 50	53 54 00	
„	6 57	„	„	„	„	„	„	H	10	2	1 35	53 56 00	
„	7 10	„	„	„	„	„	„	P	10	2	0 40	53 27 12	
„	7 20	„	„	„	„	„	„	H	10	2	1 10	53 14 00	
„	7 30	„	„	„	„	„	„	P	10	2	1 25	53 58 00	53 37 58
„	7 40	„	„	„	„	„	„	H	10	2	0 50	53 55 00	
„	7 50	„	„	„	„	„	„	P	10	2	0 50	53 38 30	
„	8 00	„	„	„	„	„	„	H	10	2	1 35	53 42 00	
„	8 30	„	„	„	„	„	„	R	10	2	1 25	53 29 00	
„	8 55	„	„	„	„	„	„	R	10	2	1 00	53 13 30	
„	9 20	„	„	„	„	„	„	R	10	2	1 00	53 13 00	
„	9 45	„	„	„	„	„	„	R	10	2	0 20	53 08 30	
„ 4...	6 45	A.M.	29.78	+ 33.5	North	Moderate	„	H	10	2	1 05	52 23 00	
„	7 00	„	„	„	„	„	„	P	10	2	1 10	52 02 00	52 30 37
„	7 15	„	„	„	„	„	„	H	10	2	1 50	52 53 30	
„	7 25	„	„	„	„	„	„	P	10	2	0 35	52 44 00	

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Winter Island, *continued.*

DAY.	TIME.		Barometer.	Thermometers in the shade.	WIND.	WEATHER.		Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.	Mean variation observed near the same hour.
	Hour.	A.M. or P.M.											
1822	H. M.		IN.	°							° ′	° ′ ″	° ′ ″
June 4...	0 40	P.M.	29.80	+ 41.5	North	Moderate	Cloudy	P	10	2	1 10	54 29 30	53 42 07
„	0 50	„	„	„	„	„	„	H	10	2	2 05	54 15 30	
„	1 05	„	„	„	„	„	„	P	10	2	1 20	53 16 00	
„	1 15	„	„	„	„	„	„	H	10	2	1 40	52 47 30	
„	8 40	„	„	+ 32	„	Light	„	P	10	2	0 35	53 15 30	53 30 45
„	8 55	„	„	„	„	„	„	H	10	2	1 00	53 46 00	
„ 5...	6 45	A.M.	29.72	„	N.W.	Moderate	„	H	10	2	1 05	51 15 30	51 00 37
„	7 00	„	„	„	„	„	„	P	10	2	0 50	50 32 00	
„	7 20	„	„	„	„	„	„	H	10	2	0 45	51 42 00	
„	7 30	„	„	„	„	„	„	P	10	2	1 50	50 33 00	
„	0 30	P.M.	29.69	+ 32.5	North	„	Small Snow	H	10	2	2 15	51 58 00	51 54 28
„	0 45	„	„	„	„	„	„	P	10	2	1 15	52 15 00	
„	1 00	„	„	„	„	„	„	H	9	2	1 30	51 50 53	
„	1 10	„	„	„	„	„	„	P	10	2	1 00	51 34 00	
„	7 30	„	29.66	+ 26	N.W.	„	Cloudy	H	10	2	1 45	53 46 00	53 51 50
„	7 40	„	„	„	„	„	„	H	10	2	1 25	53 37 30	
„	7 55	„	„	„	„	„	„	H	10	2	0 55	53 50 00	
„	8 05	„	„	„	„	„	„	H	10	2	0 45	53 49 00	
„	8 15	„	„	„	„	„	„	P	10	2	1 40	54 04 30	
„	8 25	„	„	„	„	„	„	P	10	2	1 00	54 22 00	
„ 6...	8 40	A.M.	29.70	+ 28.5	„	„	Flying Clouds	P	10	2	1 05	52 05 00	52 16 30
„	8 55	„	„	„	„	„	„	H	10	2	1 00	52 28 00	
„	0 30	P.M.	29.71	+ 30	„	Light	„	H	10	2	0 50	54 20 00	54 10 00
„	0 45	„	„	„	„	„	„	H	10	2	1 20	54 07 00	
„	0 55	„	„	„	„	„	„	H	10	2	1 00	54 13 30	
„	1 00	„	„	„	„	„	„	P	10	2	1 05	53 59 30	
„	7 15	„	29.70	+ 26	North	Moderate	Cloudy	P	10	2	1 45	53 31 30	53 32 45
„	7 25	„	„	„	„	„	„	H	10	2	1 00	53 34 00	
„ 7...	9 00	A.M.	29.69	+ 37	W.N.W.	Light	Flying Clouds	P	10	2	0 45	54 30 30	54 23 45
„	9 10	„	„	„	„	„	„	H	10	2	2 25	54 17 00	
„	0 20	P.M.	29.63	+ 41	S.W.	„	Dull	P	10	2	0 50	53 43 00	53 41 15
„	0 35	„	„	„	„	„	„	H	10	2	1 45	53 39 30	

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Winter Island, *continued.*

DAY.	TIME. Hour.	TIME. A.M. or P.M.	Barometer.	Thermometers in the shade.	WIND.	WEATHER.		Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.	Mean variation observed near the same hour.
1822	H. M.		IN.	°							° ′	° ′ ″	° ′ ″
June 7...	8 10	P.M.	29.60	+ 28	SW.	Moderate	Dull	P	10	2	1 15	53 39 00	54 06 15
„	8 30	„	„	„	„	„	„	H	10	2	1 25	53 53 30	
„	10 15	„	„	„	„	„	„	R	10	2	0 45	51 23 30	
„	10 30	„	„	„	„	„	„	R	10	2	1 05	54 19 30	
„	10 40	„	„	„	„	„	„	R	10	5	1 30	54 22 00	
„	10 55	„	„	„	„	„	„	R	10	5	1 15	54 00 00	
„ 8...	7 05	A.M.	29.52	+ 22	N.N.W.	Fresh	Cloudy	P	10	2	0 50	53 43 00	53 42 45
„	7 15	„	„	„	„	„	„	H	10	2	0 25	53 42 30	
„	10 15	„	29.54	+ 25.5	„	„	„	R	10	2	1 10	53 51 00	51 00 04
„	10 30	„	„	„	„	„	„	R	10	2	1 10	54 18 00	
„	10 45	„	„	„	„	„	„	R	10	2	1 20	54 17 30	
„	11 00	„	„	„	„	„	Clear	R	10	5	1 15	53 25 30	
„	11 15	„	„	„	„	„	„	R	10	5	1 00	54 01 00	
„	11 30	„	„	„	„	„	„	R	10	5	1 15	53 58 30	
„	0 30	P.M.	„	„	„	„	„	H	10	2	0 55	54 09 00	
„	7 35	„	29.56	„	W N.W.	„	Cloudy	H	10	2	0 40	53 31 00	53 39 30
„	7 45	„	„	„	„	„	„	H	10	2	0 50	53 48 00	
„ 9...	6 00	A.M.	29.53	+ 27	N.W.	„	„	R	10	5	1 10	54 20 00	54 19 15
„	6 15	„	„	„	„	„	„	R	10	5	2 10	54 27 00	
„	6 30	„	„	„	„	Strong	„	R	10	2	1 10	54 02 00	
„	7 10	„	„	„	„	„	„	R	10	2	1 30	54 00 00	
„	7 45	„	„	„	„	„	Clear	P	10	1	3 15	54 27 30	
„	7 55	„	„	„	„	„	„	H	10	1	2 25	54 42 00	
„	0 35	P.M.	29.64	+ 30	„	„	„	P	10	1	3 35	54 43 30	54 54 30
„	0 45	„	„	„	„	„	„	H	10	1	1 50	55 05 30	
„	8 00	„	29.75	+ 32	N.N.W.	Moderate	Flying Clouds	H	10	1	2 50	54 35 30	54 12 30
„	8 15	„	„	„	„	„	„	H	10	2	1 05	53 49 30	
„ 10..	7 30	A.M.	29.74	+ 29	N.W.	Fresh	Clear	P	10	1	2 45	54 33 30	54 26 30
„	7 45	„	„	„	„	„	„	H	10	1	3 40	54 19 30	
„	0 50	P.M	29.98	+ 30	„	„	Cloudy	H	10	1	4 05	54 11 00	53 55 20
„	1 05	„	„	„	„	„	„	H	10	2	0 40	53 41 00	
„	1 20	„	„	„	„	„	„	H	10	5	1 40	53 54 00	

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Winter Island, *continued.*

DAY.	TIME. Hour.	TIME. A.M. or P.M.	Barometer.	Thermometers in the shade.	WIND.	WEATHER.		Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.	Mean variation observed near the same hour.
1822	H. M.		IN.	°							° ′	° ′ ″	° ′ ″
June 10..	8 40	P.M.	29.96	+ 29	N.W.	Moderate	Cloudy	H	10	2	1 30	53 50 00	53 52 00
„	8 50	„	„	„	„	„	„	H	10	5	2 55	53 54 00	
„ 11..	7 45	A.M.	29.81	+ 31	„	„	„	P	10	5	3 35	53 45 30	53 52 15
„	7 55	„	„	„	„	„	„	H	10	5	2 30	53 59 00	
„	9 00	„	29.80	+ 34	W.N.W.	„	„	R	10	5	1 20	54 28 30	54 31 32
„	9 15	„	„	„	„	„	„	R	10	5	2 00	54 24 00	
„	9 40	„	„	„	„	„	„	R	10	2	0 40	54 49 00	
„	10 00	„	„	„	„	„	„	R	10	2	1 05	55 06 30	
„	10 20	„	„	„	„	„	„	R	10	2	0 35	54 39 30	
„	10 45	„	„	„	„	„	„	R	10	2	2 10	54 18 30	
„	11 00	„	„	„	„	„	„	R	10	5	1 40	54 34 00	
„	11 20	„	„	„	„	„	„	R	10	5	2 15	54 48 00	
„	11 35	„	„	„	„	„	„	R	10	1	2 10	54 19 00	
„	11 50	„	„	„	„	„	„	R	10	1	1 35	54 44 30	
„	0 30	P.M.	„	„	„	„	„	P	10	1	2 35	54 54 30	
„	0 40	„	„	„	„	„	„	H	10	5	2 40	54 04 00	
„	0 50	„	„	„	„	„	„	P	10	2	0 30	54 04 30	
„	1 00	„	„	„	„	„	„	H	10	2	0 25	54 09 00	
„	6 30	„	29.71	+ 31	S.W.	Fresh	„	B	10	2	1 05	53 46 30	53 45 15
„	6 45	„	„	„	„	„	„	H	10	2	1 10	53 44 00	
„ 12..	7 55	A.M.	29.54	+ 30	North	„	„	H	10	2	1 15	53 32 00	53 32 00
„	11 30	„	29.64	+ 31	„	„	„	B	10	2	1 15	54 15 30	53 58 30
„	0 30	P.M.	„	„	„	„	„	H	10	2	1 55	53 44 00	
„	0 40	„	„	„	„	„	„	P	10	5	3 25	53 56 00	
„	7 55	„	29.84	+ 25	„	„	Clear	P	10	2	1 05	54 01 00	54 08 15
„	8 05	„	„	„	„	„	„	H	10	2	0 35	54 15 30	
„ 13..	7 40	A.M.	29.82	+ 34	„	„	Cloudy	H	10	2	1 35	53 45 30	53 51 15
„	7 55	„	„	„	„	„	„	P	10	2	0 35	53 57 00	
„	0 35	P.M.	29.96	+ 39	„	„	Clear	P	10	2	0 30	53 48 30	53 48 48
„	0 45	„	„	„	„	„	„	H	10	2	1 10	53 46 30	
„	1 30	„	„	+ 36	„	„	„	R	10	2	1 45	53 05 00	
„	2 40	„	„	„	„	„	„	R	10	2	1 15	54 05 30	

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Winter Island, *continued.*

DAY.	TIME. Hour.	TIME. A.M. or P.M.	Barometer.	Thermometers in the shade.	WIND.	WEATHER.		Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.	Mean variation observed near the same hour.
1822	H. M.		IN.										
June 13..	3 00	P.M.	29.96	+ 36°	North	Fresh	Clear	R	10	2	0° 40′	54° 18′ 30″	53° 48′ 48″
„	7 10	„	29.94	+ 35	N.N.W.	Moderate	„	H	10	2	1 45	53 36 00	
„	7 20	„	„	„	„	„	„	H	10	2	0 45	53 34 30	
„	9 45	„	„	„	„	„	„	R	10	1	1 15	54 18 30	
„	10 00	„	„	„	„	„	„	R	10	1	1 30	54 21 30	
„	10 20	„	„	„	„	„	„	R	10	1	1 05	54 08 00	54 06 30
„	10 30	„	„	„	„		„	R	10	1	1 10	54 13 00	
„	10 45	„	„	„	„	„	„	R	10	5	2 20	54 06 30	
„	11 10	„	„	„	„	„	„	R	11	5	2 00	54 41 33	
„	11 20	„	„	„	„	„	„	R	10	2	1 00	54 00 30	
„	Mid.	„	„	„	„	„	„	R	10	2	1 20	54 07 00	
„ 14..	7 40	A.M.	„	„	South	Light	Cloudy	P	10	2	0 45	53 52 00	
„	7 50	„	„	„	„	„	„	H	10	2	0 50	53 45 00	
„	9 45	„	„	„	„	„	„	R	10	2	1 30	53 41 30	53 51 45
„	10 15	„	„	„	„	„	„	R	10	2	1 20	53 38 30	
„	10 30	„	„	„	„	„	„	R	10	5	1 50	54 07 30	
„	11 00	„	„	„	„	„	„	R	10	5	2 00	54 08 00	
„	0 30	P.M.	29.90	+ 44	S.E.	Moderate	„	P	10	2	0 50	53 34 00	53 37 30
„	0 45	„	„	„	„	„	„	H	10	2	0 55	53 41 00	
„	7 15	„	29.85	+ 27	„	„	„	B	10	2	1 50	53 44 00	
„	7 45	„	„	„	„	„	„	H	10	2	0 50	53 27 00	53 33 30
„	9 00	„	„	„	„	„	„	H	10	2	0 25	53 29 30	
„ 15..	7 40	A.M.	29.70	„	North	Fresh	„	H	10	2	0 55	53 50 00	53 53 30
„	7 50	„	„	„	„	„	„	P	10	2	0 45	53 57 00	
„	7 00	P.M.	29.60	„	„	„	„	B	10	2	1 30	54 05 00	54 09 15
„	7 20	„	„	„	„	„	„	B	10	2	2 00	54 13 30	
„ 16..	9 15	A.M.	29.54	+ 40	N.W.	Light	Clear	H	10	2	1 15	55 06 30	
„	9 30	„	„	„	„	„	„	H	10	2	1 05	55 01 30	
„	9 45	„	„	„	„	„	„	H	10	5	2 25	55 02 30	
„	10 30	„	„	„	„	„	„	B	10	2	1 15	54 50 30	
„	10 45	„	„	„	„	„	„	B	10	2	1 15	54 07 00	54 30 38
„	11 00	„	„	„	„	„	„	C	10	2	0 50	54 13 00	

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Winter Island, *continued.*

DAY.	TIME. Hour.	TIME. A.M. or P.M.	Barometer.	Thermometer in the shade.	WIND.	WEATHER.		Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.	Mean variation observed near the same hour.
1822	H. M.		IN.	°							° ′	° ′ ″	° ′ ″
June 18..	11 10	A.M.	29.54	+ 40	N.W.	Light	Clear	C	10	2	1 10	53 41 00	
„	11 20	„	„	„	„	„	„	C	10	2	2 10	54 03 00	
„	0 55	P.M.	„	+ 42	W.N.W.	Moderate	„	H	9	2	1 25	54 01 27	54 41 43
„	1 10	„	„	„	„	„	„	P	10	2	1 20	55 22 00	
„	7 40	„	„	+ 39	„	„	„	B	10	2	2 45	55 15 00	
„	7 50	„	„	„	„	„	„	B	10	2	3 30	52 59 30	54 50 22
„	8 10	„	„	„	„	„	„	C	10	2	2 00	55 38 00	
„	8 20	„	„	„	„	„	„	C	10	2	2 00	54 31 00	
„	10 00	„	„	+ 36	„	„	„	R	10	2	1 10	53 59 30	
„	10 15	„	„	„	„	„	„	R	10	2	0 50	53 49 30	
„	10 30	„	„	„	„	„	„	R	10	2	2 20	53 48 30	53 57 35
„	10 45	„	„	„	„	„	„	R	10	5	2 30	53 58 30	
„	11 00	„	„	„	„	„	„	R	10	5	2 05	53 49 30	
„	11 15	„	„	„	„	„	„	R	10	5	2 15	54 20 00	
„ 17..	7 40	A.M.	29.70	+ 39	„	„	„	P	10	5	0 50	54 07 30	53 50 30
„	7 55	„	„	„	„	„	„	H	10	2	1 15	53 33 30	
„	1 10	P.M.	„	+ 40	„	„	„	B	10	2	1 30	53 02 00	53 02 00
„	1 30	„	„	„	„	„	„	B	10	2	2 30	53 02 00	
Mean Variation by 60 Observations made in the Autumn of 1821........												50 32 43.7	
Mean Variation by 1719 Observations made in the Spring of 1822.												53 51 50.2	

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Igloolik, 1823.											
DAY.	TIME.		Barometer.	Thermometers in the shade.	WIND.	WEATHER.	Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.
	Hour.	A.M. or P.M.									
1823	H. M.		IN.	°						° ′	° ′ ″
April 23..	6 00	A.M.	30.13	Zero	North	Light airs with small snow.	R	10	5	1 30	80 15 00
,,	6 15	,,	,,	,,	,,	,, ,,	R	10	5	1 10	80 00 00
,,	6 30	,,	,,	,,	,,	,, ,,	R	10	5	1 05	79 59 00
,,	7 00	,,	,,	,,	,,	,, ,,	R	10	5	1 30	79 57 00
,,	7 20	,,	,,	,,	,,	,, ,,	R	10	5	1 25	80 02 00
,,	Noon		30.10	+ 11	,,	,, ,,	R	10	5	1 05	81 34 30
,,	0 20	P.M.	,,	,,	,,	,, ,,	R	10	5	1 10	81 38 00
,,	0 40	,,	,,	,,	,,	,, ,,	R	10	5	0 45	82 04 30
,,	1 00	,,	,,	,,	,,	,, ,,	R	10	5	1 20	82 04 00
,,	1 20	,,	,,	,,	,,	,, ,,	R	10	5	1 10	81 52 00
,, 24..	3 40	,,	29.89	+ 7	N.N.W.	Moderate breezes and fine.	R	10	5	1 25	81 19 30
,,	4 10	,,	,,	,,	,,	,, ,,	R	10	5	1 10	81 25 00
,,	4 30	,,	,,	,,	,,	,, ,,	R	10	5	1 50	81 18 30
,,	5 00	,,	,,	,,	,,	,, ,,	R	10	5	1 30	81 27 00
,,	5 30	,,	,,	,,	,,	,, ,,	R	10	5	1 35	81 28 00
,, 28..	7 00	A.M.	30.00	+ 13	S.S.E.	Light breezes and cloudy.	R	10	5	2 30	82 28 30
,,	7 35	,,	,,	,,	,,	,, ,,	R	10	5	1 40	83 10 00
,,	7 50	,,	,,	,,	,,	,, ,,	R	10	5	2 00	82 41 00
,,	0 15	P.M.	29.98	+ 26	South	Light breezes and fine.	R	10	5	2 30	83 20 30
,,	0 30	,,	,,	,,	,,	,, ,,	R	10	5	3 30	82 36 00
,,	0 45	,,	,,	,,	,,	,, ,,	R	10	5	2 20	82 30 30
,,	1 00	,,	,,	,,	,,	,, ,,	R	10	5	1 30	82 52 00
,,	1 10	,,	,,	,,	,,	,, ,,	P	10	5	2 40	83 04 30
,,	5 40	P.M.	29.90	+ 20	,,	Fresh breezes and squally.	R	10	5	1 10	83 15 00
,,	6 00	,,	,,	,,	,,	,, ,,	R	10	5	1 40	83 37 30
,,	6 20	,,	,,	,,	,,	,, ,,	R	10	5	1 45	83 37 00
,,	6 40	,,	,,	,,	,,	,, ,,	R	10	5	1 55	83 32 00
,, 29..	5 55	A.M.	29.78	+ 22	,,	Light breezes with snow.	R	10	2	2 10	81 03 00
,,	6 15	,,	,,	,,	,,	,, ,,	R	10	2	2 25	81 31 30
,,	6 30	,,	,,	,,	,,	,, ,,	R	10	2	2 35	81 28 00
,,	0 45	P.M	29.80	+ 25	Northerly	Moderate with small snow.	C	10	2	3 20	81 25 00
,,	1 00	,,	,,	,,	,,	,, ,,	C	10	2	3 00	80 27 00

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Igloolik, 1823, *continued*.

DAY.	TIME. Hour.	TIME. A.M. or P.M.	Barometer.	Thermometers in the shade.	WIND.	WEATHER.	Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.
1823	H. M.		IN.	°						° ′	° ′ ″
April 29..	5 40	P.M.	29.83	+ 20	Northerly	Light breezes and cloudy.	R	10	2	4 10	81 12 00
,,	6 00	,,	,,	19	,,	,, ,,	R	10	2	4 00	81 20 30
,,	6 20	,,	,,	18	,,	,, ,,	R	10	5	4 45	82 23 00
,,	6 40	,,	,,	17	,,	,, ,,	R	10	5	3 55	81 37 00
,,	7 00	,,	,,	15	,,	,, ,,	R	10	5	3 05	81 51 00
,, 30..	5 00	,,	30.08	9	N.W.	Moderate and fine, squalls at times.	P	10	5	3 45	82 19 00
,,	5 25	,,	,,	,,	,,	,, ,,	P	10	5	2 10	83 27 30
May 1....	6 30	A.M.	30.05	Zero	West	Light winds and clear.	C	10	5	2 30	81 57 00
,,	6 45	,,	,,	,,	,,	,, ,,	C	10	5	1 30	81 40 00
,,	7 00	,,	,,	,,	,,	,, ,,	C	10	5	1 30	81 30 00
,,	0 15	P.M.	30.00	+ 15	N.W.	Light airs and cloudy.	R	10	5	3 45	81 59 00
,,	0 30	,,	,,	,,	,,	,, ,,	R	10	5	2 10	82 09 00
,,	0 50	,,	,,	,,	,,	,, ,,	R	10	5	3 30	82 01 00
,,	1 20	,,	,,	,,	,,	,, ,,	R	10	2	2 45	81 59 30
,,	1 40	,,	,,	,,	,,	,, ,,	R	10	2	2 50	81 56 30
,,	5 00	,,	,,	+ 10	Northerly	Light winds and fine.	C	10	5	2 10	82 26 00
,,	5 20	,,	,,	,,	,,	,, ,,	C	10	5	3 20	82 56 00
,,	5 40	,,	,,	,,	,,	,, ,,	C	10	5	3 00	82 31 00
,,	6 30	,,	29.90	+ 4	N.E.	Light airs and cloudy.	R	10	5	3 05	80 03 30
,,	6 50	,,	,,	,,	,,	,, ,,	R	10	5	2 30	80 04 30
,,	7 15	,,	,,	,,	,,	,, ,,	R	10	5	2 40	80 14 00
,,	7 30	,,	,,	,,	,,	,, ,,	R	10	2	2 50	80 42 00
,,	7 45	,,	,,	,,	,,	,, ,,	R	10	2	3 20	80 19 00
,, 2...	0 30	,,	30.00	+ 16	,,	Moderate and cloudy.	C	10	2	3 00	80 38 00
,,	0 45	,,	,,	,,	,,	,, ,,	C	10	2	3 20	81 49 00
,,	6 30	,,	,,	,,	Northerly	,, ,,	C	10	2	4 50	81 06 00
,,	6 45	,,	,,	,,	,,	,, ,,	C	10	2	4 00	81 15 00
,, 5...	4 30	,,	30.07	+ 27	S.E.	Light, hazy and sleet.	C	10	5	3 30	83 47 00
,,	5 00	,,	,,	+ 30	,,	,, ,,	C	10	5	3 00	83 57 00
,,	5 15	,,	,,	,,	,,	,, ,,	C	10	5	4 10	83 36 00
,,	6 10	,,	,,	,,	,,	Light airs and cloudy.	R	10	5	3 00	83 40 30
,,	6 30	,,	,,	+ 28	,,	,, ,,	R	10	5	3 30	83 28 30

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Igloolik, 1823, ***continued.***

DAY.	TIME.		Barometer.	Thermometers in the shade.	WIND.	WEATHER.	Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.
	Hour.	A.M. or P.M.									
1823	H. M.		IN.	°						° ′	° ′ ″
May 5...	6 50	P.M.	30.07	+ 27	East	Light airs and fine.	R	10	2	3 45	82 18 00
„	7 10	„	„	26	„	„ „	R	10	2	2 55	82 32 00
„	7 30	„	„	24	„	„ „	R	10	2	3 20	82 25 30
„	7 50	„	„	22	„	„ „	R	10	5	3 30	83 23 00
„ 10..	6 30	„	30.42	31	N.W.	Light winds and fine.	H	10	5	1 30	82 05 00
„	7 00	„	„	„	„	„ „	H	10	5	1 05	82 18 30
„	7 20	„	„	30	„	„ „	H	10	2	1 30	81 35 00
„	7 40	„	„	„	„	„ „	H	10	2	0 50	81 19 30
„ 13..	6 15	A.M.	30.02	+ 20	„	Light winds and clear.	C	10	2	3 10	80 47 00
„	6 30	„	„	„	„	„ „	C	10	2	3 10	80 43 00
„	7 00	„	„	„	„	„ „	C	10	5	2 10	80 52 00
„	7 30	„	„	„	„	„ „	C	10	5	2 40	81 43 00
„ 14..	6 40	„	29.95	+ 17	W.S.W.	Light airs and cloudy.	H	10	5	0 50	81 47 30
„	6 50	„	„	17	„	„ „	H	10	5	0 50	81 41 30
„	7 10	„	„	19	„	„ „	H	10	2	1 20	81 40 00
„	7 20	„	„	20	„	„ „	H	10	2	1 05	81 40 30
„	11 30	„	29.93	34	N.W.	Light winds and fine.	C	10	2	4 30	81 52 00
„	11 45	„	„	„	„	„ „	C	10	2	3 30	82 45 00
„	0 20	P.M.	„	36	Southerly	„ „	H	10	5	1 35	82 48 00
„	0 30	„	„	„	„	„ „	H	10	5	2 10	82 44 00
„	0 50	„	„	„	„	„ „	H	10	2	0 40	81 54 30
„	1 00	„	„	„	„	„ „	H	10	2	1 10	82 04 30
„	6 30	„	29.85	24.5	S.E.	Light airs with small snow.	H	10	2	0 50	81 48 00
„	6 40	„	„	„	„	„ „	H	10	2	1 05	81 44 00
„	7 00	„	„	„	„	„ „	H	10	5	1 15	81 47 30
„	7 15	„	„	„	„	„ „	H	10	5	1 25	81 46 00
„ 24..	10 00	A.M.	29.64	34	„	Moderate and hazy with snow.	R	10	5	2 45	82 38 30
„	10 20	„	„	„	„	„ „	R	10	5	2 30	82 31 00
„	10 40	„	„	„	„	„ „	R	10	5	3 45	82 24 00
„	11 10	„	„	„	„	„ „	R	10	2	2 20	82 08 00
„	11 30	„	„	„	„	„ „	R	10	2	3 40	82 06 00
„	11 50	„	„	„	„	„ „	R	10	2	3 40	82 35 00

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Igloolik, 1823, *continued.*

DAY.	TIME. Hour.	TIME. A.M. or P.M.	Barometer.	Thermometers in the shade.	WIND.	WEATHER.	Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.
1823	H. M.		IN.	°						° ′	° ′ ″
May 24..	10 00	P.M.	29.82	+ 26	S.E.	Moderate and hazy with snow.	R	10	2	3 20	81 46 30
,,	10 20	,,	,,	,,	,,	,, ,,	R	10	2	3 30	81 25 30
,,	10 40	,,	,,	,,	,,	,, ,,	R	10	2	2 30	81 34 30
,,	11 05	,,	,,	,,	,,	,, ,,	R	10	5	3 15	82 17 30
,,	11 30	,,	,,	,,	,,	,, ,,	R	10	5	2 40	81 49 30
,,	11 50	,,	,,	,,	,,	,, ,,	R	10	5	2 29	81 48 00
,, 26..	6 30	A.M.	,,	35	S.S.E.	Light breezes and cloudy.	H	10	5	1 25	82 06 00
,,	6 45	,,	,,	,,	,,	,, ,,	H	10	5	1 15	82 05 00
,,	7 00	,,	,,	36	,,	,, ,,	H	10	2	1 35	81 56 00
,,	7 15	,,	,,	,,	,,	,, ,,	H	10	2	1 25	62 01 30
,,	2 15	P.M.	29.83	49	South	,, ,,	H	10	2	1 45	82 52 30
,,	2 30	,,	,,	,,	,,	,, ,,	H	10	2	2 00	82 49 00
,,	2 40	,,	,,	,,	,,	,, ,,	H	10	5	1 10	83 45 30
,,	2 50	,,	,,	,,	,,	,, ,,	H	10	5	1 15	63 40 30
,,	7 00	,,	29.87	39	Southerly	,, ,,	H	10	5	2 05	81 45 00
,,	7 10	,,	,,	,,	,,	,, ,,	H	10	5	1 00	81 56 00
,,	7 20	,,	,,	,,	,,	,, ,,	H	10	2	0 40	81 28 00
,,	7 30	,,	,,	,,	,,	,, ,,	H	10	2	0 35	81 33 00
,, 27..	9 40	A.M.	30.04	24	West	Light airs and fine.	R	10	2	3 30	79 37 30
,,	10 00	,,	,,	,,	,,	,, ,,	R	10	2	2 30	79 16 30
,,	10 20	,,	,,	,,	,,	,, ,,	R	10	2	2 00	79 42 30
,,	10 40	,,	,,	,,	,,	,, ,,	R	10	5	2 05	81 20 00
,,	11 00	,,	,,	,,	,,	,, ,,	R	10	5	2 50	81 33 00
,,	11 20	,,	,,	,,	,,	,, ,,	R	10	5	2 30	81 28 30
,,	10 00	P.M.	30.15	[illegible]	Calm	Fine.	R	10	5	2 30	82 17 00
,,	10 30	,,	,,	,,	,,	,,	R	10	2	4 15	81 17 30
,, 28..	9 30	A.M.	30.04	36	Westerly	Light airs and cloudy.	C	10	2	2 20	82 46 00
,,	9 45	,,	,,	,,	,,	,, ,,	C	10	2	2 30	82 05 00
,,	10 00	,,	30.08	37	,,	,, ,,	C	10	2	2 30	82 19 00
,,	10 20	,,	,,	,,	,,	,, ,,	C	10	5	2 30	81 40 00
,,	10 40	,,	,,	,,	,,	,, ,,	C	10	5	2 20	82 15 00
,,	11 00	,,	,,	40	,,	,, ,,	C	10	5	2 40	82 13 00

OBSERVATIONS for determining the Variation of the Magnetic Needle, at Igloolik, 1823, *concluded*.

DAY.	TIME.		Barometer.	Thermometers in the shade.	WIND.	WEATHER.	Observer.	No. of Observations.	No. of Compass.	Range of Observations.	Variation Westerly.
	Hour.	A.M. or P.M.									
1823	H. M.		IN.	°						° ′	° ′ ″
May 28 ..	2 30	P.M.	30.03	+ 46	Southerly	Light airs and cloudy.	P	10	5	4 00	82 06 00
„	2 50	„	„	„	„	„ „	P	10	5	3 20	81 43 30
„	3 15	„	„	„	„	„ „	P	10	5	5 40	81 11 00
June 6 ...	4 00	„	29.90	27	North	Light breezes and cloudy.	B	10	5	4 50	83 35 00
„	4 15	„	„	„	„	„ „	B	10	5	8 00	85 20 00
„	4 40	„	„	„	„	„ „	B	10	5	7 45	85 19 30
„	5 00	„	„	„	„	„ „	B	10	5	6 15	83 23 30
„	5 15	„	„	„	„	„ „	B	10	2	2 00	82 31 00
„	5 30	„	„	„	„	„ „	B	10	2	1 15	82 39 00
„	5 45	„	„	„	„	„ „	B	10	2	2 30	82 35 00
July 4 ...	4 30	„	29.48	+ 40	N.W.	Moderate and cloudy.	H	10	5	3 05	82 46 30
„	4 45	„	„	„	„	„ „	H	10	5	2 05	82 31 30
„	5 00	„	„	„	„	„ „	H	10	5	1 55	82 30 30
„	5 15	„	„	„	„	„ „	H	10	2	2 15	82 41 30
„	5 30	„	„	„	„	„ „	H	10	2	0 50	82 51 00
„	5 45	„	„	„	„	„ „	H	10	2	1 15	82 45 00
Mean Variation by 144 sets of Observations..................											82 01 04

OBSERVATIONS for the Variation of the Magnetic Needle made *at Sea*, on Board His Majesty's Ship Fury, 1821, 1822, and 1823.

DAY.	North Latitude.	Longitude.	Ship's Head.	Observer.	Westerly Variation.	REMARKS
1821. May...8	53° 21′	3° 17′ E	N.N.E.	P	22° 44′ 45″	
„ 9	54 00	2 53 „	N.½W.	R	25 09 50	
„ „	54 54	2 10 „	N.byE.½N	P	25 01 40	
„ 10	56 28	1 33 „	N.N.E.	R	24 20 06	
„ „	56 28	1 33 „	N.N.E.½E.	P	23 16 19	
„ 11	57 17	1 30 „	N.N.E.	P	22 32 45	
„ 12	57 41	1 45 „	N.N.E.	R	23 56 00	
„ „	58 15	1 45 „	W.S.W.	P	27 56 15	
„ „	58 15	1 45 „	W.S.W.	R	26 47 30	
„ 13	58 18	1 03 „	W.S.W.	P	28 13 08	
„ „	58 04	1 17 „	W.S.W.	R	27 24 50	
„ „	58 19	1 06 „	N.W.byW.	R	27 19 18	
„ 15	57 51	1 32 W	E.½N.	P	24 40 04	
„ „	57 39	0 45 „	N.W.byN.	R	27 13 24	
„ „	57 48	1 40 „	E.½N.	R	24 52 38	
„ 16	58 43	1 29 „	N.E.	P	23 39 30	
„ „	57 56	2 07 „	E.N.E.	R	23 52 20	
„ „	58 07	1 39 „	N.E.	R	24 33 52	
„ 30	58 50	5 58 „	W.N.W.	P	33 34 36	
„ „	58 49	6 35 „	W.N.W.	R	34 10 18	
„ „	58 48	6 38 „	W.N.W.	H	32 35 53	
„ 31	58 28	10 30 „	W.N.W.	P	36 46 38	
„ „	58 28	10 30 „	W.N.W.	R	36 06 05	
„ „	58 26	10 48 „	W.N.W.	H	36 29 54	
June...4	57 34	27 19 „	N.W.½W.	P	43 08 30	
„ 6	57 18	32 24 „	N.W.	R	44 44 28	
„ 8	57 31	38 58 „	N.W.	P	46 27 35	
„ „	57 31	40 49 „	N.W.	P	47 31 30	
„ „	57 31	40 49 „	N.W.	R	48 25 10	
„ „	57 31	40 44 „	N.W.½N.	H	49 32 38	
„ 9	57 57	43 29 „	N.W.	R	48 26 51	
„ 10	58 16	44 40 „	N.W.byN.	R	48 01 00	
„ „	58 18	44 40 „	N.N.W.	H	47 46 56	
„ 14	60 54	53 34 „	N.N.W.½W.	R	51 09 24	
„ 15	60 58	55 08 „	N.byW.	R	51 29 00	
„ „	60 58	55 17 „	North.	P	51 30 25	

OBSERVATIONS for the Variation of the Magnetic Needle made *at Sea*, on Board His Majesty's Ship Fury, 1821, 1822, 1823, *continued.*

DAY.	North Latitude.	Longitude.	Ship's Head.	Observer.	Westerly Variation.	Mean.	REMARKS.
1821.	° ′	° ′			° ′ ″	° ′ ″	
June . . 16	61 06	57 31 W	N.W.byN.	P	53 34 32		
„ 18	61 42	62 34 „	N.E ½N.	P	51 08 00		
„ „	61 42	62 36 „	N.E.	H	51 21 12		
„ „	61 44	62 30 „	N.E.byN.	R	51 10 44		
„ 19	61 42	62 51 „	W.½S.	P	61 49 10		
„ „	61 43	62 42 „	W.½N.	H	62 20 32		
„ 25	62 43	61 09 „	S.¾W.	P	57 48 25		
„ „	62 43	60 53 „	S.½W.	R	57 55 50		
„ 26	62 45	60 54 „	W.½N.	P	65 11 24		
„ 28	62 31	60 33 „	W.byN.½N.	P	65 25 27		
„ 29	62 24	60 38 „	W.S.W.	F	62 23 00		
„ „	. . .	. . . .	. . . .	H	63 35 15		
July . . . 2	61 21	63 58 „	W.byN.½N.	R	63 35 00		
„ „	61 33	64 05 „	W.N.W.	H	61 29 09		
			N.E.	P	46 08 28	45 32 44	
			. . . .	F	44 57 00		
			N.E.byN.	P	48 49 40	46 13 20	
			. . . .	F	44 37 00		
			N.N.E.	P	50 34 20	49 58 10	
			. . . .	F	49 22 00		
			N.byE.	P	52 11 32	51 20 16	
			. . . .	F	50 29 00		
			N.1°E.	P	53 45 48	53 08 04	
			. . . .	F	52 31 00		
„ 3	61 19	64 30 „	N.byW.	P	57 52 53	55 58 56.5	These observations were obtained by swinging the Ship round, so as to obtain the amount of the deviation on each direction of her head. —True variation observed here, 52° 44′ 45″ West.
			. . . .	F	54 05 00		
			N.N.W.¼W.	P	53 23 26	52 41 13?	
			. . . .	F	51 59 00		
			N.W.byN.	P	55 54 05	55 12 02?	
			. . . .	F	54 30 00		
			N.W.2°W.	P	60 08 34	59 25 17	
			. . . .	F	58 42 00		
			N.W.byW.	P	62 12 41	61 28 20	
			. . . .	F	60 44 00		
			W.N.W.	P	62 11 15	61 26 37	
			. . . .	F	60 42 00		

OBSERVATIONS for the Variation of the Magnetic Needle made *at Sea*, on Board His Majesty's Ship Fury, 1821, 1822, and 1823, *continued.*

DAY.	North Latitude.	Longitude.	Ship's Head.	Observer.	Westerly Variation.	REMARKS.
1821. July . . 12	° ′ 61 04	° ′ 65 53 W	S.E.½S.	P	° ′ ″ 43 53 28	
„ „	. . .	. . . .	S.E.¼S.	H	46 50 57	
„ 18	61 39	66 28 „	W.byN.½N.	P	60 01 50	
„ „	. . .	. . . .	. . . .	H	60 29 47	
„ „	. . .	66 29 „	N.N.W.½W.	P	54 25 20	
„ „	. . .	. . . .	. . . .	H	54 23 43	
„ „	. . .	. . . .	N.W.½N.	H	56 54 48	
„ 23	62 11	69 49 „	N.E.½E.	P	47 05 40	
„ „	62 16	69 57 „	. . . .	R	50 09 01	
„ 25	62 30	71 32 „	N.W.byW.	H	62 42 41	
„ „	. . .	. . . .	N.W.½N.	F	60 54 00	
„ „	. . .	71 36 „	N.W.byW.	R	63 35 55	
„ „	. . .	71 33 „	. . . .	P	62 20 55	
„ „	. . .	. . . .	E.½S.	H	41 10 46	
„ 26	63 01	71 58 „	N.E.byN.	P	48 10 25	
„ „	. . .	. . . .	. . . .	R	49 29 56	
„ „	. . .	. . . .	N.N.E.¾E.	H	49 51 50	
„ „	. . .	. . . .	N.E.byN.	H	49 28 02	
„ „	. . .	. . . .	N.E.byN.	F	51 11 00	
Aug. . . . 1	64 11	77 29 „	N.N.E.½E.	F	52 12 00	
„ 2	65 05	79 24 „	E.byS.¾S.	P	39 30 50	By Kater's Compass, No. 1—Ship steady.
„ „	. . .	. . . .	E.byS.¼S.	H	44 01 45	Do. „
„ „	. . .	. . . .	E.½S.	F	41 36	Do. „
„ „	. . .	. . . .	E.byS.½S.	R	40 38 30	Do. „
„ 6	65 29	82 05 „	W.¾S.	R	73 37 25	Do. 3
„ „	. . .	. . . .	W.byS.½S.	P	74 06 00	Do. „
„ „	. . .	. . . .	. . . .	H	74 00 38	Do. „
„ 19	65 33	84 30 „	N.¼E.	P	50 55 00	
1822.			North.	P	57 33	
			N.byE.	P	54 58	
			N.N.E.	P	49 08	
			N.E.byN.	P	44 53	
			N.E.	P	42 03	
			N.E.byE.	P	39 23	
			E.N.E.	P	38 38	
			E.byN.	P	27 23	

OBSERVATIONS for the Variation of the Magnetic Needle made *at Sea*, on Board His Majesty's Ship Fury, 1821, 1822, and 1823, *concluded.*

DAY.	North Latitude.	Longitude.	Ship's Head.	Obser-ver.	Westerly Variation.	REMARKS.
1822.	° ′	° ′			° ′ ″	
July...6	66 56	81 39W.	East.	P	38 18	These observations were obtained by swinging the Ship round, by hawsers, so as to obtain the amount of the deviation, by the bearing of a distant object on shore, on each direction of her head. The compass used was that of Walker. True variation here . . 62° 17′ 00″ W. Dip of the Needle. . . 87° 47′ 13′ N.
			E.byS.	P	39 13	
			E.S.E.	P	40 53	
			S.E.byE.	P	44 38	
			S.E.	P	48 53	
			S.E.byS.	P	52 33	
			S.S.E.	P	57 08	
			S.byE.	P	61 53	
			South.	P	68 23	
			S.byW.	P	69 53	
			S.S.W.	P	7 13	
			S.W.byS.	P	72 58	
			S.W.	P	74 38	
			S.W.byW.	P	75 23	
			W.S.W.	P	77 23	
			W.byS.	P	79 33	
			West.	P	80 48	
			W.byN.	P	80 08	
			W.N.W.	P	78 38	
			N.W.byW.	P	77 08	
			N.W.	P	76 08	
			N.W.byN.	P	72 03	
			N.N.W.	P	67 23	
			N.byW.	P	63 21	
			Mean of the whole.		60 23 24	
„ 14	68 06	81 40 „	E.byN.	F	48 48 00	
„ 19	69 24	81 02 „	West.	P	101 20 50	
			N.N.W.½W.	P	86 19 20	
			N.W.byN.	R	88 23 49	
			N.byW.½W.	F	86 05 00	
„ 26	69 33	80 56 „	S.by.E.¾E.	R	71 43 00	
Aug....3	69 35	80 54 „	N.E.¾E.	R	70 07 50	
„ 5	69 32	81 23 „	E.N.E.	P	63 50 55	
„ 6	. . .	. . . .	N.N.E.½E.	R	74 41 56	
„ 26	69 45	83 16 „	N.N.E.½E.	P	83 07 45	
„ 31	. . .	. . . .	N.¾E.	R	82 38 00	

OBSERVATIONS on the Deviation on board the Fury, July 29, 18

Direction of the Ship's Head.	Bearing of Object by Compass No. 2.	Bearing of Object by Compass No. 5.	Bearing of Object by Mean of both Compasses.	True Magnetic Bearing of Object.	Amount of Deviation.	REMARKS.
North.	44° 32′	45° 57′	45° 14′	45° 02′	− 0° 12′	
N.byE.	41 02	43 07	42 04	,,	+ 3 02	
N.N.E.	37 12	38 52	38 02	,,	+ 7 00	
N.E.byN.	34 02	35 37	34 49	,,	+10 13	
N.E.	32 02	33 12	32 37	,,	+12 25	Mainmast interposed between the object and compass.
N.E.byE.	29 27	30 57	30 12	,,	+14 50	
E.N.E.	25 57	27 12	26 34	,,	+18 28	
E.byN.	23 52	25 42	24 47	,,	+20 15	
East.	23 07	23 37	23 21	,,	+21 41	
E.byS.	22 02	22 12	22 07	,,	+22 55	
E.S.E.	21 52	22 42	22 17	,,	+22 45	
S.E.byE.	22 12	21 57	22 04	,,	+22 58	
S.E.	23 22	23 17	23 19	,,	+21 43	Object imperfectly seen, being intercepted by the Davit.
S.E.byS.	27 47	29 22	28 34	,,	+16 28	
S.S.E.	31 37	34 17	32 57	,,	+12 05	
S.byE.	38 17	39 12	38 44	,,	+ 6 18	
South.	48 02	49 27	48 44	,,	− 3 42	
S.byW.	53 42	56 27	55 04	,,	−10 02	
S.S.W.	59 57	61 42	60 49	,,	−15 47	
S.W.byS.	62 37	65 22	63 59	,,	−18 57	
S.W.	66 17	69 12	67 44	,,	−22 42	Object shut in with the Mizen-mast.
S.W.byW.	67 02	68 47	67 54	,,	−22 52	
W.S.W.	67 17	69 52	68 34	,,	−23 32	
W.byS.	66 47	68 27	67 37	,,	−22 35	
West.	65 32	67 27	66 29	,,	−21 27	
W.byN.	64 02	65 32	64 47	,,	−19 45	
W.N.W	63 17	64 07	63 42	,,	−18 40	
N.W.byW.	59 02	60 57	59 59	,,	−14 57	
N.W.	56 17	59 02	57 39	,,	−12 37	
N.W.byN.	53 57	55 17	54 37	,,	− 9 35	
N.N.W.	50 37	52 27	51 32	,,	− 6 30	
N.byW.	46 47	48 52	47 49	,,	− 2 47	
	Mean of	all	. . 45 26			

N°. V.

TABLE I.

OBSERVATIONS

FOR DETERMINING THE LATITUDE OF THE FURY'S STATION,

AT WINTER ISLAND, 1821—22.

OBSERVATIONS for determining the **LATITUDE** of the Fury's Station, at Winter Island, 1821—22.

N. B.—All these Observations were made with a Sextant and Artificial Horizon.

DAY.	Observed Altitude.	Object observed.	Obser-ver.	Barome-ter.	Thermo-meter.	North Latitude.	REMARKS.
1821.	° ′ ″			IN.	°	° ′ ″	
Oct. 11	33 00 15	Ω	P	29.86	+ 4	66 11 46	
„ 13	31 30 24	Ω	P	29.80	+14	66 11 42	
„ 14	30 45 34	Ω	P	„	+ 5	66 11 50.5	
„ 15	30 01 25	Ω	P	29.83	+ 8	66 11 41	
„ 16	29 18 02	Ω	P	30.14	+ 5	66 11 20	
Dec. 20	64 09 52	Ursæ Major.	P	29.88	—19	66 10 53.5	* below the Pole.
„ „	64 08 50	„	R	„	„	66 10 23.5	„ „ „
„ „	52 51 10	Ursæ Major.	P	„	„	66 11 17.9	„ „ „
„ „	52 50 50	„	R	„	„	66 11 13.1	„ „ „
„ „	102 10 12	Ursæ Minor.	P	„	„	66 11 40	„ „ „
„ „	102 09 50	„	R	„	„	66 11 25.8	„ „ „
„ 28	92 52 52	α Arietis.	P	30.00	—24	66 11 45	
„ „	92 53 20	„	R	„	„	66 11 36.7	
„ „	102 08 52	Ursæ Minor.	P	„	„	66 10 58	
„ „	102 09 40	„	R	„	„	66 11 19.7	
„ 29	103 51 04	α Andromedæ.	P	30.12	—28	66 12 01	
„ „	103 51 20	„	R	„	„	66 11 54.8	
1822.							
Jan. 13	102 10 12	Ursæ Minor.	P	29.78	—31	66 11 41	
„ „	102 09 54	„	R	„	„	66 11 27.4	
„ „	79 57 32	Aldebaran.	P	„	„	66 11 20	
„ „	79 57 50	„	R	„	„	66 11 11.2	
„ 17	30 57 02	Rigel.	P	29.64	—34	66 10 42	
„ „	30 56 15	„	R	„	„	66 11 04.7	
„ „	60 03 22	Bellatrix.	P	„	„	66 11 06	
„ „	60 03 22	„	R	„	„	66 11 06	
„ „	46 48 37	Orionis.	P	„	„	66 12 00.4	
„ „	46 49 05	„	R	„	„	66 11 45	
„ „	62 25 22	Orionis.	P	„	„	66 11 11	
„ „	62 25 10	„	R	„	„	66 11 16.7	
„ 29	30 55 12	Rigel.	P	30.00	—27	66 11 35	
„ „	30 55 55	„	R	„	„	66 11 15.3	
„ „	60 03 22	Bellatrix.	P	„	„	66 11 06	

OBSERVATIONS for determining the LATITUDE of the Fury's Station, at Winter Island, 1821—22, *continued*.

DAY.	Observed Altitude.	Object observed.	Observer.	Barometer.	Thermometer.	North Latitude.	REMARKS.
1822.	° ′ ″			IN.	°	° ′ ″	
Jan. 29	60 02 10	Bellatrix.	R	30.00	−27	66 11 43	
,, ,,	46 50 02	Orionis.	P	,,	,,	66 11 17.9	
,, ,,	46 50 10	,,	R	,,	,,	66 11 13.6	
,, ,,	43 37 02	Orionis.	P	,,	,,	66 11 36.8	
,, ,,	43 37 04	,,	R	,,	,,	66 11 34.9	
,, ,,	62 25 42	Orionis.	P	,,	,,	66 10 57	
,, ,,	62 25 25	,,	R	,,	,,	66 11 10.4	
Feb. 24	28 17 22	Ω	P	29.96	−25	66 11 27	
,, ,,	14 56 57	Sirius.	P	30.00	−32	66 11 04	
,, ,,	14 57 40	,,	R	,,	,,	66 10 39.2	
,, ,,	112 10 34	Castor.	P	,,	,,	66 11 44	
,, ,,	112 10 32	,,	R	,,	,,	66 11 45	
,, ,,	104 32 52	Pollux.	P	,,	,,	66 11 23	
,, ,,	104 32 47	,,	R	,,	,,	66 11 24.2	
,, 25	112 10 42	Castor.	P	30.00	−30	66 11 39	
,, ,,	112 10 25	,,	R	,,	,,	66 11 48.4	
,, ,,	104 33 37	Pollux.	P	,,	,,	66 10 59.5	
,, ,,	104 32 55	,,	R	,,	,,	66 11 20.1	
,, 27	30 30 47	Ω	P	29.57	−20	66 11 26	
,, ,,	30 30 45	Ω	R	,,	,,	66 11 28.5	
,, ,,	112 10 32	Castor.	P	29.60	−30	66 11 43	
,, ,,	112 10 17	,,	R	,,	,,	66 11 51.9	
,, ,,	104 32 24	Pollux.	P	,,	,,	66 11 35	
,, ,,	104 32 40	,,	R	,,	,,	66 11 27.1	
,, 28	31 16 20	Ω	P	29.71	,,	66 11 19	
,, ,,	112 10 46	Castor.	P	29.83	−34	66 11 39	
,, ,,	112 10 42	,,	R	,,	,,	66 11 40.2	
,, ,,	104 33 22	Pollux.	P	,,	,,	66 11 08	
,, ,,	104 32 42	,,	R	,,	,,	66 11 26.8	
March 1	32 01 32	Ω	P	29.90	−26	66 11 22	
,, ,,	32 01 40	Ω	R	,,	,,	66 11 16.7	
,, 3	34 36 34	Ʊ̄	P	29.36	−17	66 11 37	
,, ,,	33 33 15	Ω	R	,,	,,	66 10 56.5	

OBSERVATIONS for determining the LATITUDE of the Fury's Station, at Winter Island, 1821—22, *continued.*

DAY.	Observed Altitude.	Object observed.	Observer.	Barometer.	Thermometer.	North Latitude.	REMARKS.
1822.	° ′ ″			IN.	°	° ′ ″	
March 4	112 11 32	Castor.	P	29.67	−29	66 11 15	
,, ,,	112 11 12	,,	R	,,	,,	66 11 25.1	
,, ,,	104 32 55	Pollux.	P	,,	,,	66 11 22	
,, ,,	104 32 40	,,	R	,,	,,	66 11 27.6	
,, 5	35 03 57	☊	P	29.64	−24	66 11 37	
,, ,,	35 04 35	☊	R	,,	,,	66 11 21.4	
,, ,,	112 11 27	Castor.	P	29.76	−24	66 11 17.5	
,, ,,	112 10 45	,,	R	,,	,,	66 11 38.4	
,, ,,	104 33 17	Pollux.	P	,,	,,	66 11 09	
,, ,,	104 32 47	,,	R	,,	,,	66 11 24	
,, 6	35 50 54	☊	P	30.03	−18	66 11 20	
,, ,,	35 51 05	☊	R	,,	,,	66 11 12.7	
,, ,,	112 11 44	Castor.	P	30.15	−24	66 11 10	
,, ,,	112 10 55	,,	R	,,	,,	66 11 33.8	
,, ,,	59 02 09	Procyon.	P	,,	,,	66 11 20	
,, ,,	59 01 10	,,	R	,,	,,	66 11 50.2	
,, 7	37 41 12	☋	P	30.27	− 6	66 11 28	
,, ,,	37 41 05	☋	R	,,	,,	66 11 33.3	
,, 8	38 27 12	☋	P	30.12	+12	66 11 40	
,, ,,	38 27 25	☋	R	,,	,,	66 11 32.4	
,, 10	40 01 02	☋	P	29.74	−10	66 11 33	
,, ,,	40 00 30	☋	R	,,	,,	66 11 47.0	
,, 11	40 47 42	☋	P	29.95	− 8	66 11 41	
,, ,,	40 47 40	☋	R	,,	,,	66 11 41.7	
,, ,,	112 10 22	Castor.	P	30.00	−22	66 11 48	
,, ,,	112 10 10	,,	R	,,	,,	66 11 56.5	
,, ,,	59 01 32	Procyon.	P	,,	,,	66 11 38	
,, ,,	59 01 20	,,	R	,,	,,	66 11 44.2	
,, 13	42 21 27	☋	P	29.68	+ 2	66 11 58	
,, ,,	42 22 05	☋	R	,,	,,	66 11 27.5	
,, 14	43 08 42	☋	P	29.47	− 6	66 11 38	
,, ,,	43 09 20	☋	R	,,	,,	66 11 23	
,, 18	46 18 52	☋	P	29.56	−15	66 11 16	

OBSERVATIONS for determining the LATITUDE of the Fury's Station, at Winter Island, 1821—22, *continued.*

DAY.	Observed Altitude.	Object observed.	Observer.	Barometer.	Thermometer.	North Latitude.	REMARKS.
1822.	° ′ ″			IN.	°	° ′ ″	
March 18	46 18 30	$\bar{\odot}$	R	29.56	−15	66 11 25.6	
„ 19	47 05 39	$\bar{\odot}$	P	29.91	−16	66 11 34	
„ „	47 05 45	$\bar{\odot}$	R	„	„	66 11 27.1	
„ 22	49 27 32	$\bar{\odot}$	P	29.82	−12	66 11 30	
„ „	49 27 20	$\bar{\odot}$	R	„	„	66 11 36.8	
„ 23	50 15 01	$\bar{\odot}$	R	29.98	−13	66 11 13.4	
„ 24	51 01 50	$\bar{\odot}$	R	30.11	− 9	66 11 31.9	
„ 25	51 49 00	$\bar{\odot}$	R	30.30	−13	66 11 30.9	
„ 26	51 32 12	$\underline{\odot}$	P	30.35	− 6	66 11 17	
„ „	51 31 35	$\underline{\odot}$	R	„	„	66 11 39.5	
„ 30	54 38 52	$\underline{\odot}$	P	29.20	+ 7	66 11 30	
„ „	54 38 35	$\underline{\odot}$	R	„	„	66 11 36.2	
April 1	56 12 12	$\underline{\odot}$	P	29.04	− 7	66 11 17	
„ „	56 12 20	$\underline{\odot}$	R	„	„	66 11 11.5	
„ 2	56 58 12	$\underline{\odot}$	P	29.50	0	66 11 17	
„ „	56 58 10	$\underline{\odot}$	R	„	„	66 11 19	
„ 4	58 29 50	$\underline{\odot}$	R	29.84	+ 2	66 11 21.7	
„ 5	59 15 10	$\underline{\odot}$	R	29.90	+ 6	66 11 24.8	
„ 6	60 00 20	$\underline{\odot}$	R	29.6[illegible]	+ 7	66 11 33.4	
„ 9	62 15 12	$\underline{\odot}$	P	29.61	+ 9	66 11 10	
„ 12	64 27 15	$\underline{\odot}$	P	29.96	+18	66 11 40	
„ 13	65 11 37	$\underline{\odot}$	P	30.09	+ 5	66 11 19.5	
„ „	65 11 00	$\underline{\odot}$	R	„	„	66 11 41	
„ 15	66 37 32	$\underline{\odot}$	P	29.82	+ 6	66 11 31.5	
„ „	66 37 20	$\underline{\odot}$	R	„	„	66 11 38.1	
„ 16	67 20 42	$\underline{\odot}$	P	29.70	+ 8	66 11 17	
„ „	67 20 20	$\underline{\odot}$	R	„	„	66 11 28.7	
„ 17	68 02 32	$\underline{\odot}$	P	29.62	+ 9	66 11 32	
„ „	68 03 00	$\underline{\odot}$	R	„	„	66 11 18.4	
„ 18	68 44 17	$\underline{\odot}$	P	29.79	+10	66 11 40	
„ „	68 44 20	$\underline{\odot}$	R	„	„	66 11 39.8	
„ 19	69 25 45	$\underline{\odot}$	R	29.76	+11	66 11 47.9	
„ 20	70 07 05	$\underline{\odot}$	R	29.73	+12	66 11 47.8	

OBSERVATIONS for determining the **LATITUDE** of the **Fury's Station, at Winter Island, 1821—22,** *continued.*

DAY.		Observed Altitude.	Object observed.	Observer.	Barometer.	Thermometer.	North Latitude.	REMARKS.
1822.		° ′ ″			IN.	°	° ′ ″	
April	23	72 09 12	$\underline{\odot}$	P	29.90	+22	66 11 34	
,,	,,	72 09 10	$\underline{\odot}$	R	,,	,,	66 11 36	
,,	24	72 49 12	$\underline{\odot}$	P	29.74	+12	66 11 25	
,,	,,	72 48 50	$\underline{\odot}$	R	,,	,,	66 11 32.6	
,,	29	77 05 02	$\overline{\odot}$	P	29.78	+ 5	66 11 23	
,,	,,	77 04 40	$\overline{\odot}$	R	,,	,,	66 11 33.2	
,,	30	77 42 05	$\overline{\odot}$	R	30.00	+13	66 11 20.5	
May	1	77 13 52	$\underline{\odot}$	P	30.10	+14	66 11 32	
,,	,,	78 18 40	$\overline{\odot}$	R	,,	,,	66 11 20.2	
,,	,,	77 15 22	$\underline{\odot}$	C	,,	,,	66 11 21	
,,	2	78 54 04	$\overline{\odot}$	R	30.08	+20	66 11 37.9	
,,	,,	77 51 57	$\underline{\odot}$	C	,,	,,	66 11 03	
,,	9	81 48 53	$\underline{\odot}$	B	29.70	+28	66 11 29	
,,	10	82 20 15	$\underline{\odot}$	R	29.80	+28	66 11 28.8	
,,	,,	82 20 00	$\underline{\odot}$	C	,,	,,	66 11 32	
,,	,,	82 20 03	$\underline{\odot}$	B	,,	,,	66 11 36	
,,	11	83 54 30	$\overline{\odot}$	R	29.93	+22	66 11 38.3	
,,	,,	82 51 40	$\underline{\odot}$	B	,,	,,	66 11 21	
,,	12	83 22 02	$\underline{\odot}$	P	30.00	+20	66 11 28	
,,	,,	83 21 50	$\underline{\odot}$	R	,,	,,	66 11 34	
,,	,,	83 21 35	$\underline{\odot}$	C	,,	,,	66 11 40	
,,	,,	83 22 20	$\underline{\odot}$	B	,,	,,	66 11 17	
,,	13	83 52 12	$\underline{\odot}$	P	29.95	+20	66 11 19	
,,	,,	84 55 20	$\overline{\odot}$	R	,,	,,	66 11 28	
,,	,,	83 52 00	$\underline{\odot}$	C	,,	,,	66 11 26	
,,	,,	83 52 10	$\underline{\odot}$	B	,,	,,	66 11 21	
,,	14	84 21 10	$\underline{\odot}$	B	29.83	+30	66 11 28	
,,	18	86 12 58	$\underline{\odot}$	B	29.60	+28	66 11 06	
,,	20	88 07 02	$\overline{\odot}$	P	29.86	+22	66 11 30.6	
,,	,,	88 06 45	$\overline{\odot}$	R	,,	,,	66 11 41.1	
,,	,,	87 04 07	$\underline{\odot}$	C	,,	,,	66 11 08	
,,	,,	87 04 13	$\underline{\odot}$	B	,,	,,	66 11 31	
,,	21	88 31 45	$\overline{\odot}$	R	30.05	+26	66 11 35	

OBSERVATIONS for determining the **LATITUDE** of the Fury's Station, at Winter Island, 1821—22, *continued.*

DAY.	Observed Altitude.	Object observed.	Observer.	Barometer.	Thermometer.	North Latitude.	REMARKS.
1822.	° ′ ″			IN.	°	° ′ ″	
May 21	87 28 23	$\underline{\odot}$	C	30.05	+26	66 11 35	
„ „	87 28 55	$\underline{\odot}$	B	„	„	66 11 19	
„ 22	88 56 00	$\overline{\odot}$	R	29.95	+35	66 11 34.5	
„ „	87 52 37	$\underline{\odot}$	C	„	„	66 11 36	
„ „	87 52 43	$\underline{\odot}$	B	„	„	66 11 28	
„ 23	89 19 30	$\overline{\odot}$	R	29.40	+33	66 11 24.2	
„ 24	89 41 55	$\overline{\odot}$	R	29.40	+33	66 11 32.9	
„ „	88 38 52	$\underline{\odot}$	C	„	„	66 11 26	
„ „	88 39 13	$\underline{\odot}$	B	„	„	66 11 15	
„ 25	89 01 22	$\underline{\odot}$	P	29.60	+27	66 11 11	
„ „	90 04 00	$\overline{\odot}$	R	„	„	66 11 30.7	
„ „	89 01 15	$\underline{\odot}$	C	„	„	66 11 17	
„ „	89 00 33	$\underline{\odot}$	B	„	„	66 11 36	
„ 26	90 25 17	$\overline{\odot}$	P	29.72	+31	66 11 27	
„ „	90 25 20	$\overline{\odot}$	R	„	„	66 11 27.5	
„ „	89 22 35	$\underline{\odot}$	C	„	„	66 11 14	
„ „	89 22 38	$\underline{\odot}$	B	„	„	66 11 11	
„ 29	90 21 45	$\underline{\odot}$	C	29.80	+30	66 11 19	
„ „	90 21 48	$\underline{\odot}$	B	„	„	66 11 20	
„ 30	90 39 47	$\underline{\odot}$	P	„	„	66 11 24	
„ „	90 40 00	$\underline{\odot}$	R	„	„	66 11 21.6	
„ „	90 40 04	$\underline{\odot}$	C	„	„	66 11 18	
„ „	90 40 00	$\underline{\odot}$	B	„	„	66 11 21	
„ 31	90 57 25	$\underline{\odot}$	C	29.93	+33	66 11 23	
„ „	90 57 25	$\underline{\odot}$	B	„	„	66 11 23	
June 1	91 14 40	$\underline{\odot}$	B	„	+35	66 11 09	
„ 2	91 30 00	$\underline{\odot}$	R	29.82	+30	66 11 33.3	
„ „	91 30 02	$\underline{\odot}$	P	„	„	66 11 28	
„ „	91 30 10	$\underline{\odot}$	C	„	„	66 11 26	
„ „	91 30 10	$\underline{\odot}$	B	„	„	66 11 26	
„ 5	92 13 20	$\underline{\odot}$	C	29 68	+36	66 11 32	
„ „	92 13 10	$\underline{\odot}$	B	„	„	66 11 37	
„ 6	92 26 45	$\underline{\odot}$	C	29.69	+32	66 11 18	

OBSERVATIONS for determining the **LATITUDE** of the Fury's Station, at Winter Island, 1821—22, *concluded.*

DAY.	Observed Altitude.	Object observed.	Obser-ver.	Barome-ter.	Thermo-meter.	North Latitude.	REMARKS.
1822.	° ′ ″			IN.	°	° ′ ″	
June 6	92 26 10	$\underline{\odot}$	B	29.69	+32	66 11 34	
„ 7	92 38 50	$\underline{\odot}$	B	29.62	+32	66 11 18	
„ 8	92 49 35	$\underline{\odot}$	C	29.55	+25	66 11 38	
„ „	92 49 30	$\underline{\odot}$	B	„	„	66 11 37	
„ „	93 53 10	$\overline{\odot}$	R	„	„	66 11 21.6	
„ 9	94 03 00	$\overline{\odot}$	R	29.53	+28	66 11 42.7	
„ „	93 00 15	$\underline{\odot}$	C	„	„	66 11 31	
„ 10	93 09 55	$\underline{\odot}$	C	30.00	+32	66 11 31	
„ „	93 09 45	$\underline{\odot}$	B	„	„	66 11 37	
„ 11	93 19 00	$\underline{\odot}$	R	29.80	+36	66 11 28.9	
„ „	93 19 25	$\underline{\odot}$	B	„	„	66 11 13	
„ 12	93 27 15	$\underline{\odot}$	C	29.64	+31	66 11 19	
„ „	93 26 45	$\underline{\odot}$	B	„	„	66 11 36	
„ 13	93 34 12	$\underline{\odot}$	C	30.00	+35	66 11 31	
„ „	93 34 38	$\underline{\odot}$	B	„	„	66 11 18	
„ 14	93 40 50	$\underline{\odot}$	C	29.90	+40	66 11 31	
„ „	93 41 28	$\underline{\odot}$	B	„	„	66 11 10	
„ „	93 40 35	$\underline{\odot}$	R	„	„	66 11 37.3	
„ 16	93 51 35	$\underline{\odot}$	C	29.52	+42	66 11 25	
„ 17	93 55 15	$\underline{\odot}$	C	29.70	+36	66 11 26	
„ „	93 55 43	$\underline{\odot}$	B	„	„	66 11 14	
By the Mean of 218 Meridian Altitudes						66 11 26.78	Latitude of the Fury's Station.
Difference of Latitude between the Ship and Observatory, by trigonometrical measurement.........						+ 10	
Latitude of the Observatory.......................						66 11 36.78	
Do. by Mr. Fisher's actual observations.........						66 11 34.5	

OBSERVATIONS for determining the LATITUDE of the Fury's Station, at Igloolik, 1822—23.

DATE.	Observed Altitude.	Object.	Observer.	Barometer.	Thermometer.	Latitude North.	PHENOMENA AND REMARKS.
1822.	° ′ ″			IN.	°	° ′ ″	
Dec. 11	81 33 41	*	R	29.63	−44	69 20 50.9	Arcturus.
,, 12	81 33 26	,,	R	29.70	−44	69 20 57.7	,,
,, ,,	73 39 20	,,	R	29.80	−40	69 20 45	Aldebaran.
,, ,,	73 40 10	,,	B	,,	,,	69 20 19.7	,,
,, ,,	24 40 00	,,	R	,,	,,	69 20 31.7	Rigel.
,, ,,	56 06 35	,,	R	,,	,,	69 20 54.5	Betelgueuse.
,, ,,	53 47 10	,,	B	,,	,,	69 19 34.7	Bellatrix.
,, ,,	36 04 35	,,	B	,,	,,	69 21 19.5	α Lyræ. North.
,, ,,	98 14 10	,,	B	,,	,,	69 20 36.9	Pollux.
,, 13	36 04 25	,,	R	,,	,,	69 21 14	α Lyræ. North.
,, 14	81 32 50	,,	R	29.90	−36	69 21 13.7	α Bootes.
,, 16	36 49 25	,,	R	,,	,,	69 20 58.8	Aldebaran.
,, ,,	24 39 25	,,	R	,,	,,	69 20 45.3	Rigel.
,, ,,	53 44 15	,,	R	,,	,,	69 21 00	Bellatrix.
,, ,,	56 06 15	,,	R	,,	,,	69 21 07.2	Betelgueuse.
,, 17	81 33 00	,,	B	29.60	−35	69 21 07.7	Arcturus.
,, ,,	73 38 21	,,	C	29.70	−37	69 21 13.1	Aldebaran.
,, ,,	83 55 50	,,	B	29.84	−37	69 20 57.7	Rigel.
,, ,,	56 07 20	,,	B	,,	,,	69 20 31.8	Betelgueuse.
,, 18	81 32 00	,,	B	29.84	−39	69 21 38.9	Arcturus.
,, ,,	36 03 41	,,	R	29.70	−37	69 20 56	α Lyræ. North.
,, ,,	105 51 21	,,	R	,,	,,	69 21 13	Castor.
,, ,,	98 13 01	,,	R	,,	,,	69 21 10.9	Pollux.
,, ,,	48 05 20	,,	R	,,	,,	69 21 02.2	α Cygni. North.
,, 19	81 33 07	,,	R	30.07	−36	69 21 04.1	Arcturus.
,, ,,	81 32 37	,,	B	,,	,,	69 21 21.7	,,
,, ,,	86 35 28	,,	B	30.05	−32	69 20 59.4	α Arietis.
,, ,,	73 39 48	,,	B	30.02	−32	69 20 32.4	Aldebaran.
,, 21	56 05 35	,,	R	29.60	−18	69 21 20	Betelgueuse.
,, 22	105 51 45	,,	R	,,	,,	69 20 58.6	Castor.
,, ,,	98 12 35	,,	R	,,	,,	69 21 21.4	Pollux.
,, ,,	48 05 30	,,	R	,,	,,	69 21 01.7	α Cygni. North.
,, 30	81 33 08	,,	B	29.68	−42	69 21 01.1	Arcturus.

OBSERVATIONS for determining the LATITUDE of the Fury's Station, at Igloolik, 1822—23, *continued.*

DATE.	Observed Altitude.	Object.	Observer.	Barometer.	Thermometer.	Latitude North.	PHENOMENA AND REMARKS.
1822.	° ′ ″			IN.	°	° ′ ″	
Dec. 31	81 33 16	*	R	29.62	−33	69 20 55.6	Arcturus.
" "	81 33 40	"	B	"	"	69 20 42.7	"
1823.							
Jan. 1	81 33 10	"	C	29.80	−40	69 20 57.8	"
" "	50 24 45	"	R	29.90	−44	69 21 19	Capella. North.
" "	50 23 10	"	C	"	"	69 20 31.9	"
" "	53 44 05	"	R	29.91	−45	69 21 03.9	Bellatrix.
" "	56 06 10	"	R	"	"	69 21 07.3	Betelgueuse.
" "	36 03 59	"	R	"	"	69 21 05	α Lyræ. North.
" 2	105 51 25	"	R	"	"	69 21 12.4	Castor.
" "	105 52 20	"	B	"	"	69 20 44.6	"
" "	98 13 10	"	R	"	"	69 21 07.3	Pollux.
" "	98 13 25	"	B	"	"	69 20 59.4	"
" "	86 35 30	"	R	29.90	−41	69 20 58	α Arietis.
" "	86 37 40	"	B	"	"	69 19 54	"
" 3	56 06 10	"	R	29.90	−45	69 20 51.7	Capella. North.
" "	24 39 25	"	B	29.83	−45	69 20 41.6	Rigel.
" "	53 44 40	"	B	"	"	69 20 40.1	Bellatrix.
" "	56 06 55	"	B	"	"	69 20 43.6	Betelgueuse.
" "	36 02 30	"	B	"	"	69 20 22.2	α Lyræ. North.
" 4	81 33 03	"	R	29.79	−44	69 21 01.3	Arcturus.
" "	73 38 29	"	R	29.75	−42	69 21 11.3	Aldebaran.
" "	24 39 29	"	R	"	−40	69 20 42	Rigel.
" "	53 44 19	"	R	"	"	69 20 56.9	Bellatrix.
" "	56 05 44	"	R	"	−39	69 21 18.4	Betelgueuse.
" "	36 04 09	"	R	"	−38	69 21 14.5	α Lyræ. North.
" 5	50 24 09	"	R	29.80	−42	69 21 01.8	Capella. North.
" 6	50 23 39	"	R	29.84	−32	69 20 50	"
" "	86 35 35	"	R	29.78	−30	69 20 55.6	α Arietis.
" "	86 35 55	"	B	"	"	69 20 44.8	"
" "	73 38 10	"	R	"	"	69 21 06.1	Aldebaran.
" "	36 02 35	"	B	"	"	69 20 31.3	α Lyræ. North.
" 11	86 35 50	"	R	30.00	−21	69 20 46.8	α Arietis.

OBSERVATIONS for determining the LATITUDE of the Fury's Station, at Igloolik, 1822—23, *continued*.

DATE.	Observed Altitude.	Object.	Observer.	Barometer.	Thermometer.	Latitude North.	PHENOMENA AND REMARKS.
1823.	° ′ ″			IN.	°	° ′ ″	
Jan. 11	86 35 10	*	B	30.00	—21	69 21 06.7	α Arietis.
„ „	24 39 10	„	B	„	—22	69 20 42.9	Rigel.
„ 20	81 32 30	„	R	29.63	—20	69 21 12.5	Arcturus.
„ „	39 20 30	„	R	„	„	69 21 10	β Persei. North.
„ „	24 00 45	„	R	„	„	69 21 20.1	β Libræ.
„ „	57 12 10	„	R	„	„	69 20 42.7	α Persei. North.
„ „	95 57 40	„	R	„	„	69 21 07	α Coronæ Borealis.
„ „	50 23 40	„	R	„	„	69 20 51.9	Capella. North.
„ 21	81 33 20	„	C	29.83	—21	69 20 47.5	Arcturus.
„ 22	50 23 33	„	R	29.86	—22	69 20 48.2	Capella. North.
„ 23	73 39 03	„	C	30.20	—34	69 20 40	Aldebaran. } Several Altitudes reduced to the Meridian.
„ „	73 38 31	„	B	„	„	69 21 08.6	„
„ „	24 39 20	„	B	„	„	69 20 44.2	Rigel.
„ „	24 39 03	„	C	„	„	69 20 54.4	„
„ 24	73 39 10	„	C	30.34	—30	69 20 49.3	Aldebaran. { Mean of several Altitudes reduced to the Meridian.
„ „	73 33 52.2	„	R	„	„	69 21 00.9	Aldebaran. { Mean of twenty Observations reduced to the Meridian.
„ „	105 52 05	„	R	„	„	69 20 52.7	Castor.
„ „	98 13 40	„	R	„	„	69 20 51.8	Pollux.
„ 25	24 38 55.6	„	R	30.43	—23	69 21 03.5	Rigel by 14 } Observations reduced to Meridian.
„ „	56 06 17	„	R	„	„	69 20 58.7	Betelgueuse „ 12
„ „	36 03 18	„	R	„	„	69 20 55.8	α Lyræ. North 8
„ 29	73 38 56.8	„	R	29.30	—16	69 20 49.8	Aldebaran by 14
„ „	56 06 17	„	B	29.29	—18	69 20 54.1	Betelgueuse.
„ „	36 02 52	„	B	„	„	69 20 53.5	α Lyræ. North.
„ „	52 43 52	„	B	„	„	69 20 30.4	Procyon.
Feb. 10	73 39 38	„	B	30.16	—30	69 20 33.7	Aldebaran.
„ „	24 38 28	„	B	„	„	69 21 05.8	Rigel.
„ „	98 15 08	„	B	„	„	69 20 29	β Tauri.
„ „	56 07 08	„	B	„	„	69 20 32.9	Betelgueuse.
„ „	36 03 18	„	B	„	„	69 20 59.6	α Lyræ. North.
„ „	105 52 15	„	R	„	„	69 20 48.3	Castor.
„ „	98 13 25	„	R	„	„	69 21 00.5	Pollux.
„ „	98 13 58	„	B	„	„	69 20 48.4	„

OBSERVATIONS for determining the **LATITUDE** of the Fury's Station, at Igloolik, 1822—23, *continued.*

DATE.	Observed Altitude.	Ob-ject.	Ob-server.	Barometer.	Thermo-meter.	Latitude North.	PHENOMENA AND REMARKS.
1823.	° ′ ″			IN.	°	° ′ ″	
Feb. 11	48 04 45	*	R	30.16	−30	69 20 46.8	α Cygni. North.
,, ,,	48 05 08	,,	B	,,	,,	69 20 58.7	,,
,, 20	18 57 49	☊	R	29.63	−29	69 20 36.7	
,, ,,	18 59 07	,,	B	,,	,,	69 19 57.6	
,, 22	20 23 22	,,	R	29.51	−18	69 20 35	
,, ,,	20 23 15	,,	B	,,	,,	69 20 38.3	
,, 24	21 50 42	,,	B	29.79	−25	69 20 36.8	
,, ,,	21 50 40	,,	R	,,	,,	69 20 35.2	
,, 27	24 03 40	,,	R	30.00	−35	69 20 37.5	
,, ,,	24 04 29	,,	C	,,	,,	69 20 12	
,, ,,	24 39 16	*	C	30.02	−42	69 20 46.3	Rigel.
,, ,,	56 06 43	,,	C	,,	,,	69 20 47	Betelgueuse.
,, ,,	36 02 55	,,	C	,,	,,	69 20 47.7	α Lyræ. North.
,, 28	24 48 28	☊	B	29.98	−35	69 20 42	
,, ,,	24 39 36	*	R	29.93	−38	69 20 33	Rigel.
,, ,,	24 39 30	,,	C	,,	,,	69 20 36.1	,,
,, ,,	56 07 05	,,	C	,,	,,	69 20 34.5	Betelgueuse.
,, ,,	56 06 40	,,	R	,,	,,	69 20 48	,,
,, ,,	36 03 23	,,	R	,,	,,	69 21 04	α Lyræ. North.
,, ,,	36 03 50	,,	C	,,	,,	69 21 17.8	,,
Mar. 1	25 32 33	☊	B	29.72	−33	69 21 09.4	
,, ,,	25 33 30	,,	R	,,	,,	69 20 40.7	
,, 2	26 18 30	,,	R	29.70	−32	69 20 51	
,, ,,	26 19 55	,,	B	,,	,,	69 20 07	
,, ,,	24 38 54	*	B	29.75	−35	69 20 50.5	Rigel.
,, ,,	56 07 39	,,	B	,,	−36	69 20 15.8	Betelgueuse.
,, ,,	36 02 59	,,	B	,,	−37	69 20 53.8	α Lyræ. North.
,, ,,	36 02 10	,,	C	,,	,,	69 20 28.8	,,
,, ,,	105 52 29	,,	B	,,	−38	69 20 42.7	Castor.
,, ,,	52 41 28	,,	C	,,	,,	69 21 46.8	Procyon.
,, ,,	98 13 24	,,	B	,,	,,	69 21 01.7	Pollux.
,, ,,	48 04 54	,,	B	,,	−39	69 20 56.6	α Cygni. North.
,, 3	27 04 32	☊	R	29.92	−30	69 20 36.8	

OBSERVATIONS for determining the LATITUDE of the Fury's Station, at Igloolik, 1822—23, *continued*.

DATE.		Observed Altitude.	Ob-ject.	Ob-server.	Barometer.	Thermo-meter.	Latitude North.	PHENOMENA AND REMARKS.
1823.		° ′ ″			IN.	°	° ′ ″	
Mar.	3	56 07 42	*	C	30.00	−40	69 20.17	Betelgueuse.
,,	,,	36 03 05	,,	R	,,	,,	69 20 53.4	α Lyræ. North.
,,	,,	36 03 27	,,	C	,,	,,	69 21 04.8	,,
,,	,,	105 52 30	,,	R	,,	,,	69 20 44.6	Castor.
,,	,,	105 52 32	,,	C	,,	,,	69 20 41.9	,,
,,	,,	98 13 30	,,	R	,,	,,	69 20 59.1	Pollux.
,,	,,	98 14 07	,,	C	,,	,,	69 20 40.8	,,
,,	4	27 50 23	☉	R	30.10	—34	69 20 38.3	
,,	,,	27 50 40	,,	C	,,	,,	69 20 31.1	
,,	5	28 36 12	,,	R	29.70	−28	69 20 37.7	
,,	,,	28 36 26	,,	C	,,	,,	69 20 35	
,,	7	30 08 35	,,	C	29.96	−21	69 20 40.6	
,,	,,	30 08 14	,,	R	,,	,,	69 20 49.2	
,,	8	30 54 59	,,	R	30.14	−18	69 20 41.1	
,,	,,	30 54 42	,,	C	,,	,,	69 20 50.7	
,,	10	32 28 27	,,	R	29.81	−18	69 20 37.1	
,,	,,	32 27 57	,,	C	,,	,,	69 20 52	
,,	11	33 15 13	,,	C	30.00	—23	69 20 43.5	
,,	12	34 02 08	,,	R	29.96	−21	69 20 43.9	
,,	,,	34 02 01	,,	C	,,	,,	69 20 47	
,,	13	34 49 12	,,	R	29.90	−10	69 20 40.4	
,,	,,	34 48 59	,,	C	,,	,,	69 20 44.9	
,,	14	35 36 13	,,	C	29.71	− 9	69 20 41.1	
,,	15	36 23 20	,,	R	30.00	—13	69 20 45.7	
,,	16	37 10 41	,,	R	30.50	−21	69 20 47.4	
,,	,,	37 10 42	,,	C	,,	,,	69 20 46.7	
,,	18	38 45 26	,,	B	30.72	−16	69 20 41	
,,	,,	38 44 38	,,	R	,,	,,	69 21 00.5	
,,	19	39 32 28	,,	R	30.38	− 6	69 20 44.2	
,,	21	41 07 20	,,	R	30.06	− 4	69 20 30.7	
,,	22	41 54 00	,,	R	30.00	− 2	69 20 47.3	
,,	,,	41 54 01	,,	C	,,	,,	69 20 46.3	
,,	24	43 29 03	,,	R	29.94	− 7	69 20 27.3	

OBSERVATIONS for determining the **LATITUDE** of the Fury's Station, at Igloolik, 1822—23, *concluded.*

DATE.	Observed Altitude.	Object.	Observer.	Barometer.	Thermometer.	Latitude North.	PHENOMENA AND REMARKS.
1823.	° ′ ″			IN.	°	° ′ ″	
Mar. 28	46 36 28	$\underline{\odot}$	R	30.00	−13	69 20 40.6	
„ 29	47 22 39	„	R	29.94	−12	69 20 54.9	
„ 30	48 09 30	„	R	30.08	−10	69 20 48	
„ 31	48 56 32	„	R	30.22	− 8	69 20 30.1	
„ „	48 56 20	„	C	„	„	69 20 35.2	
April 1	49 42 48	„	R	30.26	− 6	69 20 31.4	
„ „	49 42 22	„	C	„	„	69 20 42.7	
„ 4	52 00 55	„	R	29.61	− 1	69 20 28	
„ 7	54 16 34	„	R	29.92	− 9	69 20 44	
„ 8	55 01 20	„	R	30.10	+ 1	69 20 48	
„ 12	57 59 15	„	R	30.20	+ 4	69 20 41	
„ 19	62 58 07	„	R	29.94	+ 2	69 20 47.5	
„ 21	64 20 33	„	R	29.93	+ 7	69 20 43	
„ 22	65 01 04	„	R	30.20	+13	69 20 44	
„ 24	66 21 37	„	C	29.90	+ 5	69 20 28.5	
„ 28	68 55 12	„	C	30.00	+25	69 21 07.3	
„ „	68 55 50	„	R	„	„	69 20 47	
May 1	70 46 55	„	C	30.00	+15	69 21 02.4	
„ 13	77 26 39	„	R	30.02	+25	69 20 36	
„ 27	83 19 03	„	R	30.05	+25	69 20 50	
„ 28	83 39 05	„	R	30.01	+48	69 20 45	
June 18	87 39 05	„	R	29.82	+40	69 20 49	
„ 19	87 41 55	„	B	30.12	+30	69 20 56	
„ „	88 44 40	$\overline{\odot}$	R	„	„	69 20 50	
„ 23	88 46 45	„	R	„	„	69 20 45	
Mean Latitude by 189 Meridian Altitudes. . .						69 20 49.4	

Nº. VI.

TABLE I.

TIDE TABLE.

WINTER ISLAND, 1821—22.

The Observations contained in this and the succeeding Table, were made with a Tide-pole graduated to feet and inches, let down through a hole in the ice, alongside the Fury, and firmly moored to the bottom by a heavy weight. The days are according to the civil computation, commencing immediately after midnight.

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22.

DAY.	Time of High Water. H. M.	Rise of Tide. Feet	In.	Time of Low Water. H. M.	Fall of Tide. Feet	In.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1821. Oct. 11	......	....		6 50 P.M.	14	2	☾ full at 3 A.M. Perigee.	
„ 12	1 00 A.M.	14	3	7 30 A.M.	14	2		
„ „	1 10 P.M.	14	3	7 30 P.M.	15	2		
„ 13	1 15 A.M.	15	1	8 10 A.M.	15	1		
„ „	1 30 P.M.	15	2	8 15 P.M.	15	8		Highest tide (15ft. 8in.), 5 ebb after Full Moon.
„ 14	2 00 A.M.	15	6	......	....			
„ „	2 15 P.M.	14	7	8 30 P.M.	....			
„ 15	2 40 A.M.	14	00	9 30 A.M.	....			
„ „	3 30 P.M.	13	7	9 45 P.M.	12	11	☾ in No. Tropic, midnight.	
„ 16	4 00 A.M.	12	8	10 00 A.M.	11	8		
„ „	4 00 P.M.	11	3	10 15 P.M.	10	11		
„ 17	4 30 A.M.	10	3	10 45 A.M.	9	5	Last Quarter of Moon.	
„ „	4 45 P.M.	10	00	11 12 P.M.	9	11		
„ 18	5 20 A.M.	9	11	11 50 A.M.	8	5		
„ „	5 50 P.M.	6	9	......	....			
„ 19	......	....		0 30 A.M.	6	6		
„ „	6 20 A.M.	6	2	0 45 P.M.	6	3		
„ „	7 05 P.M.	6	2	......	....			
„ 20	......	....		1 30 A.M.	6	1		Smallest tide (6ft. 1in.), 5 ebb after the Last Quarter.
„ „	7 50 A.M.	6	2	2 20 P.M.	6	4		
„ „	8 25 P.M.	6	7	......	....			
„ 21	......	....		2 50 A.M.	6	7		
„ „	9 25 A.M.	6	10	3 45 P.M.	7	0		
„ „	10 15 P.M.	7	3	......	....			
„ 22	......	....		4 15 A.M.	7	5		
„ „	10 30 A.M.	7	9	4 30 P.M.	7	11		
„ „	11 00 P.M.	7	4	......	....		☾ in Equinoctial, 10 P.M.	
„ 23	......	....		5 00 A.M.	7	7		
„ „	11 30 A.M.	8	5	5 45 P.M.	9	00		
„ „	Midnight.	9	4	......	....			
„ 24	......	....		6 00 A.M.	10	2		
„ „	Noon.	10	1	4 50 P.M.	9	10		
„ „	Midnight.	10	3	......	....			

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22, *continued.*

DAY.	Time of High Water.	Rise of Tide.		Time of Low Water.	Fall of Tide.		Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1821.	H. M.	Feet	In.	H. M.	Feet	In.		
Oct. 25	......	....		5 00 A.M.	10	5		
,, ,,	0 15 P.M.	11	6	......	....		☾ New Moon, 7 hours and a quarter P.M., Apogee.	The tide pole being displaced about this time, there is some uncertainty as to the time of the highest spring tide.
,, 29	......	....		8 55 P.M.	10	4		
,, 30	2 30 A.M.	10	7	9 10 A.M.	9	10		
,, ,,	2 40 P.M.	9	11	9 20 P.M.	9	0	☾ in Southern Tropic.	
,, 31	3 00 A.M.	9	8	9 30 A.M.	10	5½		
,, ,,	3 20 P.M.	8	4½	9 45 P.M.	8	8		
Nov. 1	3 45 A.M.	8	9	10 00 A.M.	8	7		
,, ,,	3 45 P.M.	7	7	10 00 P.M.	7	2		
,, 2	4 15 A.M.	7	8	10 25 A.M.	6	11		
,, ,,	4 20 P.M.	6	5	10 45 P.M.	6	3	☾ First Quarter.	
,, 3	4 30 A.M.	6	1	11 20 A.M.	6	0		
,, ,,	5 45 P.M.	5	6	Midnight.	5	10		
,, 4	6 00 A.M.	5	3	0 30 P.M.	5	10		Smallest tide (5ft. 3in.) 5 flood after First Quarter of Moon. One tide omitted.
,, 5	7 45 A.M.	6	2	2 30 P.M.	6	5		
,, 6	......	....		3 15 A.M.	6	6		
,, ,,	9 15 A.M.	7	10	3 45 P.M.	8	3	☾ in the Equinoctial.	
,, ,,	9 40 P.M.	8	6	......	....			
,, 7	......	....		4 15 A.M.	8	10		
,, ,,	10 15 A.M.	9	10	4 45 P.M.	10	6		
,, ,,	10 45 P.M.	10	10	......	....			
,, 8	......	....		5 15 A.M.	11	3		
,, ,,	10 30 A.M.	11	8	5 40 P.M.	12	3		
,, ,,	10 15 P.M.	12	3	......	....			
,, 9	......	....		6 00 A.M.	12	9		
,, ,,	11 30 A.M.	13	5	6 10 P.M.	13	9	Full Moon, a quarter P.M., Perigee.	
,, ,,	11 40 P.M.	13	10	......	....			
,, 10	......	....		6 30 A.M.	13	9		
,, ,,	0 10 P.M.	14	00	6 50 P.M.	14	3		
,, 11	0 45 A.M.	14	5	7 00 A.M.	13	11		
,, ,,	1 15 P.M.	14	11	7 30 P.M.	15	1		Greatest tide (15ft. 1in.), 5 ebb after Full Moon.
,, 12	1 50 A.M.	14	8	8 00 A.M.	13	10		
,, ,,	2 00 P.M.	13	7	8 15 P.M.	13	4	☾ in Northern Tropic.	

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1821.	H. M.	Feet In.	H. M.	Feet In.		
Nov. 13	2 15 A.M.	12 5	8 40 A.M.	12 4		
„ „	2 45 P.M.	12 00	9 00 P.M.	12 0		
„ 14	2 45 A.M.	12 2	9 35 A.M.	12 0		
„ „	3 15 P.M.	11 7	10 00 P.M.	11 9		
„ 15	4 15 A.M.	10 6	10 30 A.M.	9 6		
„ „	4 45 P.M.	8 9	10 45 P.M.	8 6		
„ 16	5 00 A.M.	8 4	11 00 A.M.	7 11		
„ „	5 20 P.M.	7 5	11 30 P.M.	7 1	☾ Last Quarter.	
„ 17	5 40 A.M.	7 3	0 15 P.M.	7 0		
„ „	6 10 P.M.	6 5	......	....		
„ 18	......	....	1 15 A.M.	6 4		
„ „	6 50 A.M.	6 4	1 30 P.M.	6 5		
„ „	7 30 P.M.	6 0	......	....		
„ 19	......	....	2 00 A.M.	5 8		Smallest tide (5ft. 8in.), 5 ebb after Last Quarter of Moon.
„ „	8 10 A.M.	6 3	2 30 P.M.	6 8	☾ in the Equinoctial	
„ „	8 50 P.M.	6 7	......	....		
„ 20	......	....	2 50 A.M.	6 4		
„ „	9 30 A.M.	7 2	3 40 P.M.	7 4		
„ „	9 50 P.M.	7 4	......	....		
„ 21	......	....	4 10 A.M.	7 4		
„ „	10 15 A.M.	7 8	4 30 P.M.	8 6		
„ „	10 40 P.M.	8 7	......	....		
„ 22	......	....	5 00 A.M.	8 8		
„ „	11 00 A.M.	8 8	5 20 P.M.	9 2	☾'s Apogee.	
„ „	11 20 P.M.	9 2	......	....		
„ 23	......	....	5 40 A.M.	9 3		
„ „	11 30 A.M.	9 3	6 00 P.M.	9 5		
„ „	Midnight.	9 7	......	....		
„ 24	0 15 A.M.	....	6 35 P.M.	10 3	New Moon, 1 hour and three-quarters P.M.	
„ 25	0 30 A.M.	10 7	6 50 A.M.	10 8		
„ „	0 40 P.M.	10 9	7 00 P.M.	10 6		
„ 26	1 00 A.M.	10 9	7 30 A.M.	10 6		
„ „	1 15 P.M.	10 9	7 50 P.M.	10 7		

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22, *continued.*

DAY.	Time of High Water.	Rise of Tide.		Time of Low Water.	Fall of Tide.		Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1821.	H. M.	Feet	In.	H. M.	Feet	In.		
Nov. 27	1 45 A.M.	11	1	8 15 A.M.	10	3		Greatest tide (11ft. 1in.), 5 flood after New Moon.
„ „	1 55 P.M.	10	1	8 45 P.M.	10	0		
„ 28	2 15 A.M.	11	0	8 30 A.M.	10	3		
„ „	2 30 P.M.	9	3	9 00 P.M.	9	3		
„ 29	2 45 A.M.	9	4	9 15 A.M.	9	6		
„ „	3 00 P.M.	9	2	9 30 P.M.	9	2		
„ 30	3 15 A.M.	9	3	9 35 A.M.	9	0		
„ „	3 45 P.M.	9	1	9 55 P.M.	8	10		
Dec. 1	4 15 A.M.	9	0	10 20 A.M.	8	5		
„ „	4 50 P.M.	8	5	11 00 P.M.	8	6		
„ 2	5 30 A.M.	8	3	11 15 A.M.	8	1		
„ „	5 40 P.M.	7	9	11 30 P.M.	6	11	☾ First Quarter.	
„ 3	5 55 A.M.	7	0	Noon.	6	7		Smallest tides (6ft. 7in.), the 3d ebb and 4th flow after First Quarter of Moon.
„ „	6 20 P.M.	6	7	......	....		☾ in the Equinoctial.	
„ 4	......	....		0 30 A.M.	6	11½		
„ „	6 45 A.M.	6	11½	2 00 P.M.	7	5		
„ „	7 40 P.M.	7	6	......	....			
„ 5	......	....		2 30 A.M.	7	8		
„ „	8 15 A.M.	8	3	2 45 P.M.	8	8		
„ „	9 00 P.M.	8	10	......	....			
„ 6	......	....		3 10 A.M.	9	0		
„ „	9 20 A.M.	9	5	3 45 P.M.	9	6		
„ „	9 50 P.M.	9	8	......	....			
„ 7	......	....		4 20 A.M.	9	9	☾'s Perigee.	
„ „	10 30 A.M.	10	6	4 50 P.M.	11	0		
„ „	10 45 P.M.	11	1	......	....			
„ 8	......	....		5 15 A.M.	11	1		
„ „	11 20 A.M.	11	7	5 45 P.M.	11	10	☾ in Northern Tropic.	
„ „	11 45 P.M.	12	4	......	....		Full Moon, 10 hours and a half P.M.	
„ 9	......	....		6 00 A.M.	12	2		
„ „	Noon.	12	4	6 00 P.M.	12	2		
„ 10	......	....		7 15 P.M.	12	9		
„ 11	1 30 A.M.	12	11	7 40 A.M.	12	11		Greatest tides (12ft. 11in.), 4 flood, 4 ebb, and 5 flood after Full Moon.

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821--22, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Sun, Moon, and Weather.	REMARKS on the TIDES.
1821.	H. M.	Feet In.	H. M.	Feet In.		
Dec. 11	2 00 P.M.	12 12	8 15 P.M.	12 6		
,, 12	2 15 A.M.	12 4	8 25 A.M.	12 0		
,, ,,	2 30 P.M	12 0	8 45 P.M.	11 10		
,, 13	2 45 A.M.	11 8	9 20 A.M.	11 0		
,, ,,	3 30 P.M.	11 0	10 00 P.M.	11 1		
,, 14	4 00 A.M.	11 2	10 15 A.M.	10 7		
,, ,,	4 20 P.M.	9 11	10 30 P.M.	9 9		
,, 15	4 30 A.M.	9 6	11 00 A.M.	9 2		
,, ,,	5 00 P.M.	8 2	11 00 P.M.	8 0		
,, 16	5 30 A.M.	8 2	11 25 A.M.	7 10	☾ Last Quarter, 3 A.M.	
,, ,,	6 00 P.M.	7 1	11 50 P.M.	6 11	☾ in Equinoctial.	
,, 17	6 15 A.M.	6 10	0 15 P.M.	6 7		
,, ,,	6 15 P.M.	6 11	......	....		
,, 18	......	....	0 40 A.M.	6 8		
,, ,,	7 00 A.M.	7 2	1 30 P.M.	6 11		
,, ,,	7 30 P.M.	6 7	......	....		
,, 19	......	....	2 00 A.M.	6 4		
,, ,,	8 00 A.M.	6 5	2 30 P.M.	6 1	☾'s Apogee	Smallest tide (6ft. 1in.), 6 ebb after Last Quarter of Moon.
,, ,,	8 45 P.M.	6 6	......	....		
,, 20	......	....	3 00 A.M.	6 8		
,, ,,	9 00 A.M.	6 6	3 15 P.M.	6 10		
,, ,,	9 15 P.M.	7 0	......	....		
,, 21	......	....	3 25 A.M.	7 3		
,, ,,	10 00 A.M.	6 10	4 00 P.M.	6 5		
,, ,,	10 30 P.M.	6 5	......	....		
,, 22	......	....	4 30 A.M.	6 1		
,, ,,	10 50 A.M.	5 8	4 50 P.M.	6 6	Sun in Southern Tropic.	
,, ,,	11 20 P.M.	7 5	......	....		
,, 23	......	....	5 15 A.M.	7 4		
,, ,,	11 30 A.M.	8 6	5 45 P.M.	9 2	☾ in Southern Tropic.	
,, ,,	Midnight.	9 4	......	....		
,, 24	......	....	6 15 A.M.	9 2	New Moon, 7 hours and a half A.M.	
,, ,,	0 30 P.M.	9 4	6 45 P.M.	10 0		

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22, *continued.*

DAY.	Time of High Water.	Rise of Tide.		Time of Low Water.	Fall of Tide.		Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1821.	H. M.	Feet	In.	H. M.	Feet	In.		
Dec. 25	0 45 A.M.	10	0	7 00 A.M.	10	0		
„ „	0 50 P.M.	10	3	7 15 P.M.	10	5		
„ 26	1 15 A.M.	10	10	7 30 A.M.	11	0		
„ „	1 30 P.M.	11	4	7 40 P.M.	10	7		Greatest tide (11ft. 4 in.), 5th flood after New Moon. But the tides kept up as high as 11 feet till the 29th.
„ 27	2 00 A.M.	10	7	8 10 A.M.	10	5		
„ „	2 10 P.M.	10	7	8 30 P.M.	10	6		
„ 28	2 40 A.M.	11	0	8 50 A.M.	10	11		
„ „	2 45 P.M.	10	9	9 00 P.M.	10	10		
„ 29	3 15 A.M.	11	0	9 20 A.M.	10	10		
„ „	3 30 P.M.	9	10	9 45 P.M.	10	1		
„ 30	4 00 A.M.	10	3	10 15 A.M.	10	2	☾ in Equinoctial.	
„ „	4 00 P.M.	10	1	10 30 P.M.	9	9		
„ 31	4 30 A.M.	9	11	10 50 A.M.	9	7		
„ „	4 50 P.M.	9	0	11 15 P.M.	8	10	☾ in First Quarter.	
1822.								
Jan. 1	5 15 A.M.	9	1	11 45 A.M.	8	9		
„ „	5 45 P.M.	8	6	......	....		Sun nearest the Earth.	
„ 2	......	....		0 30 A.M.	8	4		
„ „	6 15 A.M.	8	9	0 45 P.M.	8	3		
„ „	6 45 P.M.	8	0	......	....			
„ 3	......	....		1 10 A.M.	7	11		
„ „	7 20 A.M.	8	1	1 30 P.M.	8	1		
„ „	8 00 P.M.	7	11	......	....			
„ 4	......	....		2 10 A.M.	7	10		
„ „	8 45 A.M.	7	9	3 11 P.M.	8	2	☾ Perigee.	Smallest tide (7ft. 9in.), 7th flood after First Quarter of the Moon; only 3ft. 7in. difference between these Neaps and the last Springs.
„ „	9 00 P.M.	8	7	......	....			
„ 5	......	....		3 50 A.M.	8	4		
„ „	9 30 A.M.	8	2	4 30 P.M.	8	5	☾ in Northern Tropic	
„ „	10 10 P.M.	9	4	......	....			
„ 6	......	....		5 00 A.M.	9	5		
„ „	11 00 A.M.	9	9	5 30 P.M.	10	3		
„ „	11 30 P.M.	10	1	......	....			
„ 7	......	....		6 00 A.M.	10	5	Full Moon 10 hours and a quarter A.M.	

OBSERVATIONS on the TIDES at WINTER ISLAND, 1821—22, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.	H. M.	Feet In.	H. M.	Feet In.		
Jan. 7	0 05 P.M.	10 3	6 20 P.M.	10 7		
„ 8	0 25 A.M.	10 8	6 20 A.M.	11 6		
„ „	0 45 P.M.	11 4	6 50 P.M.	11 9		
„ 9	1 15 A.M.	12 0	7 20 A.M.	12 1		
„ „	1 45 P.M.	12 2	7 50 P.M.	12 4		
„ 10	2 00 A.M.	12 7	8 30 A.M.	12 7		Greatest tide (12ft. 7in.) 5th flood, 5th ebb, and 6th flood after full Moon.
„ „	2 30 P.M.	12 7	9 00 P.M.	12 5		
„ 11	3 00 A.M.	12 6	9 30 A.M.	12 2		
„ „	3 20 P.M.	11 9	9 45 P.M.	11 7		
„ 12	3 45 A.M.	11 5	9 45 A.M.	11 5		
„ „	4 00 P.M.	11 4	10 15 P.M.	10 11	☾ in Equinoctial.	
„ 13	4 05 A.M.	11 2	10 30 A.M.	11 4		
„ „	4 30 P.M.	10 5	10 40 P.M.	10 8		
„ 14	4 45 A.M.	10 6	11 00 A.M.	8 11		
„ „	5 00 P.M.	8 5	11 30 P.M.	8 6	☾ in Last Quarter at Midnight.	
„ 15	5 30 A.M.	8 11	Noon.	8 1		
„ „	6 00 P.M.	8 2	......	....		
„ 16	......	....	0 25 A.M.	7 9		
„ „	6 30 A.M.	6 11	0 30 P.M.	6 9	☾'s Apogee.	
„ „	6 45 P.M.	6 0	......	....		
„ 17	......	....	0 45 A.M.	5 9		
„ „	6 55 A.M.	5 10	1 00 P.M.	6 0		
„ „	7 20 P.M.	5 7	......	....		
„ 18	......	....	1 45 A.M.	5 8		
„ „	8 00 A.M.	5 9	2 30 P.M.	5 0		
„ „	8 30 P.M.	4 10	......	....		
„ 19	......	....	2 40 A.M.	5 1		
„ „	9 00 A.M.	3 11	3 30 P.M.	4 3	☾ in Southern Tropic.	Smallest tide (3ft. 11in.), 8th ebb after last quarter of Moon.
„	9 30 P.M.	5 9	......	....		
„ 20	......	....	4 00 A.M.	5 6		
„ „	9 45 A.M.	5 7	4 30 P.M.	5 6		
„ „	10 30 P.M.	6 1	......	....		
„ 21	......	....	5 00 A.M.	5 9		

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.	H. M.	Feet In.	H. M.	Feet In.		
Jan. 21	11 15 A.M.	5 10	5 25 P.M.	7 2		
" "	11 35 P.M.	7 3	......	....		
" 22	......	....	6 30 A.M.	8 0		
" "	Noon.	8 4	7 00 P.M.	8 6	New Moon, 11 hours and three-quarters P.M.	
" 23	0 30 A.M.	8 10	7 20 A.M.	8 11		
" "	0 50 P.M.	9 1	7 30 P.M.	9 10		
" 24	1 15 A.M.	9 7	7 45 A.M.	10 11		
" "	1 20 P.M.	11 2	8 30 P.M.	11 2		
" 25	1 45 A.M.	11 8	8 30 A.M.	11 5		
" "	2 00 P.M.	11 11	8 30 P.M.	11 9		
" 26	2 00 A.M.	12 5	8 40 A.M.	12 0	☾ in Equinoctial.	
" "	2 30 P.M.	12 2	9 00 P.M.	13 4		Greatest tide (13ft. 4in.), 6th ebb after New Moon.
" 27	2 45 A.M.	12 11	9 30 A.M.	12 11		
" "	3 15 P.M.	12 3	9 45 P.M.	12 3		
" 28	3 40 A.M.	12 7	10 15 A.M.	12 3		
" "	4 00 P.M.	12 0	10 30 P.M.	11 10		
" 29	4 20 A.M.	11 8	10 40 A.M.	11 10		
" "	4 45 P.M.	11 00	10 55 P.M.	11 1		
" 30	5 10 A.M.	10 11	11 15 A.M.	10 2	☾ First Quarter.	
" "	5 30 P.M.	9 11	11 45 P.M.	9 1	☾ in Perigee.	
" 31	5 45 A.M	8 8	Noon.	8 10		
" "	6 15 P.M.	8 8	......	....		
Feb. 1	......	....	0 10 A.M.	8 7		
" "	6 35 A.M.	8 5	0 50 P.M.	8 2		
" "	7 17 P.M.	7 9	......	....		
" 2	......	....	1 30 A.M.	7 7		
" "	7 30 A.M.	7 11	3 00 P.M.	7 8	☾ in Northern Tropic.	
" "	9 00 P.M.	8 0	......	....		
" 3	......	....	3 30 A.M.	7 6		Smallest of tides (7ft. 6in.), 8th and 9th ebbs after First Quarter of Moon.
" "	9 30 A.M.	7 8	3 55 P.M.	7 6		
" "	10 00 P.M.	7 11	......	....		
" 4	......	....	5 00 A.M.	8 0		
" "	11 15 A.M.	8 6	5 30 P.M.	9 0		

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22, *continued.*

DAY.		Time of High Water.	Rise of Tide.		Time of Low Water.	Fall of Tide.		Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.		H. M.	Feet	In.	H. M.	Feet	In.		
Feb.	4	11 55 P.M.	9	4	......	..	..		
„	5	......	..	..	6 20 A.M.	9	5		
„	„	Noon.	9	10	6 30 P.M.	10	7	Full Moon, 11 hours and three-quarters P.M.	
„	6	0 15 A.M.	11	1	7 00 A.M.	11	5		
„	„	0 30 P.M.	11	8	7 20 P.M.	11	0		
„	7	1 00 A.M.	11	7	7 40 A.M.	11	3		
„	„	1 20 P.M.	11	7	8 10 P.M.	12	3		
„	8	1 35 A.M.	12	4	8 30 A.M.	12	7		Greatest tide (12ft. 7in.), 5th ebb after Full Moon.
„	„	2 00 P.M.	12	2	8 50 P.M.	12	3		
„	9	2 25 A.M.	11	10	8 45 A.M.	12	6	☾ in Equinoctial.	
„	„	2 30 P.M	12	4	9 15 P.M.	12	1		
„	10	3 00 A.M.	12	3	9 30 A.M.	11	9		
„	„	2 45 P.M.	11	7	9 35 P.M.	10	5		
„	11	3 15 A.M.	11	11	9 50 A.M.	11	7		
„	„	3 50 P.M.	10	8	10 10 P.M.	10	9		
„	12	4 00 A.M.	10	8	10 30 A.M.	10	8		
„	„	4 00 P.M.	10	4	10 45 P.M.	10	0		
„	13	4 15 A.M.	9	10	11 00 A.M.	9	4		
„	„	4 50 P.M.	8	10	11 00 P.M.	8	4	☾ Last Quarter, Apogee.	
„	14	5 00 A.M.	7	0	11 40 A.M.	7	0		
„	„	5 55 P.M.	6	6	11 50 P.M.	6	0		
„	15	6 00 A.M.	6	6	Noon.	5	6		
„	„	6 20 P.M.	5	11	......	..	..		
„	16	......	..	..	12 20 A.M.	5	7		
„	„	6 45 A.M.	5	7	0 55 P.M.	5	5	☾ in Southern Tropic.	
„	„	7 30 P.M.	5	1	......	..	..		Smallest tide (5ft. 1in.), 6th flood after Last Quarter of Moon.
„	17	......	..	..	1 20 A.M.	5	7		
„	„	7 10 A.M.	6	0	2 40 P.M.	4	3		
„	„	8 15 P.M.	4	2	......	..	..		
„	18	......	..	..	3 10 A.M.	4	5		
„	„	9 15 A.M.	4	2	4 00 P.M.	5	0		
„	„	10 10 P.M.	5	9	......	..	..		
„	19	......	..	..	4 40 A.M.	6	3		

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821--22, *continued.*

DAY.	Time of High Water.	Rise of Tide.		Time of Low Water.	Fall of Tide.		Phenomena of Sun, Moon, and Weather.	REMARKS on the TIDES.
	H. M.	Feet	In.	H. M.	Feet	In.		
1822. Feb. 19	10 50 A.M.	6	3	5 15 P.M.	7	1		
„ „	11 15 P.M.	7	10	......	....			
„ 20	......	....		5 30 A.M.	8	6		
„ „	11 30 A.M.	8	2	6 00 P.M.	9	0		
„ „	Noon.	9	6	......	....			
„ 21	......	....		6 25 A.M.	10	1		
„ „	0 20 P.M.	....		......	....		New Moon, 2 P.M.	
„ 22	0 45 A.M.	11	5	7 20 A.M.	11	0		
„ „	0 45 P.M.	11	2	7 35 P.M.	11	10		
„ 23	1 20 A.M.	12	0	8 00 A.M.	12	9		
„ „	1 45 P.M.	13	0	8 30 P.M.	13	3	☾ in Equinoctial.	
„ 24	2 00 A.M.	13	6	8 45 A.M.	13	5		
„ „	2 15 P.M.	13	11	9 10 P.M.	13	8		Greatest tide (13ft. 11in.), 6th flood after New Moon.
„ 25	2 30 A.M.	13	10	9 15 A.M.	13	8	☾'s Apogee.	
„ „	3 00 P.M.	13	5	9 40 P.M.	13	5		
„ 26	3 20 A.M.	13	5	9 45 A.M.	13	4		
„ „	3 45 P.M.	13	4	10 00 P.M.	13	1		
„ 27	3 50 A.M.	12	5	10 10 A.M.	12	7		
„ „	4 20 P.M.	12	0	10 40 P.M.	11	2		
„ 28	4 40 A.M.	11	1	11 10 A.M.	9	7	☾'s First Quarter, 9 A.M.	
„ „	4 45 P.M.	10	5	11 30 P.M.	9	3		
Mar. 1	5 15 A.M.	8	11	Noon.	9	5		
„ „	5 35 P.M.	10	10	......	....		☾ in Northern Tropic.	
„ 2	......	....		0 15 A.M.	7	4		
„ „	6 00 A.M.	7	8	0 30 P.M.	6	11		
„ „	6 45 P.M.	7	4	......	....			
„ 3	......	....		1 05 A.M.	6	7		
„ „	7 30 A.M.	6	2	1 45 P.M.	6	0		Smallest tides 6ft.), 6th ebb and 7th flood after First Quarter of Moon.
„ „	8 15 P.M.	6	0	......	....			
„ 4	......	...		2 45 A.M.	6	6		
„ „	9 00 A.M.	6	2	3 30 P.M.	6	6		
„ „	10 00 P.M.	7	4	.... .	....			
„ 5	......	....		4 20 A.M.	7	6		

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22, *continued.*

DAY.	Time of High Water. H. M.	Rise of Tide. Feet	In.	Time of Low Water. H. M.	Fall of Tide. Feet	In.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822. Mar. 5	10 30 A.M.	8	4	5 00 P.M.	8	8		
,, ,,	10 45 P.M.	9	0	......	....			
,, 6	......	....		5 45 A.M.	9	8		
,, ,,	11 40 A.M.	9	6	6 30 P.M.	10	5		
,, 7	0 15 A.M.	11	0	6 50 A.M.	11	3		
,, ,,	0 20 P.M.	11	0	7 15 P.M.	10	7	Full Moon, 3 P.M.	
,, 8	0 45 A.M.	10	8	7 15 A.M.	11	11		
,, ,,	1 00 P.M.	12	0	7 20 P.M.	11	10	☾ in Equinoctial.	
,, 9	1 25 A.M.	12	8	7 40 A.M.	12	0		
,, ,,	1 40 P.M.	12	0	8 10 P.M.	11	10		
,, 10	2 00 A.M.	11	11	8 20 A.M.	12	5		Greatest tide (12ft. 5in.), 5th ebb after Full Moon.
,, ,,	2 10 P.M.	11	6	8 50 P.M.	11	11		
,, 11	2 20 A.M.	12	0	9 00 A.M.	11	11		
,, ,,	2 30 P.M.	11	9	9 15 P.M.	11	7		
,, 12	2 50 A.M	12	0	9 30 A.M.	10	10	☾'s Apogee.	
,, ,,	3 30 P.M.	10	6	9 15 P.M.	10	4		
,, 13	3 35 A.M.	10	6	10 05 A.M.	9	0		
,, ,,	3 30 P.M.	9	6	10 15 P.M.	9	7		
,, 14	3 40 A.M.	8	9	10 25 A.M.	9	1		
,, ,,	4 10 P.M.	8	9	9 50 P.M.	8	7		
,, 15	4 30 A.M.	8	11	10 20 A.M.	9	0		
,, ,,	4 40 P.M.	6	7	10 40 P.M.	6	6	☾ Last Quarter, in Southern Tropic.	
,, 16	4 50 A.M.	5	8	11 10 A.M.	5	3		
,, ,,	5 15 P.M.	4	11	Midnight.	4	9		
,, 17	5 40 A.M.	4	3	Noon.	3	9		
,, ,,	6 05 P.M.	3	8	......	....			
,, 18	......	....		0 02 A.M.	3	4		
,, ,,	7 10 A.M.	3	1	1 40 P.M.	3	5		Smallest tide (3ft. 1in.), 5th flood after Last Quarter of Moon; also the smallest tide of any noticed. Sun and Moon both near the Equinoctial.
,, ,,	8 15 P.M.	3	9	......	....			
,, 19	......	....		2 00 A.M.	4	3		
,, ,,	9 00 A.M.	4	5	3 30 P.M.	5	0		
,, ,,	9 35 P.M.	5	7	......	....			
,, 20	......	....		4 00 A.M.	6	1		

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22, *continued.*

DAY.	Time of High Water.	Rise of Tide.		Time of Low Water.	Fall of Tide.		Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.	H. M.	Feet	In.	H. M.	Feet	In.		
Mar. 20	10 20 A.M.	6	4	4 45 P.M.	6	11		
„ „	10 20 P.M.	7	8	......	....			
„ 21	......	....		5 15 A.M.	8	5		
„ „	11 15 A.M.	8	9	5 35 P.M.	9	4	Sun in Equinoctial.	
„ „	11 30 P.M.	9	10	.....	....			
„ 22	......	....		6 00 A.M.	10	5		
„ „	0 10 P.M.	10	9	6 25 P.M.	11	7	New Moon, 13 hours and a half P.M. Moon in Equinoctial.	
„ 23	0 30 A.M.	11	11	6 45 A.M.	12	3	New Moon, 1 hour and a half A.M.	
„ „	0 40 P.M.	12	7	7 10 P.M.	12	11		
„ 24	1 00 A.M.	13	7	7 30 A.M.	13	11		
„ „	1 30 P.M.	13	11	7 40 P.M.	14	1	☾'s Perigee.	
„ 25	1 50 A.M.	14	5	8 10 A.M.	14	8		Greatest tide (14ft 8in.), 6th ebb after New Moon.
„ „	1 55 P.M.	14	2	8 30 P.M.	14	4		
„ 26	2 10 A.M.	14	0	8 30 A.M.	14	4		
„ „	2 40 P.M.	13	10	8 40 P.M.	13	6		
„ 27	3 00 A.M.	13	4	9 10 A.M.	12	11		
„ „	3 15 P.M.	12	9	10 35 P.M.	11	9		
„ 28	3 30 A.M.	12	5	9 05 A.M.	10	11		
„ „	4 00 P.M.	11	5	10 10 P.M.	11	0	☾ in Northern Tropic.	
„ 29	4 20 A.M.	11	0	10 20 A.M.	10	2		
„ „	4 50 P.M.	9	2	11 00 P.M.	9	0	☾ First Quarter.	
„ 30	5 00 A.M.	8	5	11 35 A.M.	8	2		
„ „	5 45 P.M.	8	6	11 50 P.M.	7	3		
„ 31	6 05 A.M.	6	5	0 10 P.M.	5	11		
„ „	7 00 P.M.	6	0	......	...			
April 1	......	....		0 30 A.M.	5	9		
„ „	7 30 A.M.	5	8	1 40 P.M.	6	2		Smallest tide (5ft. 8in.) 5th flood after First Quarter of Moon.
„ „	7 50 P.M.	6	4	......	....			
„ 2	......	....		2 30 A.M.	6	5		
„ „	8 40 A.M.	6	7	4 00 P.M.	7	0		
„ „	9 30 P.M.	7	7	......	....			
„ 3	......	....		4 45 A.M.	8	4		
„ „	10 45 A.M.	8	2	5 10 P.M.	8	8		

OBSERVATIONS on the TIDES at WINTER ISLAND, 1821—22, *continued.*						
DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.	H. M.	Feet In.	H. M.	Feet In.		
April 3	11 10 P.M.	9 6	......	....		
„ 4	......	....	5 35 A.M.	9 9		
„ „	11 30 A.M.	9 10	5 45 P.M.	10 1	☾ in the Equinoctial.	
„ „	Midnight.	10 0	......	....		
„ 5	......	....	6 00 A.M.	11 0		
„ „	0 15 P.M.	10 11	6 20 P.M.	11 1		
„ 6	0 35 A.M.	11 5	6 30 A.M.	11 10	Full Moon, 7 hours and a quarter A.M.	
„ „	0 40 P.M.	11 8	6 45 P.M.	10 11		
„ 7	1 00 A.M.	12 1	7 15 A.M.	11 10		
„ „	1 15 P.M.	12 0	7 35 P.M.	11 4		
„ 8	1 30 A.M.	12 0	7 45 A.M.	12 0		
„ „	1 45 P.M.	12 1	8 00 P.M.	11 9		
„ 9	2 00 A.M.	12 0	8 00 A.M.	11 9		
„ „	2 20 P.M.	11 6	8 35 P.M.	12 4	☾'s Apogee.	Greatest tide (12ft. 4in.), 6th ebb after Full Moon.
„ 10	2 35 A.M.	12 2	9 00 A.M.	11 6		
„ „	2 40 P.M.	10 11	9 15 P.M.	10 6		
„ 11	3 00 A.M.	10 4	9 20 A.M.	10 5		
„ „	3 20 P.M.	9 11	9 50 P.M.	9 3	☾ in Southern Tropic.	
„ 12	3 20 A.M.	9 2	10 00 A.M.	9 0		
„ „	4 00 P.M.	8 6	10 25 P.M.	8 4		
„ 13	4 15 A.M.	8 3	10 35 A.M.	7 0		
„ „	4 30 P.M.	7 0	10 50 P.M.	6 10		
„ 14	4 50 A.M.	6 2	11 10 A.M.	6 1		
„ „	5 15 P.M.	6 3	11 30 P.M.	5 10	☾ Last Quarter.	
„ 15	5 45 A.M.	5 1	11 45 A.M.	4 9		
„ „	6 15 P.M.	5 1	......	....		
„ 16	......	....	0 30 A.M.	4 8		
„ „	7 10 A.M.	4 6	0 50 P.M.	4 3		Smallest tide (4ft. 3in.), 4th ebb after Last Quarter of Moon.
„ „	7 35 P.M.	4 8	......	....		
„ 17	......	....	1 15 A.M.	4 8		
„ „	8 20 A.M.	4 9	2 30 P.M.	5 6		
„ „	9 00 P.M.	6 0	......	....		
„ 18	......	....	3 15 A.M.	6 9		

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.	H. M.	Feet In.	H. M.	Feet In.		
April 18	9 30 A.M.	7 1	4 00 P.M.	7 2		
„ „	9 45 P.M.	7 11	......	....	☾ in the Equinoctial.	
„ 19	4	....	4 35 A.M.	8 8		
„ „	10 10 A.M.	9 0	5 00 P.M.	9 8		
„ „	10 45 P.M.	10 5	......	....		
„ 20	......	....	5 30 A.M.	10 9		
„ „	11 20 A.M.	11 0	5 45 P.M.	11 10		
„ „	11 50 P.M.	12 8	......	....		
„ 21	......	....	6 00 A.M.	13 5	New Moon, 10 hours and three-quarters A.M.	
„ „	0 10 P.M.	12 11	6 30 P.M.	14 2	☾'s Perigee.	
„ 22	0 30 A.M.	14 1	6 40 A.M.	14 0		
„ „	0 45 P.M.	13 10	7 00 P.M.	13 11		
„ 23	1 00 A.M.	14 4	7 30 A.M.	14 8		Greatest tide (14ft. 8in.), 4th ebb after New Moon.
„ „	1 20 P.M.	14 4	8 00 P.M.	[illegible]		
„ 24	1 45 A.M.	14 3	8 20 A.M.	13 11		
„ „	2 10 P.M.	14 0	8 40 P.M.	13 7	☾ in Northern Tropic.	
„ 25	2 30 A.M.	13 7	9 00 A.M.	12 6		
„ „	30 00 P.M.	12 11	9 20 P.M.	12 4		
„ 26	3 25 A.M.	12 4	9 45 A.M.	11 10		
„ „	3 40 P.M.	11 0	10 05 P.M.	10 8		
„ 27	4 20 A.M.	10 7	10 30 A.M.	9 7		
„ „	4 35 P.M.	9 4	11 00 P.M.	8 8		
„ 28	4 50 A.M.	8 2	11 30 A.M.	7 11	☾ in First Quarter.	
„ „	5 30 P.M.	7 2	......	....		
„ 29	......	...	6 10 A.M.	7 0		
„ „	6 00 A.M.	6 3	0 35 P.M.	6 2		
„ „	6 45 P.M.	6 6	......	....		
„ 30	......	....	1 00 A.M.	6 0		
„ „	7 45 A.M.	5 9	1 20 P.M.	5 9		Smallest tide (5ft. 9in.), 4th flood and 4th ebb after First Quarter of Moon.
„ „	8 00 P.M.	5 11	......	....		
May 1	......	....	2 00 A.M.	6 7		
„ „	8 15 A.M.	6 6	2 20 P.M.	7 2	☾ in Equinoctial.	
„ „	8 40 P.M.	7 10	......	....		

OBSERVATIONS ON THE TIDES AT WINTER ISLAND, 1821—22, *concluded.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.	H. M.	Feet In.	H. M.	Feet In.		
May 2	......	....	2 45 A.M.	7 10		
" "	9 40 A.M.	8 2	4 10 P.M.	8 0		
" "	10 15 P.M.	8 4	......	....		
" 3	......	....	4 45 A.M.	8 10		
" "	10 45 A.M.	9 0	5 00 P.M.	9 1		
" "	11 15 P.M.	9 7	......	....		
" 4	......	....	5 25 A.M.	10 2		
" "	11 35 A.M.	9 10	5 50 P.M.	9 9		
" "	11 50 P.M.	10 1	......	....		
" 5	......	....	6 10 A.M.	10 4		
" "	11 50 A.M.	10 5	6 30 P.M.	10 4		
" "	Midnight.	10 6	......	....	Full Moon, 11 hours and a quarter P.M.	
" 6	......	....	6 45 A.M.	10 7		
" "	0 30 P.M.	10 10	7 00 P.M.	10 6	☾ in Apogee.	
" 7	1 00 A.M.	10 11	7 10 A.M.	10 8		
" "	1 20 P.M.	11 0	7 20 P.M.	10 10		Greatest tides on the 7th & 8th (11ft.) 3d and 4th floods after Full Moon.
" 8	1 35 A.M.	11 0	7 35 A.M.	10 10		
" "	1 50 P.M.	10 11	8 00 P.M.	10 5		
" 9	2 00 A.M.	10 3	8 15 A.M.	10 3		
" "	2 10 P.M.	10 3	8 40 P.M.	10 6	☾ in Southern Tropic.	
" 10	2 25 A.M.	9 10	8 50 A.M.	9 10		
" "	2 40 P.M.	9 11	9 10 P.M.	9 8		
" 11	2 55 A.M.	8 11	9 30 A.M.	9 1		
" "	3 15 P.M.	8 10	9 40 P.M.	8 10		
" 12	3 45 A.M.	8 2	9 50 A.M.	7 10		
" "	4 00 P.M.	8 0	10 10 P.M.	7 8		
" 13	4 30 A.M.	6 8	10 20 A.M.	6 7		
" "	5 00 P.M.	7 7	10 40 P.M.	6 9	☾ in Last Quarter.	**ABSTRACT**
" 14	5 30 A.M.	6 6	11 20 A.M.	6 4		*Of the foregoing Table.*
" "	5 45 P.M.	6 6	......	....		Mean time of High Water on full and change days, 12h. 11m.
" 15	6 00 A.M.	....	......	....		Highest Spring Tide, 15ft. 9in. 13 Oct. Lowest Neap Tide, 3 1 16 Mar.
" 16	......	....	......	....	☾ in Equinoctial.	

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822--23.

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.	H. M.	Feet In.	H. M.	Feet In.		
Nov. 18	10 15 P.M.	....	......	....		
„ 19	......	....	5 00 A.M.	5 10		
„ „	10 10 A.M.	1 3	4 15 P.M.	3 3		
„ „	10 30 P.M.	7 5	......	....		
„ 20	......	....	6 00 A.M.	5 3		
„ „	10 45 A.M.	1 5	5 40 P.M.	1 7		
„ „	Midnight.	3 8	......	....		
„ 21	......	....	6 30 A.M.	3 7		
„ „	10 30 A.M.	1 4	5 10 P.M.	1 4	☾ in First Quarter.	
„ „	11 30	4 0	......	....		
„ 22	......	....	7 15 A.M.	3 7		
„ „	......	....	6 45 P.M.	....		
„ 23	0 30 A.M.	3 7	8 20 A.M.	3 9	☾ in Equinoctial.	
„ „	2 00 P.M.	1 7	7 45 P.M.	1 5		
„ 24	1 50 A.M.	2 4	9 00 A.M.	3 10		
„ „	3 00 P.M.	3 3	9 45 P.M.	2 1		
„ 25	3 30 A.M.	2 8	10 00 A.M.	4 5		
„ „	4 40 P.M.	4 7	10 15 P.M.	6 00		
„ 26	5 00 A.M.	4 4	10 45 A.M.	4 4		
„ „	5 45 P.M.	4 8	11 30 P.M.	4 4		
„ 27	6 00 A.M.	4 1	11 45 A.M.	5 0		
„ „	4 40 P.M.	6 8	......	....		
„ 28	......	....	0 45 A.M.	6 2		
„ „	6 45 A.M.	5 4	Noon.	5 8	Full Moon, 2 hours and a quarter P.M.	
„ „	7 10 P.M.	7 6	......	....		
„ 29	......	...	1 45 A.M.	6 4		
„ „	7 00 A.M.	3 8	1 20 P.M.	5 3	☾ in Perigee.	
„ „	7 45 P.M.	8 3	......	....	☾ in the Northern Tropic.	
„ 30	......	....	2 30 A.M.	7 4		
„ „	7 20 A.M.	4 2	2 30 P.M.	5 4		
„ „	8 15 P.M.	8 6	......	....		Largest tides ([illegible]), [illegible] after Full Moon.
Dec. 1	......	....	2 45 A.M.	7 6		
„ „	8 40 A.M.	4 7	3 00 P.M.	4 2		

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822—23, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.	H. M.	Feet In.	H. M.	Feet In.		
Dec. 1	9 15 P.M.	7 4	......	....		
„ 2	......	„ „	4 00 A.M.	7 10		
„ „	9 30 A.M.	3 10	3 20 P.M.	4 5		
„ „	10 20 P.M.	7 11	......	....		
„ 3	......	....	4 45 A.M.	7 3		
„ „	10 50 A.M.	3 8	4 50 P.M.	3 8		
„ „	11 00 P.M.	6 10	......	....		
„ 4	......	....	5 20 A.M.	6 8		
„ „	11 00 A.M.	3 10	5 00 P.M.	3 3		
„ „	11 30 P.M.	5 10	......	....		
„ 5	......	....	6 30 A.M.	5 7	☾ in Last Quarter.	
„ „	0 30 P.M.	2 11	7 00 P.M.	3 4		
„ 6	0 15 A.M.	5 4	7 45 A.M.	5 0	☾ in Equinoctial.	
„ „	1 30 P.M.	2 11	7 15 P.M.	1 8		
„ 7	1 15 A.M.	3 1	8 30 A.M.	4 8		
„ „	3 00 P.M.	3 1	8 00 P.M.	1 5		Smallest tide (1ft. 5in.), 5 ebb after Last Quarter of Moon.
„ 8	3 15 A.M.	2 7	9 30 A.M.	4 3		
„ „	3 30 P.M.	3 8	9 30 P.M.	2 0		
„ 9	4 00 A.M.	1 8	9 50 A.M.	3 11		
„ „	4 45 P.M.	4 9	11 10 P.M.	3 10		
„ 10	5 00 A.M.	2 11	11 00 A.M.	3 00		
„ „	5 30 P.M.	4 9	......	....		
„ 11	......	....	0 20 A.M.	4 2		
„ „	5 45 A.M.	2 0	0 30 P.M.	3 3		
„ „	6 00 P.M.	5 9	......	....		
„ 12	......	....	1 00 A.M.	5 3		
„ „	7 15 A.M.	3 2	1 30 P.M.	3 6		
„ „	7 10 P.M.	5 11	......	....		
„ 13	......	....	2 00 A.M.	6 00	☾ in Apogee.	
„ „	7 30 A.M.	3 9	1 00 P.M.	3 5	New Moon, 8 A.M.	
„ „	7 50 P.M.	5 8	......	....	☾ in Southern Tropic.	
„ 14	......	....	2 00 A.M.	6 1		
„ „	8 15 A.M.	2 10	1 45 P.M.	3 1		

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822—23, *continued.*

DAY.	Time of High Water.	Rise of Tide.		Time of Low Water.	Fall of Tide.		Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.	H. M.	Feet	In.	H. M.	Feet	In.		
Dec. 14	8 45 P.M.	7	1	......	....			
,, 15	......	...		2 10 A.M.	7	4		Greatest tide (7ft. 4in.), 4th ebb after New Moon.
,, ,,	8 30 A.M.	3	8	2 30 P.M.	3	6		
,, ,,	9 00 P.M.	6	10	......	....			
,, 16	......	....		3 30 A.M.	5	7		
,, ,,	9 00 A.M.	2	4	3 45 P.M.	3	3		
,, ,,	9 15 P.M.	6	8	......	....			
,, 17	......	....		4 00 A.M.	5	7		
,, ,,	9 30 A.M.	2	8	3 30 P.M.	3	6		
,, ,,	9 50 P.M.	6	3	......	....			
,, 18	......	....		4 30 A.M.	5	00		
,, ,,	10 10 A.M.	2	3	4 20 P.M.	2	11		
,, ,,	10 40 P.M.	5	8	......	....			
,, 19	......	....		5 30 A.M.	5	4		
,, ,,	10 50 A.M.	1	10	4 30 P.M.	2	7		
,, ,,	11 00 P.M.	5	3	......	....			
,, 20	......	....		4 50 A.M.	5	1		
,, ,,	11 00 A.M.	2	3	5 20 P.M.	1	11		
,, ,,	11 15 P.M.	4	2	......	....			
,, 21	......	...		6 30 A.M.	4	11	☾ in First Quarter.	
,, ,,	11 30 A.M.	2	0	6 45 P.M.	1	10	☾ in Equinoctial.	
,, ,,	Midnight.	3	5	......	...			
,, 22	......	....		7 00 A.M.	3	8	Sun in Southern Tropic.	
,, ,,	0 45 P.M.	2	6	6 30 A.M.	1	1		Smallest tide (1ft. 1in.), 3d ebb after Moon's First Quarter.
,, 23	1 10 A.M.	2	11	8 15 A.M.	1	7		
,, ,,	2 20 P.M.	2	3	8 30 P.M.	2	2		
,, 24	2 55 A.M.	2	2	8 45 A.M.	3	10		
,, ,,	2 15 P.M.	4	6	9 30 P.M.	2	10		
,, 25	3 30 A.M.	1	5	10 10 A.M.	3	10		
,, ,,	5 00 P.M.	5	10	10 35 P.M.	6	2		
,, 26	5 30 A.M.	3	8	10 40 A.M.	3	6		
,, ,,	5 45 P.M.	7	2	Midnight.	5	2		
,, 27	5 30 A.M.	2	1	11 30 A.M.	4	0	☾ in Perigee.	

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822—23, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1822.	H. M.	Feet In.	H. M.	Feet In.		
Dec. 27	6 20 P.M.	7 5	......	....		
,, 28	......	....	1 20 A.M.	6 7	Full Moon, 36 minutes A.M.	
,, ,,	6 50 A.M.	3 6	0 50 P.M.	5 0		
,, ,,	7 30 P.M.	8 1	......	....		
,, 29	......	....	2 00 A.M.	7 5		
,, ,,	7 40 A.M.	3 10	1 45 P.M.	4 11		
,, ,,	8 30 P.M.	8 7	......	....		
,, 30	......	....	2 30 A.M.	7 10		
,, ,,	8 45 A.M.	4 0	2 50 P.M.	4 11		
,, ,,	9 00 P.M.	8 7	......	....		Greatest tide (8ft. 7in.), 4th and 6th flood after Full Moon.
,, 31	......	....	3 20 A.M.	7 10		
,, ,,	9 30 A.M.	4 5	3 00 P.M.	4 11		
,, ,,	9 40 P.M.	8 0	......	....		
1823.						
Jan. 1	......	....	3 50 A.M.	7 8		
,, ,,	10 00 A.M.	4 1	4 10 P.M.	4 8	Sun nearest the Earth.	
,, ,,	10 30 P.M.	7 2	......	....		
,, 2	......	....	5 05 A.M.	7 4	☾ in Equinoctial.	
,, ,,	11 00 A.M.	5 1	5 30 P.M.	5 4		
,, ,,	Midnight.	7 4	......	. ..		
,, 3	......	....	6 00 A.M.	6 6		
,, ,,	0 15 P.M.	4 4	5 30 P.M.	4 0	☾ in Last Quarter.	
,, 4	0 30 A.M.	5 6	6 45 A.M.	5 8		
,, ,,	1 00 P.M.	4 4	7 00 P.M.	3 6		
,, 5	1 20 A.M.	4 3	7 40 A.M.	4 9		
,, ,,	2 00 P.M.	3 9	8 15 P.M.	2 4		
,, 6	2 10 A.M.	1 11	8 30 A.M.	3 5		
,, ,,	2 30 P.M.	3 10	8 50 P.M.	1 10		
,, 7	3 30 A.M.	1 7	9 15 A.M.	3 3		Smallest tide (1ft. 7in.), 7th flood after Last Quarter of Moon.
,, ,,	4 15 P.M.	4 2	10 20 P.M.	2 4		
,, 8	4 00 A.M.	1 11	10 00 A.M.	2 3		
,, ,,	4 45 P.M.	3 7	11 15 P.M.	3 8		
,, 9	4 40 A.M.	0 10	10 45 A.M.	2 6	☾ in Apogee.	

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822--23, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1823.	H. M.	Feet In.	H. M.	Feet In.		
Jan. 9	5 15 P.M.	4 9	......	....	☾ in Southern Tropic.	
,, 10	......	....	0 30 A.M.	4 1		
,, ,,	6 00 A.M.	1 11	11 20 A.M.	1 8		
,, ,,	7 00 P.M.	5 00	......	....		
,, 11	......	....	1 15 A.M.	3 7		
,, ,,	6 00 A.M.	2 0	1 00 P.M.	3 0		
,, ,,	7 30 P.M.	5 4	......	....		
,, 12	......	....	2 00 A.M.	5 8		
,, ,,	7 15 A.M.	2 2	1 20 P.M.	2 10	New Moon, 3h. 27m. A.M.	
,, ,,	8 00 P.M.	6 9	......	....	Sun eclipsed.	
,, 13	......	....	2 30 A.M.	6 5		
,, ,,	7 45 A.M.	2 4	1 45 P.M.	3 8		
,, ,,	8 45 P.M.	7 1	......	....		
,, 14	......	....	3 15 A.M.	5 6		
,, ,,	8 00 A.M.	3 0	2 45 P.M.	3 9		
,, ,,	8 50 P.M.	6 2	......	....		
,, 15	......	....	3 00 A.M.	6 3		
,, ,,	8 00 A.M.	3 9	2 30 P.M.	3 5		
,, ,,	9 20 P.M.	7 10	......	....		Greatest tide (7ft. 10in.), 9th flood after New Moon.
,, 16	......	....	3 00 A.M.	7 4		
,, ,,	9 45 A.M.	4 0	3 30 P.M.	3 11		
,, ,,	10 00 P.M.	6 0	......	....		
,, 17	......	....	4 30 A.M.	6 1	☾ in Equinoctial.	
,, ,,	10 15 A.M.	4 1	4 00 P.M.	4 2		
,, ,,	10 30 P.M.	5 5	......	....		
,, 18	......	....	5 15 A.M.	5 9		
,, ,,	11 00 A.M.	3 5	5 00 P.M.	3 3		
,, ,,	11 10 P.M.	4 11	......	....		
,, 19	......	....	5 30 A.M.	5 9		
,, ,,	11 50 A.M.	4 2	6 00 P.M.	3 1	☾ in First Quarter.	
,, ,,	11 50 P.M.	3 10	......	....		
,, 20	......	....	6 10 A.M.	4 10		
,, ,,	12 50 P.M.	4 4	6 30 P.M.	4 2		

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822—23, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1823.	H. M.	Feet In.	H. M.	Feet In.		
Jan. 21	1 00 A.M.	4 5	7 00 A.M.	4 5		
„ „	1 30 P.M.	5 8	6 45 P.M.	3 7		
„ 22	1 45 A.M.	1 0	8 00 A.M.	3 10		Smallest tide (1ft.), 9th flood after First Quarter of Moon.
„ „	2 20 P.M.	5 0	9 00 P.M.	3 2		
„ 23	2 30 A.M.	2 0	9 00 A.M.	3 9		
„ „	3 00 P.M.	4 9	11 00 P.M.	3 11	☾ in Northern Tropic.	
„ 24	3 45 A.M.	2 3	10 00 A.M.	2 10		
„ „	5 00 P.M.	5 2	11 00 P.M.	5 0	☾ in Perigee.	
„ 25	5 40 A.M.	1 8	11 15 A.M.	3 0		
„ „	6 00 P.M.	6 10	......	....		
„ 26	......	....	0 15 A.M.	6 4		
„ „	6 30 A.M.	2 10	0 30 P.M.	4 2	Full Moon, 11 hours and three-quarters A.M.	
„ „	7 40 P.M.	7 9	......	....	☾ Eclipsed.	
„ 27	......	....	1 15 A.M.	7 3		
„ „	8 00 A.M.	4 1	1 15 P.M.	5 1		
„ „	8 15 P.M.	9 8	......	....		Greatest tide (9ft. 8in.), 3d flood after Full Moon.
„ 28	......	....	1 30 A.M.	8 5		
„ „	9 30 A.M.	5 0	2 20 P.M.	6 0		
„ „	9 50 P.M.	8 3	......	....		
„ 29	......	....	3 20 A.M.	7 1		
„ „	9 30 A.M.	5 7	3 30 P.M.	4 6	☾ in Equinoctial.	
„ „	9 50 P.M.	6 7	......	....		
„ 30	......	....	3 50 A.M.	7 6		
„ „	10 15 A.M.	5 7	4 00 P.M.	5 4		
„ „	10 15 P.M.	6 3	......	....		
„ 31	......	....	4 30 A.M.	6 3		
„ „	10 45 A.M.	5 3	4 45 P.M.	5 3		
„ „	11 00 P.M.	6 4	......	....		
Feb. 1	......	....	5 00 A.M.	6 1		
„ „	11 00 A.M.	4 8	5 20 P.M.	4 8		
„ „	11 15 P.M.	4 7	.....	....		
„ 2	..... .	....	5 30 A.M.	4 11		
„ „	Noon.	4 11	5 30 P.M.	3 7	☾ in Last Quarter.	

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822—23, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1823.	H. M.	Feet In.	H. M.	Feet In.		
Feb. 2	11 45 P.M.	3 8	......	....		
„ 3	......	....	6 40 A.M.	4 5		
„ „	0 30 P.M.	3 7	7 15 P.M.	2 8		
„ 4	0 45 A.M.	2 0	7 15 A.M.	2 4		
„ „	2 15 P.M.	3 3	7 45 P.M.	1 11		
„ 5	1 30 A.M.	0 5	8 00 A.M.	2 6	☾ in Apogee.	Smallest tide (0ft. 5in.), 5th flood after Last Quarter of Moon; but the 7th & 9th floods were only 1 in. greater.
„ „	2 40 P.M.	3 11	9 45 P.M.	2 5	☾ in Southern Tropic.	
„ 6	3 00 A.M.	0 6	8 15 A.M.	1 9		
„ „	3 50 P.M.	4 0	10 00 P.M.	2 7		
„ 7	4 00 A.M.	0 6	10 00 A.M.	1 6		
„ „	5 00 P.M.	4 5	11 30 P.M.	4 8		
„ 8	5 45 A.M.	2 3	11 00 A.M.	1 9		
„ „	6 20 P.M.	5 0	......	....		
„ 9	......	....	1 15 A.M.	4 10		
„ „	6 30 A.M.	2 1	0 30 P.M.	3 0		
„ „	7 00 P.M.	5 0	......	....		
„ 10	......	....	2 00 A.M.	4 7		
„ „	7 30 A.M.	2 8	1 00 P.M.	3 7		
„ „	7 15 P.M.	4 11	......	....	New Moon, 9 hours and three-quarters P.M.	
„ 11	......	....	2 00 A.M.	4 9		
„ „	8 00 A.M.	3 1	1 30 P.M.	3 8		
„ „	8 30 P.M.	6 7	......	....		
„ 12	......	....	2 00 A.M.	6 2		
„ „	8 40 A.M.	4 11	2 20 P.M.	5 2		
„ „	9 00 P.M.	6 3	......	....		
„ 13	......	....	3 00 A.M.	6 4	☾ in Equinoctial.	
„ „	9 10 A.M.	4 9	3 10 P.M.	4 10		
„ „	9 15 P.M.	6 8	......	....		
„ 14	......	....	3 00 A.M.	6 3		
„ „	9 30 A.M.	5 2	3 30 P.M.	5 5		
„ „	9 45 P.M.	6 11	......	....		
„ 15	......	....	3 45 A.M.	7 4		Greatest tide (7ft. 4in.), 9th ebb after New Moon.
„ „	10 15 A.M.	5 8	4 00 P.M.	4 10		

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822—23, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1823.	H. M.	Feet In.	H. M.	Feet In.		
Feb. 15	10 40 P.M.	5 9	......	....		
,, 16	......	....	4 20 A.M.	5 10		
,, ,,	10 30 A.M.	5 9	4 30 P.M.	5 3		
,, ,,	11 00 P.M.	4 11	......	....		
,, 17	......	....	5 00 A.M.	5 9		
,, ,,	11 15 A.M.	5 9	5 40 P.M.	4 8		
,, ,,	11 25 P.M.	4 7	......	....		
,, 18	......	....	5 30 A.M.	5 11	☾ in First Quarter.	
,, ,,	11 45 A.M.	5 1	6 00 P.M.	3 6		
,, 19	0 10 A.M.	3 1	6 30 A.M.	2 9		
,, ,,	0 45 P.M.	4 2	7 20 P.M.	3 10	☾ in the Northern Tropic.	
,, 20	1 15 A.M.	2 0	7 30 A.M.	3 5		
,, ,,	2 00 P.M.	4 6	8 20 P.M.	3 10		
,, 21	3 00 A.M.	1 2	8 30 A.M.	2 4		Smallest tide (1ft. 2in.), 6th flood after First Quarter of Moon.
,, ,,	3 30 P.M.	4 8	11 00 P.M.	4 2	☾ in Perigee.	
,, 22	4 30 A.M.	1 10	10 45 A.M.	2 6		
,, ,,	5 20 P.M.	5 2	11 45 P.M.	5 0		
,, 23	6 00 A.M.	2 7	Noon.	3 6		
,, ,,	6 15 P.M.	6 1	......	....		
,, 24	......	....	0 30 A.M.	5 10		
,, ,,	6 40 A.M.	5 11	0 50 P.M.	6 4		
,, ,,	7 00 P.M.	7 1	......	....	Full Moon, 11 hours and three quarters P.M.	
,, 25	......	....	1 15 A.M.	7 2		
,, ,,	7 30 A.M.	5 0	1 30 P.M.	5 1		
,, ,,	8 00 P.M.	7 5	......	...		
,, 26	......	....	2 00 A.M.	7 7	☾ in Equinoctial.	
,, ,,	8 20 A.M.	5 9	2 15 P.M.	6 3		
,, ,,	8 30 P.M.	7 10	......	....		Greatest tide (7ft. 10in.), 6th flood after Full Moon.
,, 27	......	....	2 40 A.M.	7 5		
,, ,,	9 10 A.M.	6 4	3 00 P.M.	6 11		
,, ,,	9 20 P.M.	7 0	......	....		
,, 28	......	....	3 15 P.M.	7 8		
,, ,,	9 30 A.M.	6 10	3 45 A.M.	6 7		

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822--23, *continued*.

DAY.	Time of High Water.	Rise of Tide.		Time of Low Water.	Fall of Tide.		Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1823.	H. M.	Feet	In.	H. M.	Feet	In.		
Feb. 28	10 30 P.M.	6	9	......	....			
Mar. 1	......	....		4 00 A.M.	6	7		
„ ..	10 05 A.M.	6	9	4 30 P.M.	6	0		
„ „	10 20 P.M.	6	1	......	....			
„ 2	......	....		4 45 A.M.	5	10		
„ „	10 30 A.M.	6	2	5 00 P.M.	5	8		
„ „	10 45 P.M.	5	4	......	....			
„ 3	......	....		5 15 A.M.	5	9		
„ „	11 30 A.M.	5	8	5 30 P.M.	4	7		
„ „	11 45 P.M.	3	3	......	....			
„ 4	......	....		6 00 P.M.	4	2	☾ in Last Quarter.	
„ 5	0 15 A.M.	2	8	6 30 A.M.	3	0	☾ in Southern Tropic	
„ „	0 45 P.M.	4	1	7 00 P.M.	3	7	☾ in Apogee.	
„ 6	1 15 A.M.	3	1	7 00 A.M.	2	11		
„ „	1 30 P.M.	3	1	7 30 P.M.	2	2		
„ 7	1 40 A.M.	2	1	6 30 A.M.	3	0		
„ „	3 00 P.M.	3	2	9 15 P.M.	2	8		
„ 8	3 45 A.M.	0	8	9 00 A.M.	1	3		Smallest tide (0ft. 8in.), 7th flood after Last Quarter of Moon.
„ „	4 30 P.M.	3	10	10 00 P.M.	3	6		
„ 9	5 00 A.M.	1	3	10 20 A.M.	1	7		
„ „	5 30 P.M.	4	7	......	....			
„ 10	......	....		0 30 A.M.	3	7		
„ „	7 00 A.M.	2	0	Noon.	3	7		
„ „	6 50 P.M.	4	8	......	....			
„ 11	......	....		1 00 A.M.	5	2		
„ „	7 00 A.M.	3	5	0 15 P.M.	3	9		
„ „	7 20 P.M.	6	5	......	....			
„ 12	......	....		1 15 A.M.	6	6		
„ „	7 40 A.M.	7	4	1 00 P.M.	7	9	New Moon, 1h. P.M	Largest tide (7ft. 4in.), at the time of the Moon's change.
„ „	7 30 P.M.	6	11	......	....		☾ in Equinoctial.	
„ 13	......	....		1 15 A.M.	7	2		
„ „	7 30 A.M.	5	11	2 00 P.M.	5	8		
„ „	8 05 P.M.	7	00	......	....			

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822—23, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1823.	H. M.	Feet In.	H. M.	Feet In.		
Mar. 14	......	...	2 30 A.M.	6 9		
,, ,,	8 15 A.M.	6 4	2 40 P.M.	6 5		
,, ,,	8 45 P.M.	7 0	......	....		
,, 15	......	....	3 00 A.M.	7 2		
,, ,,	8 50 A.M.	7 0	3 00 P.M.	6 10		
,, ,,	9 15 P.M.	6 7	......	....		
,, 16	......	....	3 20 A.M.	6 11		
,, ,,	9 40 A.M.	7 0	3 45 P.M.	6 4		
,, ,,	10 00 P.M.	5 5	......	....		
,, 17	......	....	4 00 A.M.	6 2		
,, ,,	10 15 A.M.	6 10	4 03 P.M.	6 1		
,, ,,	10 25 P.M.	4 4	......	.....		
,, 18	......	....	4 40 A.M.	5 4		
,, ,,	10 30 A.M.	6 7	5 10 P.M.	5 4		
,, ,,	11 00 P.M.	3 8	......	....		
,, 19	......	....	5 30 A.M.	3 9	☾ in Southern Tropic.	
,, ,,	Noon.	5 9	6 00 P.M.	5 1	☾ in First Quarter.	
,, 20	0 10 A.M.	2 6	6 10 A.M.	3 0	☾ in Perigee.	
,, ,,	0 30 P.M.	5 5	6 45 P.M.	4 2		
,, 21	1 00 A.M.	1 7	6 30 A.M.	2 10	Sun in Equinoctial.	Smallest tide (1ft. 7in.), 3d flood after First Quarter of Moon.
,, ,,	2 10 P.M.	4 5	9 00 P.M.	3 8		
,, 22	2 45 A.M.	1 9	8 30 A.M.	1 11		
,, ,,	3 15 P.M.	4 2	11 00 P.M.	4 2		
,, 23	4 10 A.M.	2 5	10 00 A.M.	2 5		
,, ,,	4 30 P.M.	4 9	11 30 P.M.	5 6		
,, 24	5 00 A.M.	3 6	11 10 A.M.	3 2		
,, ,,	5 40 P.M.	4 0	......	....		
,, 25	......	....	0 30 A.M.	4 7		
,, ,,	6 15 A.M.	5 1	0 30 P.M.	4 11	☾ in Equinoctial.	
,, ,,	6 30 P.M.	6 10	......	....		
,, 26	......	....	1 10 A.M.	7 3		
,, ,,	6 50 A.M.	6 2	1 15 P.M.	6 0	Full Moon, a quarter P.M.	Largest tides (7ft. 9in.) 1st ebb before and 2d ebb after Full Moon.
,, ,,	7 30 P.M.	6 8	......	....		

OBSERVATIONS ON THE TIDES AT IGLOOLIK, 1822—23, *continued.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1823.	H. M.	Feet In.	H. M.	Feet In.		
Mar. 27	......	. ..	1 13 A.M.	7 3		
" "	7 45 A.M.	6 9	1 50 P.M.	6 6		
" "	8 00 P.M.	6 7	......	....		
" 28	......	....	2 15 A.M.	6 8		
" "	8 30 A.M.	6 10	2 45 P.M.	7 0		
" "	8 45 P.M.	6 10	......	....		
" 29	......	....	3 10 A.M.	6 5		
" "	9 00 A.M.	6 4	3 00 P.M.	5 6		
" "	9 15 P.M.	4 6	......	....		
" 30	......	....	3 30 A.M.	6 0		
" "	9 30 A.M.	6 11	3 35 P.M.	6 3		
" "	10 00 P.M.	6 1	......	....		
" 31	......	....	3 50 A.M.	6 3		
" "	10 10 A.M.	6 11	4 15 P.M.	6 7		
" "	10 30 P.M.	4 6	......	....		
April 1	......	....	4 25 A.M.	4 1		
" "	10 30 A.M.	6 0	4 50 P.M.	5 9	☾ in Southern Tropic.	
" "	11 00 P.M.	3 4	......	....		
" 2	......	....	5 10 A.M.	2 11	☾ in Apogee.	
" "	11 15 A.M.	5 0	6 00 P.M.	3 6		
" "	11 25 P.M.	2 0	......	....		
" 3	......	....	6 05 A.M.	2 3	☾ in Last Quarter.	
" "	0 10 P.M.	3 3	6 20 P.M.	3 6		
" 4	0 20 A.M.	1 1	5 30 A.M.	1 6		
" "	0 30 P.M.	3 9	7 30 P.M.	3 2		
" 5	1 00 A.M.	0 8	6 30 A.M.	0 9		Smallest tide (8in.), 4th flood after Last Quarter of Moon.
" "	2 00 P.M.	2 3	9 40 P.M.	1 10		
" 6	3 00 A.M.	0 11	8 00 A.M.	0 11		
" "	3 45 P.M.	2 8	11 00 P.M.	3 7		
" 7	5 15 A.M.	2 5	10 00 A.M.	1 9		
" "	5 10 P.M.	3 0	Midnight.	4 0		
" 8	6 00 A.M.	2 4	Noon.	2 1		
" "	6 05 P.M.	3 11	......	....		

OBSERVATIONS ON THE TIDES AT IGLOOLIK. 1822—23, *concluded.*

DAY.	Time of High Water.	Rise of Tide.	Time of Low Water.	Fall of Tide.	Phenomena of Moon, Sun, and Weather.	REMARKS on the TIDES.
1823.	H. M.	Feet In.	H. M.	Feet In.		
April 9	......	....	0 20 A.M.	4 4	☾ in Equinoctial.	
„ „	6 20 A.M.	3 4	0 40 P.M.	3 6		
„ „	6 30 P.M.	5 6	......	....		
„ 10	......	....	1 10 A.M.	3 11		
„ „	6 40 A.M.	3 10	1 10 P.M.	5 7		
„ „	7 00 P.M.	5 8	......	....		
„ 11	......	....	1 30 A.M.	7 5	New Moon, 1 hour and a quarter A.M.	
„ „	7 45 A.M.	7 5	1 40 P.M.	6 2		
„ „	7 50 P.M.	5 11	......	....		
„ 12	......	....	2 00 A.M.	6 1		
„ „	8 00 A.M.	7 3	2 15 P.M.	7 5		
„ „	8 15 P.M.	5 10	......	....		
„ 13	......	....	2 20 A.M.	6 7		
„ „	8 30 A.M.	7 11	2 30 P.M.	7 9		
„ „	8 45 P.M.	5 10	......	....		
„ 14	......	....	3 10 A.M.	6 5		
„ „	9 05 A.M.	8 3	3 40 P.M.	7 4	☾'s Perigee.	Largest tide (8ft. 3in.), 7th flood after New Moon.
„ „	9 25 P.M.	5 3	......	....		
„ 15	......	....	3 30 A.M.	5 6		
„ „	10 00 A.M.	7 5	4 30 P.M.	6 10	☾ in Northern Tropic.	
„ „	10 15 P.M.	4 2	......	....		
„ 16	......	....	4 15 A.M.	4 6		
„ „	11 00 A.M.	6 11	5 15 P.M.	6 8		
„ „	11 30 P.M.	4 7	......	....		
„ 17	......	....	5 30 A.M.	4 0		
„ „	11 50 A.M.	5 10	6 30 P.M.	5 3	☾ in First Quarter.	
„ „	0 15 P.M.	2 8	......	....		
„ 18	......	....	6 00 A.M.	2 11		
„ „	0 50 P.M.	5 4	7 30 P.M.	4 9		
„ 19	1 20 A.M.	1 11	7 40 P.M.	0 6		

ABSTRACT

Of the foregoing Table.

Mean time of High Water on full and change days, 7h. [illegible]m.

Highest Spring Tide, 9ft. 8in. 27 Jan.

Lowest Neap Tide, 0 5 5 Feb.

N°. II.

ON THE

ATMOSPHERICAL REFRACTION;

BY

THE REV. GEORGE FISHER.

II.

ON THE ATMOSPHERICAL REFRACTION.*

BY THE REV. GEORGE FISHER.

AS the determination of the amount of the Refraction at low temperatures has always been a subject of very considerable interest to astronomers, the opportunity afforded for this purpose during two long winters' residence in the Arctic Regions was not neglected; how far indeed this object has been attained will appear from the observations themselves, which amount to nearly four thousand, most of them at temperatures as low as between 30 and 50 degrees below zero Fahrenheit. I trust it will appear that no exertion was wanting to attain it, and I cannot therefore but consider it my duty in acknowledging the very great assistance I have constantly received from Lieutenant Reid, of H. M. S. Fury, and also Lieutenant Palmer of H. M. S. Hecla, during the whole of our two winters' residence in these climates, in their ready and constant attendance at the observatory, at a considerable distance from the ships, during the depth of winter. It happens unfortunately that none but those who have felt the pain and difficulty of making astronomical observations at such temperatures, can in any way appreciate the assistance thus gratuitously given, which was never without the greatest sacrifice of personal comfort on their parts, often accompanied with danger, and seldom without being severely frost-bitten, with the usual bad effects of long exposure to intense cold.

* As the whole detail of the observations made during the late voyage is of considerable length, far exceeding the limits of this Appendix, I have endeavoured, in the most concise manner that I am able, to give such results as immediately present themselves.

The subject of Atmospherical Refraction has usually been considered under two distinct heads, *viz:* Astronomical Refraction, as affecting the altitudes of celestial objects; and Terrestrial Refraction, as affecting the altitudes of distant terrestrial objects nearly horizontal. I shall take the opportunity, before I give any account of the observations upon either of these subjects, to give a short description of the observatories erected, and at the same time to observe that every possible assistance that could be rendered in their construction, as well as on every other occasion, was afforded by Captain Parry. They were nearly similar at both winters' stations; the description therefore of the first, at Winter Island in 1821, will be sufficient.

The base was in the form of a parallelogram, the longest sides about 23 feet in length facing the north and south, and the breadth about 12 feet; the western portion of it was separated from the east by a partition running up to the roof, and was left unfloored for the sake of steadiness. This portion of the house was fitted up for the observatory, and the remaining part rendered habitable by means of a stove and other conveniences. The middle of the roofing in the observatory, together with the sides, were cut through in the usual way in the direction of the meridian, the breadth of the slits being about 18 inches, and fitted with doors or flaps, lined with fear-nought, and secured within with fastenings.

Upon the ground in the observatory were fixed two large casks filled with earth and stones, cemented together by pouring in water, which freezing immediately, rendered the whole one solid mass, and so firm as not to be affected by any force that could be applied to them; these were placed exactly under the slits. Upon the one towards the south was fixed the Transit Instrument, which was firmly screwed to oaken blocks fitted upon the head of the cask. In the direction of the meridian towards the south, at the distance of 610 feet, was fixed the meridian mark; this consisted of a board two feet in length, nailed to two supports fitted into the ground, and having each of them oblique supports before and behind. Upon the face of the board was drawn a set of equi-distant divisions in an horizontal direction, one inch apart, and subtending at the transit an angle of 28″.5 in space. Exactly over every other division was bored a circular hole with a centre-bit of one inch in diameter, and over the centre of the meridian one was bored another hole, to distinguish it at night time from the others when the numbers over them could not be seen. At the back of the meridian mark was fixed a ledge, upon which a lantern was placed at night for the purpose of illuminating the holes, by which means they were rendered very distinct when the wires of the transit were fully illuminated; and by continual observations, by different methods, the error of the centre hole of the meridian mark was very accurately determined.

The Repeating Circle was fixed in a similar manner on the north side of the observatory, the brass sockets for the adjusting foot-screws being *let* into the head of the cask, and the one with slow motion in the direction of the meridian.

The Clock was fixed close to the west side of the observatory between the Transit and the Circle; and in order that it should be fixed perfectly firm, two thick oaken staunchions were sunk into the ground to the depth of four feet, about eighteen inches apart, and about two inches from the side of the building, so that the clock might be perfectly detached from every thing but the ground; these stauncheons were connected together by means of two stout cross pieces of wood at the top and bottom, and to which the clock was screwed; water was then poured upon the feet of the staunchcons, and the whole rendered firm and secure by the water freezing immediately. The clock was an excellent one, made by Barrett, with a dead beat escapement.

The Pendulum was composed of a strip of well-seasoned yellow deal, the bob of which was regulated by a very fine screw, and was adjusted to sideral time for astronomical purposes. The same had been in the possession of the maker for many years; and during some years it has been in my possession, I have scarcely found it subject to any difference in its going at all connected with temperature, although tried in great extremes of heat and cold. The clock when oiled with the unfrozen part of the oil of sassafras, and the maintaining power increased, performed tolerably well at temperatures as low as about 10 degrees below zero, but at lower temperatures it stopt altogether. Its place was therefore supplied by three pocket chronometers, by Arnold, which were compared before and after observation with others kept in moderate temperatures.

Having thus far explained the arrangements made each winter for making the necessary observations, I shall endeavour to explain the methods, as well as the instruments employed for determining the Astronomical Refraction. The instrument used by myself was an excellent Repeating Circle, made by Troughton, and the centre of the instrument was 39 feet above the level of the frozen sea. I had been led to expect that, at very low temperatures, this instrument would be subject to two inconveniencies, *viz.* the difficulty of moving it in azimuth, arising from the unequal contraction of the centre work of the azimuth circle; and also, from the great contraction of the spirit within the principal level, that the extremities of the bubble would not be visible. The expedient in this case that suggested itself to me, so that the principle of repetition in the instrument would still apply, was by repeating in altitude by reflection from the surface of mercury, making the horizontal wire of the back telescope to bisect the illumined horizontal row of holes upon the meridian mark, in order to ensure the perfect stability of the circle during each repetition; this method, after some practice, succeeded extremely well with high stars, yet for low stars (the observations upon which were of the greatest interest) this method could not conveniently apply, from the great distance necessary for the mercury to be placed from the instrument, as well as the necessity of continually changing its situation as the star moved in azimuth. The method I next employed was by observing the difference of the North Polar distances of high and low stars as they passed the meridian, keeping the horizontal wire of the back telescope (which was clamped to the circle) in contact with the meridian mark as before; this method, although probably sufficiently accurate for very low altitudes, yet was subject to two sources of inaccuracy, which were, 1st. the uncertainty of a distant terrestrial object being alike refracted during the interval of the meridianal passages of the two stars, and, 2nd. the principle of repetition was lost.

Both these expedients were ultimately rendered useless, for as the winter advanced and the temperatures became very low, I found the difficulties in the use of this instrument in the usual way were not real, as the stiffness or difficulty in the azimuth motion arose more from the gradual accumulation of ice in the centre-work than from the effect of the cold upon the metals; for by using the precaution of expelling every particle of ice from the instrument before every observation, by keeping it in a warm room, very little difficulty of this kind was experienced, (that is, provided the instrument was made perfectly clean and dry,) although exposed for 24 hours to a temperature of $-45°$ Fahrenheit, and so long as it is not brought again into a warm atmosphere until it is required to be cleaned; for in this case it is immediately covered with a coating of ice, and the motion of the instrument obstructed.

With regard to the other source of inconvenience which was anticipated, arising from the contraction of the spirit in the principal level, causing such an elongation in the bubble that its extremities were not both visible at the same time, in consequence of their being hid by the brass work attached; this was in a great measure removed by having the bubble made as small as possible:

by this means both extremities were rendered visible, and an observation could be made in the usual way at 25 degrees below zero, provided the level was nearly centrically adjusted each time. By several trials, I found that by bringing the horizontal wire of the front telescope (when clamped to the circle) successively in contact with two holes on the meridian mark, one above another, that a vertical motion of one minute in the circle corresponded to twenty-two divisions upon the scale attached to the level, and therefore each division of the level was equivalent to 2″.7, at the temperature of + 56° Fahrenheit. Also, at −45° Fahrenheit, the same vertical motion of one minute in the circle caused a corresponding motion in the visible end of the bubble amounting to the seven divisions upon the scale nearest the extremity of the level, so that each division between those limits was 8″.6, and the value of the divisions at other degrees of cold, between these limits, was determined by proportion according to the temperature; it is therefore probable, even at the lowest temperatures observed, that the degree of sensibility in the visible end of the bubble was at least equal to the degree of accuracy which could be attained with the telescope attached to the repeating circle, since each of the divisions could be readily subdivided by the eye into four or five equal parts, or read off to about two seconds. Therefore, so long as the level maintains a requisite degree of sensibility, it will answer the same purpose in this state as before; for if the positive and negative readings of the visible end of the bubble are equal at the first and second contact in each repetition: that is, for instance, if at the commencement of a repetition, the level be so adjusted that the end of the bubble towards the object observed be just rendered visible. then upon turning the circle in azimuth to complete the repetition, if the level has the same reading at that end of it which is now furthest from the object, it is evident that the axis of the instrument perpendicular to the plane of the circle may be considered to have moved accurately in a plane parallel to the horizon. If the readings are not the same at the time of the second contact, nor made so with the adjusting foot-screw with slow motion in the direction of the object, nor by the screw which gives vertical motion to the circle, then the apparent double zenith distance upon the instrument will be greater or less than it ought to be (according as the reading at the end towards the object is greater or less than that at the end towards the observer) by a quantity equal to the difference multiplied into the value of each division. Therefore, if the readings upon the end of the scale nearest the object be reckoned negative, and those at the other end towards the observer positive, and a cipher be put each time for the reading of that end of the bubble not visible, it is plain that the correction for the level due to any number of repetitions is equal to the difference of the positive and negative readings multiplied into the value of each division, and applied with its proper sign; instead of half that quantity which is the correction due when the readings of both ends of the level are registered in the ordinary use of the instrument.

The method, therefore, which I subsequently employed with the Repeating Circle was simply by comparing the observed meridian zenith distances of the sun and low stars above and below the pole, with the true zenith distances, computed from the latitude of the observatory, and their north polar distances. None but the principal fixed stars were used, and their apparent places were taken from the Table lately introduced into the *Nautical Almanack*, given to every tenth day of the month, and the horary angles reduced by means of the Table published by the Commissioners of Longitude for that purpose. Almost all the observations were made at the small Island of Igloolik, on the North East coast of America, in latitude 69° 21′ 0″.62 N., and Longitude 81° 36′34″ W.; the latitude of the observatory at Igloolik, was determined by twenty-one meridianal observations of stars above and below the pole, (Table VI.) The agreement between each of these observations is not probably that which would be expected between those made in more temperate climates; but when the temperatures at which several of them were made (which were between 40 and 50 degrees below zero), and the pain and difficulty attending an observation with a delicate instrument, (which was rarely made without the fingers being frozen,) are considered, a better agreement could hardly be expected, under these circumstances; nine of them, however, differ very little more than one second from the mean of all, and a mean between those which differ most between themselves agrees very nearly with a mean of the rest. If a mean of the observations upon each star be taken, the difference between each is not more than about one second, (Table V.) I have been thus particular in giving the results of the observations upon each of the stars in this Table, in order, principally, to shew the agreement of the observations upon the star Rigel with the others, and also the difference in this respect with regard to the Sun, of which, however, I shall presently speak more fully. It appears, therefore, from a mean of the whole of the observations in Table IV., that the latitude of the observatory was 69° 21′ 0″.62, which result has been used in the computation of the observations upon the low stars in determining the refraction.

As it was highly desirable that as many observations as possible should be made upon the subject of refraction, not only for the purpose of confirming my own, but from the possibility of obtaining many observations at low altitudes and temperatures with more simple instruments, from which I was from necessity precluded, arising from the comparative difficulty of observing with the Repeating Circle at low temperatures; it was from considerations of this kind that I proposed to Captain Parry, and the other officers of the Expedition, the frequent taking of the meridian altitudes of low stars with their sextants, and comparing the observed, with the true altitudes determined by calculation. Many trials however of this method, made during our first winter's residence in these climates, rendered it evident that the refraction at the lowest altitudes that can conveniently be observed by reflection with an artificial horizon, (which is about seven or eight degrees,) did so nearly agree with the tabular refraction, that the difference was far within the limits of the accuracy attainable with the sextant at low temperatures.

The method, therefore, which I proposed the second winter, was that of measuring the angular distance between a high and low star, nearly in the same vertical circle, the highest star being so near the zenith that the tabular refraction might be assumed true. It is evident that the difference between the apparent and true distances, computed from their North Polar distances and difference of right ascension, will be the joint effect of the two refractions in distance; and by a resolution of this effect in zenith distance, by direct as well as approximate methods, the refractions in altitude of the lowest stars were determined. The stars generally used were Polaris, Arcturus, Capella, Sirius, and Rigel, and above three thousand observations were taken in this way by ten different observers, usually with eight-inch sextants, with every possible care and attention which long experience in the use of this instrument could suggest, and the results are given in Table I. Each set of observations generally consisted of seven distances between the stars, with the time taken with a chronometer, the error of which from the time and place was determined either by a comparison at the observatory, or by observations of stars, east and west of the meridian, by the officers themselves the same evening, and from which the corresponding altitudes of the stars were computed. When the lower star was very near the horizon, and rising quick, each set of observations were necessarily confined to a fewer number of distances in each. It happened fortunately, as the North Polar distance of Arcturus was nearly equal to the latitude of the place, and also as it came to the meridian below the Pole at a very convenient time for observation during the winter, it could be observed very near the horizon in clear weather, when its motion in altitude was very slow; therefore this precaution became unnecessary, and nearly two thousand of the observations were made with this, and the Pole Star.

Great care is necessary in the use of the sextant at very low temperatures, where considerable accuracy is required. It was always found requisite that the instrument should be exposed a considerable time to acquire the temperature of the atmosphere, before an observation could be made with it, as I have frequently found sextants to change two or three minutes in the index error, during the time they were first brought into the cold, until the time of observation; the lateral adjustment would also vary considerably in a very short time. The index errors were determined before and after the observations, either by the enlightened edge of the Moon, Jupiter, or a bright fixed star, and frequently by comparing the measured with the computed distances of two high stars.

Having explained the method employed with the sextants for determining the refraction of the fixed stars, and an abstract of the observations being given in Table III., which is done by taking a mean of the results of the observations at nearly the same altitudes, I shall now proceed to explain the methods used for determining the Solar Refraction.

The high latitude of our winter station afforded means of obtaining many meridian observations of the sun, at very low altitudes and temperatures: in order, however, to increase the number as much as possible, they were not entirely confined to meridian observations, many others were taken on both sides of the meridian by Lieutenant Palmer and myself, and the refraction determined by comparing the observed with the true altitudes computed from the horary angle, latitude and declination. The observations of Lieutenant Palmer were made with an altitude and azimuth instrument by Carey, having a six-inch vertical circle, and an azimuth circle of the same size, with three verniers, and reading off to 20 seconds. His observations with this instrument amount to 135, and are made with the greatest care; they were taken at the Hecla's winter station; at about eight or nine feet above the level of the frozen sea. The sum of the index and collimation error of the instrument was determined by frequent meridian observations upon high stars, the true altitudes of which were computed from the latitude of the ship, and the results are given in Table V., in order to show by their agreement the degree of credit due to the instrument, and also the care that was taken by him to determine its error. The latitude of the ship by which his observations were computed was 69° 20′ 41″ N., determined trigonometrically from the latitude of the observatory, agreeing within two seconds with that determined by himself, by near one hundred observations, with an eight-inch sextant, by Troughton, and false horizon. A comparison of the zenith distances of different objects, with this instrument and the repeating circle, at the same time and place, assign an error to this instrument a little different, and which if applied to his observations would make them agree nearly with my own; but in order that his observations should be as independent of my own as possible, his own error has been applied.

The greatest part of the observations made with the sextants and the altitude instrument, were confined to altitudes not exceeding four or five degrees. And in all the observations made out of the meridian, whether made with sextant or repeating circle, the altitudes were also within the same limits; those at higher altitudes were entirely confined to observation in the meridian with the repeating circle, with not less than six or eight repetitions each. There are some circumstances which rendered the usual sources of inaccuracy attached to this method of determining the refraction by observations out of the meridian within very narrow limits, which were, first, from the high latitude of the place of observation, and from the greater part of the observations being taken near the meridian, the motion in altitude was therefore so slow, that an error of three or four seconds in time would cause but a very small error in the computed altitude; and secondly, the probable error in the horary angle was much within these limits, for there was not an observation registered in which the transit of either the same object or one of the fundamental fixed stars was not observed within about an hour either before or after the observation, so that the going of the chronometer was only depended upon during that short interval. A few of Lieutenant Palmer's observations with the sun were taken at a greater distance from noon, but whenever this happened, great care was taken by him to measure the horary angle by four of Arnold's chronometers, the errors of which were determined by a comparison at noon with one of my own chronometers, by which the sun's transit was observed the same day at the observatory.

With respect to the observations upon Sirius, made the same way with the repeating circle, still greater accuracy appeared to be attained, in consequence of taking always the transit of one of the principal stars, both before and after an observation, so but very little error could arise from this source, except that arising from the instrument not being exactly in the meridian; but the frequent observations made for the verification of its position, assigned to a very considerable degree of accuracy, the deviation of the centre hole of the meridian mark (to which the transit was constantly referred before and after an observation) from the true meridian.

The observations upon Sirius with the repeating circle are given in Table IX. Those made on the meridian are of course the most unexceptionable, they are ten in number, contained in Table VIII., and present the following results. At the apparent altitude of 4° 22′ 55″ the observed refraction is 13′ 1″.6, bar. 29.84, and the thermometer −21° Fahrenheit, by a mean of five of the observations at the highest temperature; the refraction by the French Tables is 12′ 48″.6, which is 13″.0 in defect. By the Table given by Dr. Young in the Nautical Almanac, the refraction is 12′ 51″.24, which is in defect 10″.36; being two or three seconds nearer the truth.

By a mean of five meridian observations of Sirius at the lowest temperatures, at an apparent altitude 4° 21′ 20″, the observed refraction is 13′ 52″.52, the bar. 29.76, and thermometer −40°.6 Fahrenheit; the refraction by the French Tables is 13′ 29″.4, which is 23″ in defect, and the refraction also by Dr. Young's Table is 13′ 31″.02, which is in defect 21″.5.

It appears therefore that at 20 degrees below zero the tables are not more than 10 or 11 seconds in defect, at an altitude of 4° 22′; but when the temperature is as low as 41 degrees below zero, the errors of the Tables rapidly increase; the correction by the Tables due to 1 degree of temperature Fahrenheit is 1″.57 or $\frac{1}{484}$th part of the whole refraction at this altitude, but by observation the correction for each degree between these temperatures is 2″.37, or $\frac{1}{430}$th part of the refraction.

The observations of the officers with the sextants make the observed refractions a little greater, which should be the case as they were made at about fourteen feet above the level of the frozen sea, whereas my own were made forty feet above the sea.

It appears that in the winter whenever the star Sirius was observed in the direction of S.E. from the observatory, its observed refraction was always less than that of the Tables, but when observed to the S.W. it was constantly greater, which appears to arise from the quantity of open water in the former direction; for by the action of the tides, together with the prevailing winds, which in the Artic Regions during the winter, in this part of the world, are from the N.W., there was always some portion of the surface of the sea free from ice in the direction of S.E. even in the depth of winter, and as the temperature of the surface of the sea was generally about + 28° at that time, the lower stratum of air immediately in contact with it, must have been more attenuated, and have had a greater capacity for moisture than when the sea was covered with ice, which is sufficient, I conceive, to account for this circumstance. A space of open sea at a distance among ice is always indicated by a dense haze or cloud immediately over it, and known by the name of "sea blink." In the direction of S.W. from the observatory were sea and land, both constantly covered during the winter with ice and snow, so that the refraction was less or greater than the Table, according as the visual ray passed through a space more or less in contact with the open sea; to render this more apparent the observations upon Sirius, both to the east and westward are arranged according to the altitudes in Table IX., from which it appears that at a temperature between 20 and 30 degrees below zero, and at an apparent altitude of 3° 8′, the observed refraction was either less or greater than that computed from Dr. Young's Tables by about 30″, according as the star was to the eastward or westward, and a mean between the refraction observed on both sides of the meridian at this altitude nearly agrees with that computed from these Tables. In the early part of the winter, before the sea was completely frozen over, the tabular refraction (for the fixed stars) was generally in excess, but this was not the case afterwards.

ON THE DIFFERENCE BETWEEN THE REFRACTION OF THE SUN AND THAT OF A FIXED STAR APPARENT AT VERY LOW TEMPERATURES.

After an absence of the sun during the winter of 1822-3 of about six weeks, every opportunity was taken when it again made its appearance to the southward, of obtaining very low meridian altitudes with the repeating circle whenever the weather would permit. This was done by taking two or three repetitions with one limb upon the east side of the meridian, and in the same way with the other limb after the sun's transit had been observed; by this means an observation of each limb was obtained, and the apparent altitudes thus deduced from observation were compared with the true altitudes of the same limbs computed from the declination taken from the Nautical Almanac, and the latitude of the observatory. A progressive series of altitudes of both limbs was thus obtained in this way, until the meridian altitude of sun had so far increased that the observed refraction nearly coincided with that of the Tables; the number of repetitions was then increased to six or eight, and confined to one limb each day at noon.

The observations upon the star Rigel which I had previously made, at an apparent altitude of 12° 18′, had led me to expect, from the very near agreement of the observed refraction of that star with that of the Table's, that the same would take place with the sun when it had acquired the same altitude, this however was not the case. From a habit of daily computing the refraction from the observations soon after they were made, a difference soon became perceptible, which I at first ascribed to some error in the observations; and as it first appeared in observations upon the lower limb, it seemed probable that it arose from a habit of making too close a contact with the wire; subsequent observations, however, with both limbs, proved this way of accounting for it to be quite inadmissable; every precaution, therefore, in the perfect adjustment of the circle was taken, as well as care to obviate any habitual source of error in the use of it that might possibly vitiate the observation, and the perpendicular position of the vertical circle continually verified, by observing the interval of the passages of the sun's limbs, one by reflection, and the other by direc vision, and comparing it with that given in the Nautical Almanac.

The observations, however, both of the sun and Rigel were made under circumstances so nearly similar, as to render it quite impossible to account for it by any error of this kind, independent of the care taken to obviate them. On the 27th February, the sun's lower limb had the same meridian altitude within a few minutes as the star, the thermometer at noon being 30 degrees below zero; at which time, by an excellent observation at an apparent altitude of 12 degrees, the sun's refraction was *greater* than that computed from the Tables, by 18.5 seconds; whereas, the same evening, the temperature being 43 degrees below zero Fahrenheit, the observed refraction of Rigel was *less* than that of the tables by 2.3 seconds, although the temperature was 13 degrees lower than at noon; the refraction of the sun, therefore, exceeded that of the star by about 21 seconds. And it appears upon the whole, that from the four observations upon Rigel, (which agree within one or two seconds of each other) that at an apparent altitude of 12° 18′ 28″, the barometer 29.652, and thermometer —31.7 Fahrenheit, the refraction of a fixed star is 5′ 0″.7, taking the apparent North Polar distances of that star from the Nautical Almanac, and the latitude of the observatory as determined by the other stars on both sides the Pole, which refraction is 1″.4 less than that computed from Dr. Young's Table in the Nautical Almanac; whereas the refraction of the sun at the same altitude and temperatures is greater than that of the Tables by 16″; the solar refraction, therefore, exceeded that of a fixed star by 27 or 28 seconds at that altitude, when reduced to the same temperature. It happened fortunately that at the time of making these observations of the sun at thesea ltitudes, the weather was so fine as to enable me to obtain no less than thirty-one meridian observations of the sun with the repeating circle in thirty-nine days, in all of which (with the exception of one on the 15th March, when there was probably some error in the observation) an excess of the observed above the tabular refraction is apparent, gradually diminishing as the altitudes increased.

If the solar declinations in the French Almanac be taken for granted, this difference indeed is not quite so much, for if reduced to the same meridian, the declinations are a little less than those given in the Nautical Almanac; but by a mean of excellent observations of the sun at the time of the summer solstice, 1823, *viz.*, three of the upper limb, and three of the lower, I make the latitude of the observatory to be 69° 20′ 56″.5 N., using the declinations given in the Connaissance des Tems, but by many meridian observations of the stars on both sides the Pole, I make the latitude 69° 21′ 0″. 62, which differ about four seconds. If the declinations be taken from the Nautical Almanac, the latitude by the sun is 69° 20′ 59″.4, which differs one second only from the observations of the stars, I have therefore taken in preference the declinations from the Nautical Almanac for determining the solar refraction.

In Table XII. are given the results of Lieutenant Palmer's observations with the altitude Instrument, by Carey, and they are deduced by taking means of all the observations, which do not differ from each other more than three or four minutes in altitude.

As the observations with the repeating circle are so numerous as, I conceive, clearly to establish this difference between the refraction of the sun and that of a fixed star, yet it may not be superfluous, considering the importance of the subject, as connected with the determination of the obliquity of the ecliptic, to procure as much additional confirmation as possible to this fact. It has been observed, since the great improvement of instruments of late years, by many astronomers who have been in the habit of making astronomical observations at the time of the summer and winter solstices, in order to determine the obliquity of the ecliptic, that they have obtained different results from the summer and winter observations, the obliquity appearing about nine or ten seconds greater in summer than in the winter observations; this has been ascribed to some temporary expansion which periodically affected the instrument in similar situations of the sun. It has also been suggested by M. Piazzi, and very lately by Dr. Brinkley, that it possibly may arise from some peculiar modification of the refraction of the sun's rays, which may differ from those of a fixed star. The truth of this latter suggestion of these celebrated astronomers, the observations made during the late voyage to the Arctic Regions, will, I trust, fully demonstrate, and also that the solar rays are the most refrangible of the two.

With respect to the observations made by the officers of both ships, during the last winter, I shall compare the observations upon the sun, made by Lieutenant Palmer with the altitude instrument, with those upon the fixed stars, by the other officers with their sextants; since they were all made nearly at the same height above the level of the sea. With respect also to observations made with sextants at very low temperatures, I have before mentioned that they are subject to very considerable errors, therefore we can only expect any thing like an accurate result but from a multitude of observations, and, what is of far more consequence, that they should be made by many observers with different instruments. At very low altitudes, indeed, this difference is very evident without including many observations together. For instance, the lowest altitudes at which a fixed star was observed during the voyage were taken on the 10th March, 1823, by Mr. Ross, at a temperature of 28 degrees below zero; from which it appears, that by a mean of seven observations at the apparent altitude of 29′ 25″, the observed refraction of Sirius was 3′ 54″.2, greater than that computed from the Tables. Now, there is not at this temperature an observation upon the sun at exactly the same altitude, but on the 23d January (the temperature being the same) there is one of the lower limb at an apparent altitude of 28′ 22″, which is a little less, and also one of the upper limb at an apparent altitude of 30′ 0″, which is a little greater, by which the observed refraction, by the lower limb is 17′ 22″, and that by the upper limb 15′ 46″ greater than that computed from the Tables, and by a mean of the observations of both limbs, the solar refraction, therefore, exceeded that of the star at the same altitude and temperature by 12 or 13 minutes, a quantity much too great to be an error of observation.

In many observations with different instruments by persons of different degrees of experience in observation, it is difficult to assign such a result from the observations, which, when every circumstance connected with them be taken into consideration, will in all probability be the most accurate. If we consider the authority due to each result to be proportional to the number of observations, without considering either the number of instruments employed, or the number of persons who made the observations, then the results of all the sextant observations are contained in Table III., and which are obtained by arranging them according to the altitude, and taking a mean of the results of the observations differing not more than a few minutes from each other in altitude. This method would no doubt be correct, had the number of observations of each observer been nearly equal; but the great differences between the results of the observations by different observers, clearly shew that they arise from some constant error produced by the cold upon the instruments. This is, I think, evident, not only from some of the observers constantly making the Tables more in defect than others, but because this defect does not appear in the observations to diminish, as the altitudes increase, which is contrary to the nature of the subject; and which occurs in the observations of some of the most experienced observers.

A result, however, far less exceptionable may be obtained by taking a mean between the results of each observer, instead of a general mean of all the observations together; for although this method of proceeding may appear to give a more than proper share of credit to the observations of those observers who have made but few, yet it is evident that there are other conditions to be taken into consideration besides the number of observations; such as the number of observers, and instruments employed, and also the number of evenings in which the observations were made; for those made at different periods are to be preferred to a greater number when confined to a fewer number of times of observations, as the results clearly shew.

In Table II. are given the results of the observations of each observer, made between the altitudes of 4 and 5 degrees, which are selected as they principally consist of observations upon Sirius when on or near the meridian, and therefore, were made under somewhat more favourable circumstances than the rest; and also for the sake of comparison with my own meridian observations upon Sirius, with the repeating circle at the same altitude. It appears upon the whole, by seven hundred and ninety-seven observations, made by eight different observers with sextants, at the height of about fourteen feet above the frozen sea, that at the apparent altitude of 4° 22′ 54″, thermometer −33°.2, bar. 29.87, the refraction is 13′ 39″.4, whereas by my own observations the refraction is 7″.7 less; which is as near an agreement as could be expected, considering the great differences between the results of the sextant observations.

The rapid increase in the refraction as the altitudes diminish is very remarkable; and, in consequence, the great distortions of the sun's disc when near the horizon are very great, the lower limb appearing perfectly flat, and the upper part of an elliptical shape, but of a jagged and broken appearance, having over it often a kind of tuft or crown, detached from that which would appear under usual circumstances to be the upper limb; but from its resemblance in other respects to part of the disc, so much uncertainty was introduced in making the contact with the horizontal wire of the instruments, that the observations made when this was the case are not registered. The law of variation in the refraction for altitudes near the horizon is about 12″ for one minute change in altitude, in the Tables deduced from observations made in temperate climates; whereas, in the Artic Regions, at temperatures 30 and 40 degrees below zero, the variation is no less than forty times as great, or about 8″ for one minute in the apparent altitude.

The testimony of De Veer, who wrote the particulars and who accompanied Barentz to Nova Zembla in his third voyage, where he wintered in latitude 76° N., in the year 1596-7, has been so often called in question, with respect to his account of the re-appearance of the sun, that it is but justice to state that he appears to be perfectly correct, and his observations consistent with those made during this voyage. He reports that he, in company with two others, saw the edge of the sun from the sea side, on the south side of Nova Zembla, on the 24th of January (or 3d of February, new style) at which time the sun's declination when it passed the meridian in that longitude was about 16° 48′ S., and therefore the true meridian depression of the upper limb at noon was 2° 32′ nearly, which ought to have been the amount of the refraction that the limb might have been visible. Now, if the observation at the least apparent altitude observed on the 23d January, 1823, at Igloolik, which was 8′ 40″, be reduced to the horizon, by observing the rapid law of increase in the refraction visible in the series of observations made on that day, the horizontal refraction cannot be estimated at less than 2° 30′, and which, if increased by the apparent dip, (which sometimes amounts to more than 20′ in the winter time, as I have mentioned when speaking of the terrestrial refraction,) will be quite sufficient to render the upper limb visible; and there is still less difficulty in believing that they "saw the sunne in his full roundnesse above the horizon" three days afterwards, since the daily motion in declination at that time of the year is nearly 18 minutes to the northward.

M. Le Monier, from the observations made on these two days, assures us that there must have been more than 4½ degrees of refraction, and that he "could neither explain these observations, reject them as doubtful, nor suppose any error, as was done by most other astronometers." How this conclusion has been deduced from the facts related in the Journal does not appear, neither is there the least occasion to reject as doubtful the simple and honest account of the Dutchmen.

The results of the observations made with sextants which are contained in Table I., were computed by the officers who made them, excepting those made by Mr. Fyfe, which were computed by myself. The temperatures annexed to them are those shown by thermometers fixed upon poles, a few feet above the level of the frozen sea, about twenty or thirty yards from the ships. By a comparison of these thermometers with ten others, it appears that although they agreed together tolerably well at moderate temperatures, yet the temperatures registered with the observations are three degrees higher than those indicated by the mean of all of them, when the temperatures were below −20° Fahrenheit. Frequent observations upon the point of congelation of pure mercury will probably assign a more accurate determination of the errors of the registering thermometers, by which it appears, that taking the freezing point at −39° Fahrenheit, the temperatures attached to the observations should be two degrees lower than those given in the Tables; I have not, however, altered them, but have given them as they were taken by the officers themselves at the time of observation. The temperatures attached to my own observations with the repeating circle are those determined with a thermometer freely suspended in the shade outside the observatory: the temperature in the interior was the same.

The heights of the barometer annexed to the observations are those observed with a barometer on board the Fury, which agreed, very nearly, with several mountain barometers in several comparisons: that kept on board the Hecla differed continually, and frequently very materially from the others; I have therefore substituted the observations with the barometer kept on board the Fury instead. This will cause errors of a few seconds in the computed refractions at very low altitudes, in those observations where this barometer has been used, but which will be sufficiently accurate to give an idea of the differences between the observed and computed refractions. The Table of Refractions alluded to in these observations, is that of Dr. Young's, given in the Nautical Almanac.

ON THE TERRESTRIAL REFRACTION.

The refraction of objects nearly horizontal, in high latitudes, when the land is covered with snow, and the sea with floating ice, is subject to a very great degree of uncertainty; for it seldom happens that different parts of the horizon, appear at the same elevation or depression, and the same object is often very differently refracted within a very short space of time. In Table XIII. are given the results of the observations upon this subject, made by Lieutenant Palmer and myself, together with the circumstances connected with them, to afford the data for making those conclusions which the observations themselves may appear to warrant. During the period the ships were navigating amongst the ice, the method used for determining the apparent dip was principally by comparing the observations of the apparent altitude of the sun's lower limb, taken by reflection with the artificial horizon upon the sea ice, with the altitude of the same limb above the horizon taken in the usual way with sextants, the difference between these altitudes is the elevation or depression of the visible horizon due to the altitude above the level of the sea ice, from which it was observed on ship-board. The dip sector was occasionally used, but from the navigation during the greatest part of the voyage being close in shore, as well as the circumstance I have just mentioned of the different parts of the horizon being differently refracted, it was of little use. At the time the ships were frozen up in their winter stations, the methods employed were, by observing the zenith distance of the horizon with the repeating circle, and by comparing the mean of five or six simultaneous observations, by Lieutenant Palmer and myself, one observing the altitude over the ice horizon when it was sufficiently well defined for the purpose, and the other with the artificial horizon, each alternately; and by comparing the observed altitude of the sun's lower limb with that computed from the hour angle, declination, and latitude of the place; and also by comparing the observed meridian altitude over the sea or ice horizon, with that deduced from the latitude of the place.

The refraction of a distant terrestrial object in terms of the contained angle at the earth's centre, was determined in a way similar to that employed in trigonometrical survey, that is, from the observed elevation or depression of two distant objects observed from each of them. To effect this an object was set up upon a distant hill, which was a pole, having upon the top of it a large hollow sphere formed of hoops of casks, and covered over with canvass; the distance of this object from the observatory, from which it was observed, was determined trigonometrically by two different bases measured upon the frozen sea.

As I was furnished with only one instrument with which these observations could be made with any great degree of accuracy, which was the repeating circle, simultaneous observations therefore at each place (as the rigid determination of the refraction requires) could not be obtained; but was done by first observing the zenith distance of the object from the observatory, near which was fixed a cask, the upper part being the same height as the centre of the circle; after this, the instrument was removed with the greatest possible expedition to the hill where the object was fixed, and from thence the depression of the upper part of the cask was observed; the circle was again removed to its former station at the observatory, and the zenith distance of the object again ascertained, and a mean between the two altitudes thus obtained, was taken for that which *would have been observed* at the same time the depression was taken.

As the height of the centre of the circle when upon the hill was less than the object at the same place, the observed depression was increased by the angle subtended by the height of the object above the centre of the circle, in order to reduce it to what it would have been, had the circle been the same height as the object, and as the elevation of the object from the observatory was less than the depression observed from the hill, their difference subtracted from the angle at the earth's centre will be twice the refraction. As the repeating circle could not frequently be conveyed to so great a distance over a rugged country covered with snow without very considerable exertion, as well as danger to the instrument, these observations, therefore, instead of being repeated, the true altitude of the distant object above the horizontal plane, at the place of observation was also deduced from the known altitudes of each station above the level of the sea, determined by the method of continued levelling from the water's edge, and corrected for the earth's curvature; the true altitude, determined in this way, agrees very nearly with that determined with the repeating circle. It was also further confirmed by observations made with three mountain barometers, two of which give the same determination.

By a mean, however, of the two first methods, the true altitude of the distant object above the horizontal plane at the observatory was found to be 23′ 25″.2; from which and the apparent zenith distances of the object, which were observed for some days both in the morning and afternoon, the refraction in terms of the contained terrestrial arc is computed. The distance between the objects was 20,612 feet, subtending at the earth's centre an angle of 3′ 23″.0. As the whole detail of these operations would far exceed the present limits I have given in Table XIV. the results of them only.

By a mean of ten observations made with the repeating circle, (each consisting of either two or three repetitions), it appears that, in April, 1823, the refraction at about 9h. A.M., was a little more than $\frac{1}{5}$th, and at 5h. P.M., at little less than $\frac{1}{11}$ of the contained arc, and a mean of the whole is exactly $\frac{1}{7}$th, the temperature being about 0° Fahrenheit, the whole space between each station (consisting of land and the frozen sea) being covered with snow. In the following July, by two excellent observations of the zenith's distances observed from each station, it was $\frac{2}{17}$th of the contained arc, the snow at that time being entirely gone from the land between the places of observations, and the temperature + 47° Fahrenheit.

The column attached to the observations exhibiting the hygrometrical state of the atmosphere at the time of observation, contains the space estimated upon the scale attached to Professor Leslie's hygrometer, through which the coloured liquid falls by reason of the cold produced from the evaporation of pure alcohol applied to the bulb with a camel's-hair brush: these results require a small correction to make an exact comparison between them, as the evaporation takes place at the reduced temperature of the wetted bulb; the temperatures, however, are so nearly equal, as to render this unnecessary for the present purpose.

I have before mentioned that the refraction of a low star observed during the winter appeared diminished when seen through the vapours which arise from those parts of the sea which are not covered with ice, and known by the name of "sea-blink." This appears to be the principal cause of those extraordinary observations and depressions of not only the distant horizon, but of objects of no considerable distance. By a constant comparison of altitudes of the sun taken with sextants in the usual way, with corresponding ones taken by reflection with the artificial horizon during the three summers' navigation in these seas, it soon became apparent, that as there was more or less ice in the way, (that is, between the place of observation and that part of the horizon to which the sun was referred), the observed dip was less or more accordingly; but hardly ever exceeded the tabular dip, excepting during the winter-time; and it may be useful to observe, for those who are in the habit of navigating the seas during the summer time, that the general state of the horizontal refraction is such, that in determining the altitude of the sun in the usual way, by means of the visible horizon,—that at the height of about fourteen or twenty feet above the level of the sea, if there is but little ice between the observer and the horizon, then the tabular dip is nearly correct; if the sea is about one half covered with ice, then $\frac{1}{4}$th of the tabular dip should be allowed, and if the ship is *close beset* with ice as far as it can be seen towards the sun, then no dip whatever should be allowed; although this rule will not always hold good, yet it appears to be the general result of near one hundred observations. The effect upon the elevation or depression of the horizon, when seen through "sea-blink" was often observed by bringing the horizontal wire of a fixed instrument in contact with the horizon. Upon moving the instrument in azimuth it was found that the edge of the horizon was below or above the wire, according as there is more or less water between the observer and that part of the horizon to which the instrument is directed; or as the visual ray passes through a portion of the atmosphere more or less in contact with the open sea.

The remarkable distortion, as well as the inverted appearance of distant objects nearly horizontal, such as ships, distant lands, *&c.*, have not escaped the notice of those persons who frequent these seas in the summer season. A common appearance is that of the distant confines of the visible horizon appearing like a distant high wall surrounding the ship, composed of pillars of ice closely arranged together, the intervening space appearing a valley of gradual descent from the ship, rising again towards the distant horizon. It was during a singular appearance of this kind, that the observations on the 17th July, 1823, were made by Mr. Ross and myself (given in Table XIII.) the ship at the time was closely beset with ice. It appears from four observations made at the mast-head with a dip sector, at the height of 103 feet above upper edge of the ice, that the distant horizon in different directions appeared at mean elevation of nearly 5 minutes instead of a depression of 14 or 15 minutes as given in the Table. At the height of 86 feet above the ice, the apparent altitude of the horizon was nearly 2′, the tabular dip for that height being 9′, and at the height of 3 and 5 feet its altitude was 5′ 30″, which is the same as it had at the height of 103 feet from the ice.

In the winter time very great depressions of the horizon take place, amounting to 15 or 20 minutes; the height of the eye above the level of the frozen sea being 14 feet, whereas the tabular dip for height is 3′ 14″ only.

As the refraction was diminished whenever the object was observed through a portion of the atmosphere in contact with the open sea: humidity may at first appear to be the principal cause of this; and, in order to determine this, the zenith distances given in Table XIV. were taken in the morning and afternoon, together with the state of the hygrometer at the time. These observations, however, afford rather a different result, for the zenith distances of the distant object in the morning was less than in the afternoon, when the humidity as shewn by the hygrometer was least; it appears, therefore, to arise from the great difference of temperature between the lower stratum of air and the atmosphere above it.

In the summer time, the greatest terrestrial refractions occur when the sea is entirely covered with ice in warm fine weather, and the temperature of the lower stratum of air much lower than that immediately above it. In the winter time the refraction is least when there is very little ice upon the sea, the temperature of the lower stratum in this case being much higher than the atmosphere above. It appears by an experiment that, when the sea is covered with ice in the winter, there is no sensible difference between the temperatures of the atmosphere at the surface of the ice, and at the height of 400 feet above it; this was tried by means of a paper kite with an excellent register thermometer attached to it, the altitude of which was determined by two different observers at the time, at a given distance from each other, and in the same vertical plane as the kite, and from which the perpendicular height of the kite above the level of the ice was computed. This experiment was tried under favourable circumstances, at the temperature of −24° Fahrenheit. The kite was sent up and caught in coming down without the thermometer being in the least disturbed, the indices of which did not shew the slightest alteration, although carefully compared before and after the experiments and the kite remained at the same height in the air for a considerable time.

There is another circumstance which materially affects the refraction of a distant terrestrial object at low temperatures, this is the position of the sun with respect to the object observed, which appears most depressed when it is in the same direction as the sun. I cannot better exemplify this than by relating the first observation as it occured, by which this circumstance first became apparent.

On the 23d of March 1822, at the observatory in Winter Island, the thermometer being −13° Fahrenheit, the front telescope of the repeating circle was directed towards the horizon (on the frozen sea) which appeared a well defined line of ice, and the contact made with the horizontal wire, the principal level being adjusted and clamped to the vertical circle; the sun at the time was in the direction of the telescope, and the reading of the principal vernier was 355° 1′ 0″. Upon moving the instrument in azimuth, and at the same time keeping the level adjusted, the horizon appeared considerably elevated, both to the eastward and westward of the sun; and the reading of the same vernier when the telescope was directed about 30 degrees from the sun, was 355° 4′ 15″; the horizon being elevated more in this part of the horizon by the quantity 3′ 15″ than the part under the sun, and at the distance of 15 degrees from the sun by the quantity 2′ 0″.

In order to ascertain if objects were successively depressed in this way as the sun came in azimuth over them, the horizontal wire was brought in contact as before with a piece of ice situated upon the horizon, the sun at the time being about 30° in azimuth to the left of the object. The instrument was kept in this position until the sun had come exactly over the object, which was found in the same way as before to be depressed below its former position 3′ 58″; at the same time, a faint but distinct and more distant horizon appeared above, and parallel to the former, and nearly as much above the horizontal wire of the instrument, as the object observed was depressed below it. As the sun moved to the right of the object, it gradually acquired its former elevation, and came again in contact with the horizontal wire, and the distant horizon disappeared. The same thing was constantly observed during the winter, both by Lieutenant Palmer and myself, and drawings frequently made representing the different states of the horizon under these circumstances.

TABLE I.

Of the OBSERVED REFRACTIONS of STARS at LOW ALTITUDES and TEMPERATURES, determined by means of the Apparent Distances, as observed with Sextants by different Observers of high and low Stars.

NOTE.—The different observers, viz., Captain PARRY, Messrs. HOOPER, CROZIER, ROSS, BUSHNAN, and FISHER, of H. M. S. Hecla, also Lieutenant PALMER, Messrs. RICHARDS, BIRD, and FYFE, of H. M. S. Hecla, are denoted by the initials P, H, C, R, B, F, Pr, Rrds, Bd, Fy, respectively; also the Table of Refractions, with which the observations are compared, is Dr. YOUNG's, given in the *Nautical Almanac.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1822.		° ′ ″	°		′ ″	′ ″	′ ″			
Feb. 19	Castor and Sirius	6 9 18	−36	29.70	10 30.9	....	0 41.7	3	F	Fine clear weather with aurora.
„ 25	„ „	6 3 44	−30	30.01	9 36.5	0 17.0	....	7	F	Clear weather.
„ „	„ „	5 37 30	−30	30.01	9 21.3	1 14.8	....	3	F	
Oct. 20	α Pol. and Arcturus	2 36 12	+ 5	30.26	18 6.0	....	0 37.3	9	F	
„ „	Capella & α Orion.	10 11 14	..	...	5 44.2	0 1.9	....	5	F	
Nov. 12	α Pol and Arcturus	6 43 23	−24	29.40	.....	0 43.4	....	6	Pr	Hazy about α Pol.
„ 13	„ „	5 6 24	−23	30.02	11 38.8	....	0 5.6	5	Fy	
„ „	„ „	4 48 41	..	...	11 24.4	0 43.8	....	5	Fy	
„ „	„ „	3 55 14	..	...	13 27.0	0 58.0	....	5	Pr	
„ „	„ „	3 37 3	..	...	14 54.2	0 29.0	....	5	Pr	
„ 14	„ „	3 16 35	−18	30.03	14 31.1	1 28.1	....	5	Pr	Hazy weather.
„ „	„ „	3 2 13	..	...	16 16.8	0 47.2	....	4	Pr	
„ 15	„ „	5 55 52	−18	29.73	9 30.6	0 8.7	....	5	Fy	Fine clear weather, bright aurora.
„ „	„ „	5 36 27	..	...	6 35.2	1 42.4	....	5	Fy	
„ „	„ „	5 2 30	..	...	9 49.7	1 27.8	....	5	Pr	
„ „	„ „	4 43 51	..	...	10 57.1	0 56.4	....	5	Pr	
„ „	„ „	3 38 38	..	...	13 10.4	1 49.2	....	5	Fy	
„ „	„ „	3 22 49	..	...	15 29.8	....	0 0.7	5	Fy	
„ „	„ „	3 5 41	..	...	15 52.7	0 38.7	....	5	Pr	
„ „	„ „	2 52 30	..	...	17 5.1	0 21.0	....	5	Pr	
„ 16	„ „	4 52 50	−13	29.50	11 8.0	0 20 2	....	5	Fy	

Table I.—ON THE OBSERVED REFRACTIONS OF STARS, &c.—*continued*.

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1822.		° ′ ″	°		′ ″	′ ″	′ ″			
Nov. 16	α Pol. and Arcturus	4 36 57	−13	29.50	11 17.9	0 41.5	....	5	Fy	Fine weather, with aurora.
„ 22	„ „	3 41 10	−35	29.68	15 9.0	0 2.6	....	5	Pr	
„ „	„ „	3 26 57	..	...	16 23.6	....	0 26.1	5	Pr	
„ 23	„ „	5 15 4	−36	29.84	11 28.6	....	0 2.0	5	Fy	Rather hazy about ✱
„ „	„ „	4 56 22	..	...	11 50.3	0 13.0	....	5	Fy	
„ „	„ „	4 21 2	..	...	13 38.4	....	0 17 0	5	Pr	
„ „	„ „	4 6 57	..	...	14 0.1	....	0 4.2	5	Pr	
„ „	„ „	3 16 47	..	...	16 17.0	0 25.2	....	5	Fy	
„ „	„ „	3 3 28	..	...	17 32.2	0 1.7	....	5	Fy	
„ „	„ „	2 37 53	..	...	19 16.0	0 22.8	....	5	Pr	
„ „	„ „	2 25 52	..	...	19 59.2	0 33.0	....	5	Pr	
Dec. 6	Capella and Rigel	3 40 15	−22	29.57	14 31.1	0 22.4	....	6	F	Hazy, light fog.
„ „	„ „	4 4 33	..	...	13 6.8	0 50.1	.. .	6	F	
„ 7	„ „	10 49 0	−34	29.60	5 43.0	0 2.0	....	12	F	
„ „	α Pol. and Arcturus	2 29 54	..	...	16 33.6	1 15.4	....	4	F	
„ „	„ „	3 15 26	..	...	16 36.5	....	0 6.5	4	F	
„ 8	„ „	6 31 8	−43	29.60	10 16.0	....	0 46.8	7	P	Clear weather.
„ „	„ „	6 2 33	..	...	10 44.6	....	0 37.2	7	R	
„ „	„ „	5 26 27	..	...	12 42.0	....	1 35.0	7	P	
„ „	„ „	5 5 47	..	...	12 16.6	....	0 30.2	7	R	
„ „	„ „	4 48 5	..	...	13 25.0	....	1 1.9	7	P	
„ „	„ „	4 26 50	..	...	13 32.6	....	0 21.2	7	R	
„ „	„ „	4 3 49	..	...	14 34.0	....	0 24.2	7	P	
„ „	„ „	3 52 46	..	...	14 31.9	0 17.8	....	5	Pr	
„ „	„ „	3 53 50	..	...	15 1.8	....	0 17.0	7	R	
„ „	„ „	3 36 58	..	...	15 18.3	0 16.9	....	5	Pr	
„ „	„ „	3 2 56	..	...	17 51.5	....	0 13.4	5	Pr	
„ „	„ „	2 50 13	..	...	18 41.1	....	0 8.0	5	Pr	
„ 9	„ „	7 17 13	−43	29.03	9 5.0	....	0 32.2	7	P	Hazy about ✱
„ „	„ „	6 59 51	..	...	9 29.0	....	0 35.4	7	P	

TABLE I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1822.		° ′ ″	°		′ ″	′ ″	′ ″			
Dec. 9	α Pol. and Arcturus	6 36 44	−43	29.63	10 4.0	....	0 43.1	7	R	Hazy about ✱
" "	" "	6 19 11	..	...	10 35.0	....	0 44.8	7	R	
" "	" "	5 57 51	..	...	11 9	....	0 53.1	7	P	
" "	" "	5 40 32	..	...	11 22	....	0 38.8	7	P	Fine and clear.
" "	" "	5 23 1	..	...	11 46.0	....	0 30.5	7	R	
" "	" "	5 6 12	.	...	12 27	....	0 43.8	7	R	
" "	" "	4 29 29	..	...	13 53	....	0 48.7	7	P	
" "	" "	4 7 45	..	...	14 28	...	0 27.2	7	R	
" "	" "	2 4 30	..	...	20 22.5	....	0 56.5	5	F	
" 10	" "	7 25 7	−45	29.61	8 58.6	....	0 33.2	7	P	Fine clear weather.
" "	" "	7 9 33	..	...	9 44.6	....	1 2.0	7	P	
" "	" "	6 39 58	..	...	9 46.3	....	0 27.7	7	R	
" "	" "	6 19 51	..	...	10 49	....	1 3.0	7	R	
" "	" "	6 4 22	..	..	11 11.1	....	1 3.9	7	P	
" "	" "	5 49 29	.	...	11 35.3	....	1 3.0	7	P	
" "	" "	5 31 53	..	...	12 5	....	1 5.5	7	R	
" "	" "	5 14 45	..	...	12 37	....	1 4.8	7	R	
" "	Capella and Rigel	7 59 2	..	...	6 46.1	1 3.7	....	10	F	
" "	" "	6 18 44	..	...	6 20	1 13.0	....	10	F	
" "	" "	9 57 55	..	...	5 40.3	0 40.6	....	15	F	
" "	α Pol. and Arcturus	2 42 17	..	...	22 5	....	2 45.4	5	F	
" "	" "	2 57 22	..	...	17 4.1	1 0.6	...	5	F	
" "	" "	3 13 46	.	...	16 46.2	0 10.5	...	5	F	
" "	" "	1 55 28	..	...	25 20.2	....	1 38.9	5	F	
" "	" "	2 7 46	..	...	24 18.2	....	1 57.2	4	F	
" "	" "	2 19 26	..	...	23 13.7	....	2 5.3	4	F	
" "	" "	2 29 53	..	...	21 38.6	....	1 19.7	4	F	
" 11	" "	3 13 52	−43	29.71	16 56.4	....	0 1.3	5	P	
" "	" "	3 3 10	..	...	17 19.8	0 19.4	....	5	P	
" 12	" "	6 41 24	−40	29.72	10 17.7	....	1 3.9	7	P	

Table I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1822.		° ′ ″	°		′ ″	′ ″	′ ″			
Dec. 12	α Pol. and Arcturus	6 21 9	−40	29.72	10 10.6	....	0 29.2	7	P	Fine clear evening.
„ „	„ „	5 38 19	..	...	11 44.0	....	0 57.2	..	R	
„ „	„ „	5 13 30	..	...	12 30.0	....	0 49	..	R	
„ 17	„ „	6 25 53	−35	29.60	10 35.6	....	1 8.7	..	R	
„ „	„ „	5 16 48	..	...	12 18 8	...	1 3.1	..	P	
„ „	„ „	4 50 14	..	...	12 33.6	....	0 25.4	..	R	
„ „	Capella & Regulus	4 4 50	..	...	14 19.6	....	0 20.6	..	B	
„ „	„ „	5 23 0	..	..	11 19.4	....	0 10.4	..	B	
„ „	„ „	6 29 44	..	...	7 55.5	1 4.2	....	..	B	
„ 18	α Pol. and Arcturus	5 4 33	−33	30.00	12 15.0	....	0 33.8	..	P	Fine clear weather.
„ „	„ „	4 48 38	..	...	12 44.0	....	0 27.8	..	P	
„ „	„ „	4 19 25	..	...	13 36.6	....	0 19.3	..	R	
„ „	„ „	4 7 20	..	...	14 1.6	....	0 12.5	..	R	
„ 19	„ „	5 6 25.1	−33	30.05	12 22.1	.. .	0 43.7	..	P	
„ „	„ „	4 48 44	..	...	12 59.2	....	0 42.9	..	P	
„ „	„ „	4 32 20	..	...	13 38.9	....	0 45.0	..	P	
„ „	„ „	4 8 33	..	...	14 29.6	....	0 38.7	..	R	
„ „	„ „	3 53 36	..	...	15 15.6	....	0 28.9	..	R	
„ „	„ „	3 37 30	..	...	16 3.6	. ..	0 2.0	..	R	
„ „	Capella & Regulus	4 40 24	..	...	12 51.7	0 26.2	....	5	B	
„ 29	α Pol. and Arcturus	6 39 44	−41	29.75	11 2.3	....	1 45.5	..	P	
„ „	„ „	6 18 35	..	...	11 0	....	1 14.3	..	P	
„ „	„ „	6 2 54	..	...	11 18	....	1 9.2	..	P	
„ „	„ „	5 40 39	..	...	11 32.7	....	0 49.5	..	R	
„ „	„ „	5 25 52	..	...	12 6.3	....	1 0.2	..	R	
„ „	„ „	5 11 17	..	...	12 51.7	....	1 14.2	..	R	
„ „	„ „	4 55 20	..	...	13 6.0	....	0 55.9	..	P	
„ „	„ „	4 42 54	..	...	13 47	...	1 11.9	..	P	
„ „	„ „	4 31 49	..	..	14 27	....	0 28 0	..	P	
„ „	„ „	4 15 5	..	...	14 48.7	....	1 6.0	..	R	

TABLE I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1822.		° ′ ″	°		′ ″		′ ″			
Dec. 29	α Pol. and Arcturus	4 2 5	−41	29.75	15 23.3	....	1 6.8	7	R	Fine clear evening.
„ „	„ „	3 49 20	..	...	16 6.1	....	1 1.1	7	R	
„ „	„ „	3 42 5	..	...	16 44	....	1 21.6	7	P	
„ „	„ „	3 23 20	..	...	17 24	....	1 20.4	7	P	
„ „	„ „	3 12 16	..	...	16 28	....	1 16.9	7	P	
„ „	„ „	3 0 53	..	...	19 9.1	....	1 7.5	7	R	
„ „	„ „	2 50 49	..	...	19 55.4	....	1 20.2	7	R	
„ „	„ „	2 41 46	..	...	20 42.7	....	1 24.6	7	R	
„ „	„ „	2 31 18	..	...	21 58	....	1 44.0	7	P	
„ „	„ „	2 17 51	..	...	22 33	....	1 10.0	7	P	
„ „	„ „	2 12 6	..	...	24 8.2	....	2 29.8	6	P	
„ 30	„ „	6 47 58	−40	29.65	10 38	....	2 34.4	7	P	Rather hazy weather.
„ „	„ „	6 33 4	..	...	10 43.0	....	1 18.5	..	P	
„ „	„ „	6 17 50	..	...	10 30	....	0 36.6	..	P	
„ „	„ „	5 56 51	..	...	10 53.9	....	0 32.6	..	R	
„ „	„ „	5 42 10	..	...	11 32.5	.. .	0 54.2	..	R	
„ „	„ „	5 26 27	..	...	12 16.8	....	1 15.8	..	R	
„ „	„ „	5 8 11	..	..	12 41.0	....	1 1.7	.	P	
„ „	„ „	4 57 44	..	...	13 4.0	....	1 4.7	..	P	
„ „	„ „	4 44 22	..	...	13 40	....	1 11.0	..	P	
„ „	„ „	4 28 12	..	...	14 27.4	....	1 23.4	..	R	
„ „	„ „	4 16 59	..	...	15 11.8	....	1 40.5	..	R	
„ „	„ „	4 5 33	..	...	16 3.2	....	2 0.9	..	R	
„ „	„ „	3 47 23	..	...	16 23	....	1 18.7	..	P	
„ „	„ „	3 35 3	..	...	16 57	....	1 13.1	..	P	
„ „	„ „	3 20 54	..	...	17 42	....	1 10.6	..	P	
„ „	„ „	3 4 20	..	...	18 39.7	....	1 15.2	..	R	
„ „	„ „	2 52 26	..	...	19 41.8	....	1 22.3	..	R	
„ „	„ „	2 39 56	..	...	20 34.7	....	1 10.6	..	R	
„ „	„ „	2 25 37	..	...	22 25.0	....	1 57.5	..	P	

TABLE I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farbt.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS.
1822.		° ′ ″	°		′ ″	′ ″	′ ″			
Dec. 30	α Pol. and Arcturus	2 17 27	−40	29.65	23 23	....	2 5.4	7	P	Clear weather.
" "	" "	2 9 53	..	...	24 17	....	2 16.1	7	P	
" "	" "	2 0 21	..	...	25 46.8	....	2 43.6	7	R	
" "	" "	1 48 58	..	...	26 46.1	....	2 32.8	7	R	
" "	" "	1 39 59	..	...	27 47.5	....	2 29.5	7	R	
" "	Capella and Rigel	7 17 19	..	...	8 6.7	0 22.1	...	20	F	
" 31	α Pol. and Arcturus	5 27 38	−40	29.75	11 52.0	....	0 51.3	5	H	
" "	" "	5 7 33	..	...	12 16	....	0 37.3	5	H	
" "	" "	4 50 59	..	...	12 52.1	....	0 45.3	7	R	
" "	" "	4 39 27	..	...	13 36.8	....	0 55.8	7	R	
" "	" "	4 23 17	..	...	15 25.0	....	2 5.5	5	H	
" "	" "	5 18 25	..	...	14 10.8	...	0 43.5	5	F	
" "	" "	4 9 0	..	...	15 45	....	1 51.8	5	H	
" "	" "	3 55 9	..	...	15 51.4	....	1 12.1	7	R	
" "	" "	3 45 48	..	...	16 43.5	....	1 32.9	7	R	
" "	" "	3 21 56	..	...	18 3.6	....	1 38	6	H	
" "	" "	3 4 46	..	...	20 0	....	2 26	7	R	
" "	" "	2 52 12	..	...	20 58.5	....	2 34 5	7	R	
" "	" "	2 38 14	..	...	21 54.5	....	2 12.6	4	R	
" "	" "	2 30 7	..	...	22 31 4	....	2 15.6	4	R	
" "	" "	2 23 6	..	...	23 4.4	....	2 13	5	R	
1823. Jan. 2	" "	6 7 29	−41	29.90	10 55.1	....	0 54.1	7	H	Fine clear weather.
" "	" "	5 41 38	..	...	11 43.0	....	0 59.4	7	H	
" "	" "	5 22 34	..	...	13 46.3	....	2 26.6	7	R	
" "	" "	5 7 53	..	...	14 22.6	....	2 35.8	7	R	
" "	" "	4 47 8	..	...	13 40.1	....	1 13.8	7	H	
" "	" "	4 31 24	..	...	14 31.5	....	1 30.3	7	H	
" "	" "	4 16 14	..	...	16 19.0	....	2 39.3	7	R	
" "	" "	4 4 6	..	...	17 16 2	....	3 5.1	7	R	
" "	" "	3 40 59	..	...	17 15.1	....	1 50	7	H	

Table I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″	′ ″	′ ″			
Jan. 2	Capella and Sirius	3 19 14	−43	29.86	18 34.4	....	1 50.2	7	F	Fine clear evening. Sirius shining brilliantly, with the prismatic colours.
„ „	„ „	3 29 51	..	...	17 21	....	1 11.8	7	F	
„ „	„ „	3 39 6	..	...	16 38.4	....	1 2.6	7	F	
„ „	„ „	3 49 18	..	...	15 49	....	0 41.6	9	F	
„ „	„ „	3 59 57	..	...	15 4.7	....	0 41.4	9	F	
„ 3	α Pol. and Arcturus	6 12 34	−44	29.84	11 34	....	1 37.3	7	H	Clear weather.
„ „	„ „	5 56 49	..	...	12 26.4	....	2 6.5	7	H	
„ „	„ „	5 39 51	..	...	12 38.9	....	1 49.1	7	R	
„ „	„ „	5 27 12	..	...	13 25.9	....	2 12.6	7	R	
„ „	„ „	5 1 45	..	...	14 18.5	....	2 19.3	7	H	
„ „	„ „	4 42 38	..	...	15 0.7	....	2 24.2	7	H	
„ „	„ „	4 25 21	..	...	16 1.6	....	2 41.6	7	R	
„ „	„ „	4 20 50	−43	...	13 12.5	0 18.4	....	10	Pr	
„ „	„ „	4 11 24	−44	...	16 53.8	....	2 55.0	7	R	
„ „	„ „	3 48 7	..	...	17 17.1	....	2 5.4	7	H	
„ „	„ „	3 29 45	..	...	18 0	....	1 52.5	7	H	
„ „	„ „	3 24 48	−43	...	17 12	....	0 49	10	Pr	
„ „	„ „	3 13 53	−44	...	19 22.9	....	2 17.1	7	R	
„ „	„ „	3 2 56	..	...	20 36.8	....	2 45.4	7	R	
„ „	„ „	2 44 48	..	...	20 17.1	....	1 6.0	4	H	
„ „	„ „	2 37 23	−43	...	19 35	0 19	....	5	Pr	
„ „	„ „	2 31 35	−44	...	21 13.4	....	0 54.8	4	H	
„ „	„ „	2 21 59	..	...	25 18.9	....	4 9.2	7	R	
„ „	„ „	2 13 23	..	...	27 6.9	....	5 7.4	7	R	
„ „	„ „	2 3 27	..	...	24 3.2	....	1 3.6	5	Pr	
„ „	„ „	1 48 26	..	...	31 3.8	....	6 23.4	7	R	
„ „	„ „	1 35 27	..	...	32 8.4	....	5 50	4	H	
„ „	„ „	1 27 34	..	...	34 33.4	....	7 4	4	R	
„ „	„ „	1 22 7	..	...	35 14.7	....	7 1.4	4	R	
„ „	„ „	1 17 36	..	...	36 9.9	....	6 57.2	5	R	

Table I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE		Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.			° ′ ″	°		′ ″	′ ″	′ ″			
Jan.	4	α Pol. and Arcturus	5 13 24	−41	29.75	12 52.4	....	1 22.9	5	H	Fine clear evening.
"	"	" "	4 59 57	..	...	13 49.4	....	1 53.6	5	H	
"	"	" "	4 46 22	..	...	14 27.4	....	2 3.2	5	H	
"	"	" "	4 33 27	..	...	14 54.8	....	1 59.4	7	R	
"	"	" "	3 18 41	..	...	19 56.0	....	3 14.0	7	R	
"	"	" "	3 7 29	..	...	20 48	....	3 23	7	R	
"	"	" "	2 48 18	..	...	21 7.5	....	2 27.9	7	H	
"	"	" "	2 31 44	..	...	22 21.1	....	2 13.8	7	H	
"	"	" "	2 11 53	..	...	25 44.4	....	3 45.0	7	R	
"	"	" "	2 2 9	..	...	26 59.4	....	4 4.3	7	R	
"	"	" "	1 48 25	..	...	28 45	....	4 20.4	5	R	
"	"	" "	1 38 46	..	...	29 54	....	4 20.9	5	R	
"	"	" "	1 31 15	..	...	31 15	....	4 31.1	5	R	
"	"	" "	1 25 7	..	...	32 17	....	4 47.2	6	R	
"	"	" "	1 17 45	..	...	33 30	....	4 55.2	7	R	
"	"	" "	1 11 35	..	...	35 38.9	....	6 0.8	7	R	
"	"	" "	1 5 22	..	...	37 14	....	6 41.7	7	R	
"	5	" "	4 9 40	−40	29.90	14 40	....	0 44.2	7	P	
"	"	" "	3 57 7	..	...	15 16	....	0 38.1	7	P	
"	"	" "	3 37 23	..	...	16 39	....	0 59.1	7	P	
"	"	" "	3 28 37	..	...	17 17	....	1 8.7	7	P	
"	"	" "	3 18 23	..	...	17 51	....	1 5.6	7	P	
"	"	" "	3 8 45	..	...	18 42	....	1 18.9	7	P	
"	"	" "	2 55 49	..	...	19 31	....	1 18.8	7	P	
"	"	" "	2 45 38	..	...	20 18	....	1 5.7	7	P	
"	19	Capella and Sirius	4 17 5	−19	29.67	13 16.6	....	0 21.7	11	F	
"	"	Sirius	4 22 8	..	...	13 0.0	...	0 18.5	1	F	Repeating circle on meridian.
"	20	α Pol. and Arcturus	1 15 59	−22	29.83	31 19.4	....	3 37.4	..	R	
"	"	" "	1 25 54	..	...	29 59.9	....	3 48.6	..	R	
"	"	" "	1 35 59	..	...	28 38.9	....	3 40.3	..	R	

TABLE I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″	′ ″	′ ″			
Jan. 20	α Pol. and Arcturus	1 46 34	−22	29.83	27 17	...	3 36.8	7	R	Fine clear weather.
„ „	„ „	1 58 24	..	...	26 4.5	....	3 43.9	7	R	
„ „	„ „	2 9 30	..	...	21 48.3	....	3 31.1	7	R	
„ „	„ „	0 50 53	.	...	38 7.7	....	6 20.4	7	R	
„ „	„ „	1 4 6	.	...	36 15.1	....	6 57.8	7	R	
„ „	„ „	1 17 0	..	...	34 7.1	....	6 16.9	7	R	
„ „	„ „	1 28 27	..	...	30 57.3	....	5 1.9	7	R	
„ „	„ „	1 42 4	..	...	28 44.2	....	4 29.3	7	R	
„ „	„ „	1 55 46	..	...	27 5.7	....	4 10.3	7	R	
„ „	„ „	1 54 0	−19	...	22 35.5	....	0 9.5	5	Pr	
„ „	„ „	2 8 58	−22	...	25 28	....	4 5.4	7	R	
„ „	„ „	2 4 54	−19	...	21 23.9	0 7	....	5	Pr	
„ „	„ „	2 16 58	..	...	28 58?	....	0 31.4	5	Fr	
„ „	„ „	2 20 53	−22	...	24 5	....	3 40.2	7	R	
„ „	„ „	2 27 49	−19	...	19 0.3	0 27.7	....	5	Pr	
„ „	„ „	2 28 30	...	...	19 51	....	0 18.4	5	Fr	
„ „	„ „	2 33 20	−22	...	22 39.6	....	3 18.4	7	R	
„ „	„ „	2 35 56	−19	...	18 52	0 4.7	....	5	Pr	
„ „	„ „	2 36 9	..	...	19 1	....	0 3.4	5	Fr	
„ „	„ „	2 43 17	−22	...	21 15.7	....	2 46 2	7	R	
„ „	„ „	2 54 57	..	..	20 18.6	...	2 30.9	7	R	
„ „	„ „	3 10 13	−19	...	15 3.9	0 52.5	....	5	Pr	
„ „	„ „	3 19 46	..	..	15 36.1	0 18.2	....	5	F	
„ „	„ „	3 25 45	..	...	14 54.1	0 37.6	....	5	Pr	
„ „	„ „	3 26 25	..	...	15 32.1	....	0 2.0	5	Fr	
„ 21	„ „	2 22 27	−16	29.80	20 26.5	....	0 40.3	5	Pr	Fine weather.
„ „	„ „	2 22 56	..	...	20 56	....	1 11.8	5	Fr	
„ „	„ „	2 34 31	..	...	19 29.8	....	0 26.8	5	Pr	
„ „	„ „	2 34 56	..	...	19 46	...	0 53.8	5	Fr	
„ „	„ „	2 50 28	..	...	17 18.5	....	0 17.1	5	Pr	

TABLE I.—ON THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″	′ ″	′ ″			
Jan. 21	α Pol. and Arcturus	2 59 31	−16	29.80	17 21	....	0 19.6	5	Fy	Clear weather.
„ „	Sirius and Capella	3 7 7	..	...	16 56.3	....	0 25.3	5	Pr	
„ „	„ „	3 7 4	..	...	16 53	....	0 21 7	5	Fy	
„ „	„ „	4 18 41	..	...	12 18.1	0 34.4	....	10	Pr	
„ „	„ „	4 6 53	..	...	12 42.4	0 38.6	....	10	Pr	
„ „	„ „	4 7 35	..	...	13 24.6	0 3.6	....	10	Fy	
„ 22	„ „	4 23 13	−24	29.95	12 40	0 20.2	....	10	Pr	
„ „	„ „	4 22 16	..	...	12 39.1	0 23.9	....	10	Pr	
„ 23	α Pol. and Arcturus	1 7 27	−33½	30.24	33 42.5	....	3 46.7	5	Pr	
„ „	„ „	1 14 23	..	...	33 15.5	....	4 11.8	5	P	
„ „	„ „	1 18 55	..	...	30 42.5	....	2 27.9	5	P	
„ „	„ „	1 26 37	..	...	29 1.5	....	1 51.7	5	P	
„ „	„ „	1 36 15	..	...	27 24.5	.. .	1 27.8	5	P	
„ „	„ „	1 42 9	..	...	26 5.5	....	0 58.7	5	P	
„ „	„ „	1 46 10	..	...	25 23.5	....	0 46.4	5	P	
„ „	„ „	1 56 42	..	...	24 29.5	....	0 47.2	5	P	
„ „	„ „	2 8 10	..	...	23 16.5	....	1 7.9	7	P	
„ „	„ „	2 23 8	..	...	21 25.1	....	0 36.3	7	P	
„ „	„ „	2 30 56	..	...	20 5.8	0 11.0	....	7	P	
„ „	„ „	2 42 55	..	...	18 21.9	0 52.6	....	7	P	
„ „	„ „	2 52 47	..	...	17 39.4	0 36.7	....	7	P	
„ „	„ „	3 1 26	..	...	17 9.4	0 38.9	....	7	P	
„ „	„ „	1 38 30	−35	...	30 26.7	....	4 33.9	7	R	
„ „	„ „	1 50 41	..	...	28 25	....	4 10.7	7	R	
„ „	Sirius and Capella	2 3 42	..	...	27 0	....	4 10.2	7	R	
„ „	„ „	2 18 13	.	...	24 58.5	....	3 36.4	7	R	
„ „	„ „	2 30 50	..	...	23 9.9	....	2 52.2	7	R	
„ „	„ „	2 41 59	..	...	21 44.3	....	2 21.0	7	R	
„ „	„ „	2 33 17	..	...	20 39.6	....	2 11.5	7	R	
„ „	„ „	3 4 53	..	...	19 47	....	2 7.1	7	R	

TABLE I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″	′ ″	′ ″			
Jan. 25	α Pol. and Arcturus	2 10 17	−23	30.43	23 11.6	....	1 34.1	5	P	
„ „	„ „	2 21 5	..	...	22 46.8	....	2 13.4	4	P	
„ „	„ „	3 12 48	..	...	16 48.4	....	0 7.1	5	P	
„ „	„ „	3 25 22	..	...	16 26.0	....	0 28.3	5	P	
„ „	„ „	3 35 18	..	...	15 42.7	....	0 13.1	7	P	
„ „	„ „	3 48 12	..	...	14 58.0	....	0 8.6	7	P	
„ „	„ „	3 58 43	..	29.75	14 35.9	....	0 26.8	7	P	
„ „	„ „	4 9 31	..	...	14 7	....	0 28.9	7	P	
„ „	„ „	4 23 11	.	...	13 28	....	0 17.7	7	P	
„ „	„ „	4 34 10	..	...	12 58	....	0 17.0	7	P	
„ „	„ „	4 44 13	..	...	12 29.1	....	0 6.2	7	P	
„ 29	Rigel. . . .	12 18 57	−14	29.29	4 49.3	....	0 0.7	1	F	Repeating circle on Meridian.
„ „	Sirius and Capella	4 22 33	..	...	11 57.2	0 39.1	....	10	P	
„ 30	„ „	4 21 34	−21	29.53	12 31.9	0 12.7	....	10	F	
„ 31	„ „	2 32 17	−21	29.82	19 23	....	0 26.1	10	Fy	
„ „	„ „	2 51 20	..	...	18 6.5	....	0 31.8	5	Pr	
„ „	„ „	3 1 52	..	...	17 11.0	....	0 22	5	Pr	
„ „	„ „	3 14 14	..	...	16 5	....	0 0.5	5	Fy	
„ „	„ „	3 21 9	..	...	15 40.8	0 14.6	....	1	F	Repeating circle East of Meridian.
„ „	„ „	3 24 12	..	...	15 51.1	....	0 22.1	5	Pr	
„ „	„ „	4 22 28	..	...	11 56.1	0 51.2	....	10	Pr	
„ „	„ „	4 22 23	..	...	12 55.4	....	0 3.9	..	F	Repeating circle on Meridian.
„ „	„ „	4 20 16	..	...	11 47	0 58.4	....	10	Fy	
Feb. 5	„ „	0 40 55	−10	30.26	35 42.6	....	3 11.8	2	Pr	
„ „	„ „	0 45 57	..	...	35 1.0	....	3 19.6	5	Fy	
„ „	„ „	1 2 54	..	...	29 38.5	....	0 31.6	5	B	
„ „	„ „	1 15 0	..	...	28 31.2	....	1 25.6	5	P	
„ „	„ „	1 23 6	..	...	25 57	....	0 5.8	5	Fy	
„ „	„ „	1 26 25	..	...	25 56.7	....	0 26.7	5	Pr	
„ „	„ „	1 43 18	..	...	23 30	....	0 3.2	5	Fy	

Table I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″	′ ″	′ ″			
Feb. 5	Capella and Sirius	1 31 47	−10	30.26	23 15	1 16	...	5	G	Clear weather.
„ „	„ „	1 43 18	..	...	23 30	....	0 3.2	5	Fy	
„ „	„ „	1 56 29	..	...	22 9.4	....	0 4.3	5	Pr	
„ „	„ „	1 57 12	..	...	20 47.5	1 21.3	....	5	B	
„ „	„ „	2 6 12	− 8	...	21 27.8	....	0 20.2	5	Pr	
„ 3	„ „	2 12 20	..	...	19 44.1	0 58.3	....	5	C	
„ „	„ „	2 19 54	..	...	20 8	....	0 7.2	5	Fy	
„ „	„ „	2 29 6	−10	...	18 6.5	1 8.6	....	5	B	
„ „	„ „	2 35 31.3	−13	...	18 1.3	0 51.6	....	5	F	Repeating circle, * in faint aurora.
„ „	„ „	2 43 53	−10	...	17 11.5	0 55.3	....	5	C	
„ „	„ „	3 7 44	− 8	...	16 19	0 7.8	....	10	Fy	
„ „	„ „	3 8 24	..	...	16 48.2	....	0 24.9	10	Pr	
„ „	„ „	3 10 36	−10	...	14 45.5	1 36.5	....	5	C	
„ „	„ „	3 16 35	−13	...	15 33.1	0 27.7	....	1	F	Repeating circle.
„ „	„ „	3 25 6	−10	...	14 22.5	1 5.5	....	5	B	
„ „	„ „	3 36 9	..	...	13 31.9	1 25.4	....	5	C	
„ „	„ „	3 44 48	..	...	13 35.5	0 54	....	5	B	
„ „	„ „	3 52 45	..	...	13 16.5	0 51.8	....	5	C	
„ „	„ „	4 10 42	− 8	...	13 18.5	....	0 8.1	10	P	
„ „	„ „	4 10 56.3	−13	...	13 24.3	....	0 10.3	1	F	Repeating circle.
„ „	„ „	4 22 50.3	..	...	12 48.7	....	0 2.6	1	F	Ditto, * in bright aurora.
„ 10	„ „	1 49 25	−30	30.17	26 13.5	....	2 13	7	R	
„ „	„ „	1 58 28	−29	...	25 13	....	2 22.4	6	Pr	
„ „	„ „	2 2 30	−30	...	24 55.2	....	2 19.9	7	R	
„ „	„ „	2 16 13	..	...	23 41	....	2 29	7	R	
„ „	„ „	2 20 6	−29	...	.....	....	1 25.5	7	Fy	
„ „	„ „	2 31 51	−30	...	21 56.8	....	2 2.1	7	R	
„ „	„ „	2 44 22	..	...	20 45.6	....	1 52.9	7	R	
„ „	„ „	2 59 18	..	...	19 43.9	....	1 57.7	7	R	
„ „	„ „	3 1 0	−29	...	18 24	....	0 46.7	7	Fy	

TABLE I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″	′ ″	′ ″			
Feb. 10	Capella and Sirius	3 3 7	−30	30.17	18 2.6	....	0 40.1	7	Pr	
„ „	„ „	3 8 58	..	...	18 40	....	1 32.2	7	R	
„ „	„ „	3 18 28	..	...	18 3.6	....	1 31.8	7	R	
„ „	„ „	3 28 10	..	...	17 35.2	....	1 38.2	7	R	
„ „	„ „	3 38 4	..	...	16 32	....	1 5.7	7	R	
„ „	„ „	3 42 47	..	...	15 27.3	....	0 23.3	7	Pr	
„ „	„ „	3 45 38	..	...	15 55.6	....	0 53.8	7	R	
„ „	„ „	3 51 56	..	...	15 24.2	....	0 37	7	R	
„ 16	„ „	2 35 5	−41	29.32	20 40.5	....	0 59.6	7	Pr	
„ „	„ „	2 41 35	..	...	18 24.4	0 44.2	....	7	Fy	
„ „	„ „	3 11 30	..	...	16 43.7	0 12.8	....	7	Pr	
„ „	„ „	3 11 41	..	...	16 57	....	0 1	7	Fy	
„ „	„ „	3 49 44	−45	...	15 1.8	....	0 5.5	1	F	{ Repeating circle (rather hazy).
„ „	„ „	4 0 19.5	..	...	14 56.5	....	0 43.2	1	F	Ditto.
„ „	„ „	4 9 8.2	..	...	14 43.2	....	0 54.6	1	F	Ditto.
„ „	„ „	4 9 59	−41	...	13 51.4	....	0 11.2	7	Pr	
„ „	„ „	4 19 42	−45	...	14 13.0	....	0 53.2	1	F	{ Repeating circle (on meridian).
„ 18	„ „	1 56 25	−34	29.73	24 53.6	....	1 46.8	7	Pr	
„ „	„ „	1 56 16	..	...	24 46	....	1 36.8	7	Fy	
„ „	„ „	2 32 13	..	...	20 53.3	....	1 6.8	7	Pr	
„ „	„ „	2 39 52	..	...	19 44	....	0 34.8	7	Fy	
„ „	„ „	3 3 45	..	...	17 30.4	....	0 13.5	7	Pr	
„ „	„ „	3 3 10	..	...	16 51.5	0 27.7	....	7	Fy	
„ „	„ „	3 19 16	−39	...	16 12.3	0 19.8	....	1	F	{ Rep. circle (rather hazy about star).
„ „	„ „	3 41 1	..	...	15 27	....	0 10.2	1	F	
„ 19	„ „	4 5 0	−34	...	14 29.8	....	0 37.1	7	Pr	
„ „	„ „	4 5 0	..	...	14 29	....	0 36.3	7	Fy	
„ 20	„ „	4 7 20	−39	...	13 58.1	....	0 4.2	1	F	Repeating circle
„ „	„ „	4 18 36	..	...	13 38.3	....	0 13.2	1	F	Ditto.
„ „	„ „	4 22 54	..	...	13 47.3	....	0 24 5	1	F	Ditto (on meridian).

Table I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1822.		° ′ ″	°		′ ″		′ ″			
Feb. 19	Capella and Sirius	1 57 18	−35	29.79	23 49.8	....	0 42.8	7	Pr	
" "	" "	1 57 21	..	...	24 1	....	0 53	7	Fy	
" "	" "	3 0 55	..	...	18 34.7	....	0 58.1	7	Pr	
" "	" "	3 0 49	..	..	18 32	....	0 55.2	7	Fy	
" "	" "	4 7 33	..	...	14 3.3	....	0 15.2	10	Pr	
" "	" "	4 7 16	..	...	13 45	0 7.3	....	10	Fy	
" 21	" "	3 1 13	−21	20.51	16 58.5	....	0 3.8	7	Pr	Clear weather.
" "	" "	3 1 28	..	...	17 1	....	0 7.0	7	Fy	
" "	" "	4 0 18	..	...	13 1.1	0 9.6	....	7	Pr	
" "	" "	4 10 29	..	...	13 12	....	0 1.3	7	Fy	
" "	Sirius. . . .	4 23 5	−23	...	13 9.2	....	0 26.4	1	F	Rep. circle (meridian observation).
" "	Rigel. . . .	12 18 8	..	29.05	4 57.3	....	0 1 6	1	F	Ditto ditto.
" 24	α Pol. and Arcturus	3 41 32	..	...	18 14.7	....	3 6 0	7	P	
" "	" "	3 44 17	..	...	13 20.4	....	0 57.4	7	P	
" "	" "	5 1 32	..	...	12 34.7	....	0 47.7	7	P	
" "	" "	5 14 57	..	...	4 31.1	....	0 13.3	7	P	
" "	" "	3 3 30	..	...	17 36.5	....	0 24	7	Pr	
" "	" "	3 3 1	..	...	17 14	....	0 0	7	F	
" "	" "	5 30 7	..	...	10 51.6	0 2.8	....	7	P	
" "	" "	5 43 33	..	...	10 12.0	0 39.3	....	7	P	
" "	" "	5 57 4	..	...	9 33.8	0 25 6	....	7	P	
" "	" "	3 48 2	..	...	14 47	0 1.3	....	5	Bd	
" "	" "	3 49 0	..	...	15 42.1	....	0 46.4	5	Rds	
" "	" "	4 9 22	..	...	14 0.6	....	0 13	7	Pr	
" "	" "	4 9 7	..	...	13 44	0 4	....	7	Fy	
" "	" "	4 21 59	..	...	13 34.8	....	0 17 9	1	F	Repeating circle (meridian observation). Light clouds and calm weather.
" "	" "	4 23 17	..	...	12 44.3	0 22.3	....	7	Bl	
" "	" "	4 24 21	..	...	13 58.4	....	0 48.8	7	Rds	
" "	Rigel. . . .	12 18 19	..	...	5 4.6	0 1.3	....	..	"	Rep. circle (meridian observation).
" 27	α Pol. and Arcturus	3 33 49	−40	30.00	16 37	....	0 38.8	5	P	

TABLE I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1828.		° ′ ″	°		′ ″	′ ″	′ ″			
Feb. 27	α Pol. and Arcturus	3 51 4	−40	30.00	15 53.1	....	1 48.6	7	P	Fine clear evening.
„ „	„ „	3 56 32	..	...	15 9.4	....	0 31.1	7	P	
„ „	„ „	4 8 14	..	...	14 25	....	0 23.8	7	P	
„ „	„ „	4 18 11	..	...	13 41	....	0 5.3	7	P	
„ „	„ „	4 28 21	..	...	13 6	0 5.8	....	7	P	
„ „	„ „	4 35 23	..	...	12 30.3	0 21.8	....	7	P	
„ „	„ „	4 45 56	..	...	11 54	0 37.7	....	7	P	
„ „	„ „	4 56 16	..	...	11 0.7	1 13.4	....	7	P	
„ „	Rigel	12 18 27	−43	...	5 9.5	0 2.8	....	1	F	Repeating circle (on meridian).
„ „	Sirius and Capella	3 0 49	−38	...	18 3.2	....	0 12.4	7	Pr	
„ „	„ „	3 41 54	..	...	16 54.5	....	1 30.3	7	Bd	
„ „	„ „	3 39 15	..	...	14 32.9	0 53.7	....	7	Rds	
„ „	„ „	4 5 38	..	...	14 28.2	....	0 23.9	7	Pr	
„ „	„ „	4 23 21	..	...	13 21.6	0 8.1	....	7	Bd	
„ „	„ „	4 22 51	..	...	13 20.4	....	0 0	7	Rds	
„ „	Sirius	4 23 31	..	...	14 10.7	....	0 41.1	1	F	Repeating circle (on meridinn).
„ 28	Sirius and Capella	3 32 28	−37	29.93	16 45	....	0 52.8	5	P	
„ „	„ „	3 1 47	−36	...	18 5.9	....	0 23.3	7	Pr	
„ „	„ „	3 2 13	..	...	18 29	....	0 49	7	Fy	
„ „	„ „	3 16 5	..	...	15 35.8	....	0 33.6	7	B	
„ „	„ „	3 46 10	..	...	15 54	....	0 49.8	7	Rds	
„ „	„ „	4 4 26	..	...	15 30	....	1 26.8	7	Fy	
„ „	„ „	4 3 51	..	...	14 53.2	....	0 49.3	7	Pr	
„ „	„ „	4 18 41	..	...	12 41.2	0 40.8	....	7	Bd	
„ „	„ „	4 18 27	..	...	13 2.3	0 23.0	...	7	Rds	
„ „	„ „	4 24 43	..	...	14 21.6	....	1 9.8	3	Rds	
Mar. 3	„ „	4 17 14	−36	30.02	13 40.9	....	0 10.6	7	Pr	
„ „	„ „	4 16 34	..	...	13 1.0	0 31.6	....	7	Fr	
„ „	„ „	4 20 43	..	...	13 37.7	....	0 16.1	7	Pr	
„ „	„ „	4 20 0	..	...	12 53.0	0 29.7	....	7	Fy	

Table I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″	′ ″	′ ″			
Mar. 3	Sirius and Capella	4 24 6	−36	30.00	13 23.2	. ..	0 21.5	7	$\mathrm{B^d}$	
„ „	„ „	4 23 24	..	...	13 5.2	0 10.6	....	6	$\mathrm{R^{ds}}$	
„ „	„ „	4 21 50	..	...	14 50.4	....	1 31 5	6	$\mathrm{R^{ds}}$	
„ „	„ „	4 21 25	..	...	14 25 9	....	1 5.2	7	$\mathrm{B^d}$	
„ 4	„ „	4 21 49	−35	30.10	12 57	0 4.1	....	7	$\mathrm{F^y}$	
„ „	„ „	4 22 38	..	..	13 43.7	....	0 25.3	7	$\mathrm{P^r}$	
„ „	„ „	4 22 59	..	...	12 54	0 3.9	....	7	$\mathrm{F^y}$	
(Feb.28)	„ „	2 20 30	−37	29.95	22 49	....	1 49	7	R	
„ „	„ „	2 31 54	..	...	20 5.8	....	1 0.7	7	R	
„ „	„ „	2 40 38	..	...	19 23	....	0 13	7	R	
Mar. 7	„ „	4 21 55	−27	30.11	13 4.6	0 1.6	....	7	$\mathrm{P^r}$	
„ „	„ „	4 21 38	..	...	12 50	0 17.3	....	7	$\mathrm{F^y}$	
„ „	„ „	4 23 14	..	...	13 8.6	....	0 4.9	7	$\mathrm{P^r}$	
„ „	„ „	4 22 37	..	...	12 30	0 35.3	....	7	$\mathrm{F^y}$	
„ „	„ „	4 21 41	..	...	13 9.6	....	0 1.8	7	$\mathrm{B^d}$	
„ „	„ „	4 20 23	−28	...	14 3.1	....	0 48.3	7	R	
„ „	„ „	4 17 19	..	...	13 2.1	0 20.3	....	10	C	
„ „	„ „	4 17 43	..	...	14 37.2	....	1 25.4	7	R	
„ „	„ „	4 14 52	..	...	15 10.2	....	1 42.4	7	R	
„ „	„ „	4 8 59	..	...	15 24.8	....	1 41.8	7	R	
„ „	„ „	4 3 37	..	...	15 47.3	....	1 49.3	7	R	
„ „	„ „	3 58 14	..	...	16 10.3	....	2 7.4	7	R	
„ „	„ „	3 49 18	..	...	14 15.7	0 31.3	....	7	C	
„ „	„ „	3 34 29	..	...	16 47.7	....	1 14.8	7	R	
„ „	„ „	3 26 26	..	...	17 6.6	....	1 10.9	7	R	
„ „	„ „	3 23 45	..	...	15 12 3	0 50.6	....	5	C	
„ „	„ „	3 15 51	..	...	17 26.1	....	0 50.3	7	R	
„ „	„ „	3 13 26	..	...	15 35.5	1 5.6	....	5	C	
„ „	„ „	3 6 40	..	...	17 54.3	....	0 45.8	7	R	
„ „	„ „	2 56 40	..	...	18 37	....	0 50	7	R	

Table I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″	′ ″	′ ″			
Mar. 7	Sirius and Capella	2 47 22	−28	30.11	18 0.9	0 38	....	5	C	
" "	" "	2 46 27	..	...	19 23.7	....	0 45.7	7	R	
" "	" "	2 38 15	..	...	19 48.6	0 29.5	....	5	C	
" "	" "	2 36 46	..	...	20 44.4	....	1 19.4	7	R	
" "	" "	2 23 46	..	...	21 41.7	....	1 15	7	R	
" "	" "	2 12 22	..	...	23 32	....	1 58.2	7	R	
" "	" "	2 0 0	..	...	25 14.2	....	2 31.8	7	R	
" "	" "	1 47 30	..	...	27 32.3	....	3 23.3	7	R	
" "	" "	1 18 5	..	...	31 25.3	....	3 24.4	7	R	
" 10	" "	4 22 51	−24	29.95	12 24	0 35.7	....	7	Pr	
" "	" "	4 22 37	..	...	12 20.6	0 35.8	....	7	Fy	
" "	" "	4 23 9	−27	...	13 16.7	....	0 18.9	1	F	{Rep. circle (meridian observation).
" "	" "	4 22 0	−24	...	13 53.2	....	0 54.3	7	Bd	
" "	" "	4 7 52	..	...	13 6.4	0 26.7	....	6	Pr	
" "	" "	4 7 26	..	...	12 38.2	0 57.7	...	6	Fy	
" "	" "	3 50 26	..	...	14 11.9	....	0 53.5	7	Bd	
" "	" "	2 59 46	−28	...	19 3.3	....	1 28.1	7	R	
" "	" "	2 45 28	..	...	19 27.6	....	0 48.6	7	R	
" "	" "	2 34 58	..	...	20 35.8	....	1 3.2	7	R	
" "	" "	2 22 23	..	...	21 45.6	....	1 17.2	7	R	
" "	" "	2 8 52	..	...	23 8	....	1 26.4	7	R	
" "	" "	1 55 53	..	...	24 58.7	....	1 54.1	7	R	
" "	" "	1 41 50	..	...	26 27.5	....	1 47.7	7	R	
" "	" "	1 27 43	..	...	28 1.2	....	1 27.2	7	R	
" "	" "	1 12 13	..	...	29 39	....	1 0	7	R	
" "	" "	0 58 49	..	...	32 4	....	1 18.6	7	R	
" "	" "	0 43 14	..	...	36 24.8	....	2 31.6	7	R	
" "	" "	0 29 25	..	...	40 29	....	3 54.2	7	R	
" 11	" "	4 13 50	−33	30.00	12 56.4	0 20.4	....	7	Pr	
" "	" "	4 13 23	..	...	12 29.6	0 56.3	...	7	Fy	

Table I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″	′ ″	′ ″			
Mar. 11	Sirius and Capella	4 5 53	−33	30.00	13 22.9	0 25.1	....	7	R^{d}	
„ „	„ „	4 5 35	..	...	13 35.2	0 18.7	....	6	R^{ds}	
„ „	„ „	3 53 49	..	...	14 46.9	....	0 17	7	P^{r}	
„ „	„ „	3 52 56	..	...	13 54	0 39.2	....	7	F^{y}	
„ „	„ „	3 33 33	..	...	16 32.7	....	1 3.1	7	R^{ds}	
„ „	„ „	3 31 54	..	...	14 54.2	0 39.4	....	7	B^{d}	
„ 12	„ „	4 6 17	−31	29.96	14 51.2	....	0 55	7	R	
„ „	„ „	4 3 23	..	...	15 40.6	....	1 42.5	7	R	
„ „	„ „	3 59 23	..	...	15 47.2	....	1 36.1	7	R	
„ „	„ „	3 39 27	..	...	17 41.2	....	2 20.1	7	R	
„ „	„ „	3 33 57	..	...	18 9	....	2 12.5	7	R	
„ „	„ „	3 25 55	..	...	18 24.8	....	2 5.3	7	R	
„ „	„ „	2 38 58	..	...	21 2.1	....	1 46.2	7	R	
„ „	„ „	2 30 48	..	...	21 59.2	....	2 4.1	7	R	
„ „	„ „	2 22 25	..	...	22 50.2	....	2 13.7	7	R	
„ „	„ „	1 39 28	..	...	27 43.3	....	2 39.7	7	R	
„ „	„ „	1 29 45	..	...	28 41	....	2 28.6	7	R	
„ „	„ „	1 20 7	..	...	30 53.5	....	3 7.1	7	R	
„ 18	„ „	4 9 3	−20	30.65	14 30.8	....	0 50	7	R	
„ „	„ „	4 4 7	..	. .	14 44.9	....	0 50.3	7	R	
„ „	„ „	3 58 49	..	...	14 58.6	....	0 49.4	7	R	
„ „	„ „	3 52 32	..	...	15 26.5	....	0 48.5	7	R	
„ „	„ „	3 45 29	..	...	15 56.8	....	1 1.8	7	R	
„ „	„ „	3 38 1	..	...	16 22.6	....	1 8	7	R	
„ „	„ „	3 28 56	..	...	16 51.8	....	1 5.6	7	R	
„ „	„ „	3 20 46	−24	...	17 16	....	0 53.6	1	F	Repeating circle.
„ „	„ „	3 20 4	20	...	17 19.7	....	1 0.2	7	R	
„ „	„ „	3 9 17	..	...	17 50.7	....	0 52.3	7	R	
„ „	„ „	3 7 34	−24	...	17 25.7	....	0 17.4	1	F	Repeating circle.
„ „	„ „	3 6 24	−17	...	17 5	....	0 14.2	7	P^{r}	

TABLE I.—OF THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″		′ ″			
Mar. 18	Sirius and Capella	2 54 56	−24	30.65	18 20.3	....	0 21.2	1	F	Repeating circle.
„ „	„ „	2 40 17	−17	...	19 2	....	0 13.8	7	B^{t}	
„ „	„ „	2 40 22	..	...	19 7.4	....	0 16.5	5	R^{ds}	
„ „	„ „	2 37 2	−20	...	20 31.8	....	1 8.4	7	R	
„ „	„ „	2 24 41	..	...	21 49.1	....	1 29.7	7	R	
„ „	„ „	2 11 28	..	...	22 24.3	....	0 56.3	7	R	
„ „	„ „	2 4 36	..	...	22 21.1	....	0 29.5	7	P^{r}	
„ „	„ „	1 58 19	..	...	23 38.4	....	0 54.6	7	R	
„ „	„ „	1 43 36	..	...	25 39.7	....	1 19.7	7	R	
„ „	„ „	1 35 50	−17	...	26 5	....	1 3.9	5	R^{ds}	
„ „	„ „	1 36 0	..	...	26 15	....	1 8.6	5	B^{d}	
„ „	„ „	1 28 54	..	...	26 54	....	0 42	7	R	
„ „	„ „	1 11 33	..	...	29 49.1	....	1 2	7	R	
„ „	„ „	1 9 24	..	...	31 11	....	2 30.7	4	P^{r}	
„ „	„ „	0 58 22	..	...	33 26.5	....	2 35.3	7	R	
„ „	„ „	0 56 41	..	...	35 47	....	3 11.5	2	R^{ds}	
„ „	„ „	0 45 33	..	...	37 23	....	4 12.5	7	R	
„ „	„ „	0 33 45	..	...	42 14	....	7 4.7	1	R^{ds}	
„ „	„ „	0 30 55	..	...	42 8	....	5 44.4	7	R	
„ (12)	„ „	4 18 44	−31	29.96	14 39.5	....	1 7.8	7	H	
„ „	„ „	4 11 19	..	...	15 22.8	....	1 45.2	7	H	
„ „	„ „	3 54 46	..	...	16 43.7	....	2 18.7	7	H	
„ „	„ „	3 49 45	..	...	17 3.4	....	2 15.2	7	H	
„ „	„ „	3 45 17	..	...	17 26.3	....	2 27.1	7	H	
„ „	„ „	3 4 38	..	...	19 31.8	....	2 16.3	7	H	
„ „	„ „	2 56 44	..	...	19 42.2	....	1 53.9	7	H	
„ „	„ „	2 49 16.5	..	...	19 58.5	....	1 29	7	H	
„ „	„ „	2 11 18	..	...	22 58.9	....	1 23.2	7	H	
„ „	„ „	2 2 57	..	...	23 49.6	....	1 24.2	7	H	
„ „	„ „	1 53 29	..	...	24 45.7	....	1 21.5	7	H	

TABLE I.—ON THE OBSERVED REFRACTIONS OF STARS, &c.—*continued.*

DATE	Stars observed	Apparent Altitude	Thermr. (Farht.)	Barom.	Observed Refraction	Tables in Excess	Tables in Defect	No. of Observations	Observer	REMARKS
1823.		° ′ ″	°		′ ″	′ ″	′ ″			
Mar. 12	Sirius and Capella	4 18 41	−36	29.93	12 41.2	0 40.8	....	7	Bd	
" "	" "	4 18 27	..	...	13 2.3	0 23.0	....	7	Rds	
" "	" "	4 24 43	..	...	14 21.6	....	1 9.8	3	Rds	

TABLE II.

CONTAINING the MEANS of the OBSERVATIONS of each OBSERVER; principally upon the Star SIRIUS, when or near the Meridian.

Observers	No. of Observations	No. of Nights of Observation	Thermometer	Barometer	Tables in Excess	Tables in Defect	Apparent Altitudes
			°		′ ″	′ ″	° ′ ″
Captain PARRY . . .	166	11	−36	29.95	....	0 26.3	4 34 46
Lieutenant PALMER	177	25	−27.5	29.88	0 4.3	....	4 14 29
Mr. HOOPER	41	4	−41.1	29.80	....	1 51.8	4 37 7
" ROSS	126	11	−39.6	29.72	....	1 22.5	4 20 25
" RICHARDS . . .	42	5	−35.3	29.97	....	0 22.5	4 20 10
" BIRD	56	7	−32	29.98	....	0 5.8	4 20 0
" FYFE	147	16	−29	29.86	0 13.4	....	4 20 52
" FISHER	42	4	−25.4	29.81	....	0 2.4	4 15 24

TABLE III.

CONTAINING the MEAN RESULTS from the OBSERVATIONS of all the OBSERVERS when taken Collectively.

Apparent Altitude	Thermometer	Barometer	Observed Refraction	Error of the Tables	No. of Observations
° ′ ″	°		° ′ ″	′ ″	
0 31 22	−21.7	30.40	0 41 37.1	Table in Defect 5 38.5	15
0 43 55	16.0	30.08	0 36 7.9	„ 3 27.3	16
0 56 9	21.7	30.26	0 34 21.3	„ 3 21.2	23
1 13 15	25.1	30.09	0 31 56.4	„ 3 28.1	100
1 29 11	27.9	30.07	0 29 27.1	„ 3 7.8	96
1 42 44	30.1	30.05	0 27 31.6	„ 2 52.2	104
1 55 47	28.2	30.00	0 24 41.2	„ 1 35.8	108
2 5 13	31.0	29.96	0 24 1.2	„ 1 47.3	110
2 14 35	31 2	30.03	0 23 20.8	„ 2 1.2	110
2 24 32	28.5	29.96	0 21 30.1	„ 1 13.5	120
2 34 41	29.9	29.92	0 20 38.2	„ 1 1.6	190
2 43 52	31.9	30.01	0 19 49.1	„ 0 51.9	117
2 55 0	30.4	29.90	0 18 54.5	„ 1 1.3	107
3 4 28	30.5	29.99	0 17 53.5	„ 0 35.9	254
3 15 44	31.0	29.92	0 16 55.9	„ 0 20.0	102
3 25 17	29.2	29.99	0 16 43.4	„ 0 45.6	126
3 35 57	29.5	30.02	0 15 59.4	„ 0 59.0	121
3 45 49	33.8	29.94	0 15 53.4	„ 0 49.3	154
3 55 7	31.2	30.03	0 14 58.7	„ 0 29.5	129
4 6 29	32.2	29.89	0 14 21.6	„ 0 29.3	256
4 15 25	32.4	29.90	0 14 1.1	„ 0 31.7	161
4 22 52	30.9	29.92	0 13 21.2	„ 0 11.8	274
4 44 14	35.0	29.87	0 13 0.1	„ 0 34.7	197
5 14 6	38.1	29.76	0 12 23.3	„ 0 55.8	166
5 46 11	36.9	29.75	0 11 5.9	„ 0 38.0	108
6 13 54	39.8	29.70	0 10 31.9	„ 0 42.9	89
6 41 14	41.9	29.65	0 10 17.3	„ 1 2.0	56
7 34 29	44.0	29.62	0 6 10.2	Table in Excess 0 4.2	61
10 19 23	24.7	29.82	0 5 42.5	„ 0 14.9	32

TABLE IV.

CONTAINING THE SOLAR REFRACTIONS AT LOW ALTITUDES AND TEMPERATURES.

NOTE.—Those Observations, with the mark I against them, were made by Lieutenant PALMER, with the Altitude Instrument by CAREY, at the height of about 9 or 10 feet above the ice on the Frozen Sea; and those marked RC, were made with the Repeating Circle by TROUGHTON, at the Observatory on Igloolik, by myself, at the height of 40 feet above the level of the Sea. Latitude 69° 21′ N.

DATE		Barom.	Therm.	Apparent Altitude	Observed Refraction	⊙'s Limb	Tables in		Instrument	REMARKS
1822.	Time of Day						Excess	Defect		
			°	° ′ ″	′ ″			′ ″		
Nov. 10	Noon	29.74	−12	3 29 5	15 12	L	.....	0 5	I	Clear weather.
„ 11	..	29.61	−27	3 14 25	17 18	..	.....	0 8	..	Rather hazy.
„ 13	..	29.85	−22	2 44 35	20 6	..	.....	1 44	..	„
„ 15	..	29.85	−15	2 14 15	21 38	..	.....	1 13	..	Clear weather.
„ 16	..	29.50	− 9½	2 1 45	23 41	..	.....	2 27	..	„
„ 18	..	29.91	14	1 34 5	25 34	..	.....	0 52	..	„
„ 22	..	29.57	28	0 49 55	35 58	..	.....	4 10	..	„
„ 23	..	29.79	32	0 41 25	43 12	..	.....	9 29	..	„
„ 25	..	29.62	32	0 26 45	49 52	..	.....	12 31	..	„
„ 28	..	29.50	−34	0 26 10	50 19	U	.....	12 48	..	„
„ 29	..	29.70	−28	0 22 30	57 2	..	.....	19 2	..	„
1823. Jan. 19	..	29.69	−10	1 3 4	31 21	..	.....	2 55	..	Hazy—Parhelion E. and W. of ⊙ 2 Observns.
„ „	..	...	−15	1 1 32.5	30 38.8	..	.....	1 35.8	RC	„ 1 Repn.
„ „	..	...	−10	0 37 26	38 17	L	.....	4 51	I	„ 2 Observns.
„ „	..	...	−15	0 35 6.4	36 15.3	..	.....	2 31	RC	„ 1 Repn.
„ „	P.M.	...	..	0 29 31.3	41 23.3	..	.....	6 23 7	..	„ 1 Repn.
„ „	..	..	..	0 21 49.5	42 47.5	..	.....	6 5.5	..	„ 1 Repn.
„ „	..	...	..	0 38 32	36 32	U	....	3 21	..	„ 1 Repn.
„ 20	A.M.	29.70	15	0 12 20	51 35	..	.....	13 36	I	Clear weather—Limbs jagged.
„ „	..	...	..	0 17 0	46 13	..	.....	8 23	..	„ „

TABLE IV.—CONTAINING THE SOLAR REFRACTIONS, &c.—*continued*.

DATE 1823.	DATE Time of Day	Barom.	Therm.	Apparent Altitude	Observed Refraction	☉'s Limb	Tables in Excess	Tables in Defect	Instrument	REMARKS
				° ′ ″	′ ″			′ ″		
Jan. 20	A.M.	29.70	−19	0 21 32.7	47 49	U	.....	10 48	RC	Hazy weather—Limbs jagged.
„ „	..	...	−15	0 26 20	44 35	..	.....	8 3	I	Clear „
„ „	..	...	..	0 10 22	51 17	L	.....	11 50	..	„ „
„ „	..	...	..	0 13 22	49 1	..	.....	10 18	..	„ „
„ „	..	...	−19	0 15 15	48 7	..	.....	9 35	RC	„ „
„ „	..	...	−15	0 17 42	46 33	..	.....	8 54	I	„ „
„ „	..	...	..	0 24 22	46 34	..	.....	10 27	..	„ „
„ „	..	...	..	0 30 42	40 10	L	.....	5 28	..	Clear weather—Limbs well def[d].
„ „	..	...	−19	0 30 21	39 47	..	.....	4 42	RC	Rather hazy.
„ „	..	...	15	0 57 40	31 59	U	.....	2 19	I	Clear.
„ „	..	...	..	0 38 42	37 39	L	.....	4 28	..	„
„ „	..	...	..	1 6 20	30 18	U	.....	1 55	..	„
„ „	..	...	..	0 45 2	36 57	L	.....	4 58	..	„
„ „	Noon	29.76	..	1 13 28	29 1	U	.....	1 39	..	„ (2 Observ[ns].)
„ „	..	...	−19	1 13 35	29 40	..	.....	2 5	RC	„ (2 Rep[ns].) .. {Therm. in ☉ − 19°.
„ „	..	...	−15	0 48 6	36 13	L	.....	4 52	I	„ (2 Observ[ns].)
„ „	..	...	−19	0 45 6	35 2	..	.....	2 50	RC	„ (2 Rep[ns].)
„ 21	A.M	29.85	18	0 48 1.4	35 57.4	U	.....	4 23.4	..	Much haze—☉ much distorted.
„ „	.	...	..	0 53 26.4	34 20.4	.	.....	3 43.4	..	„ „
„ „	..	...	..	1 8 7	31 21	..	.....	3 2.5	..	„ „
„ „	Noon	29.84	−16¾	0 56 40.2	32 58.2	L	.....	2 53.4	..	Clear—Limbs tolerably defined.
„ „	..	...	..	1 24 58	27 47	U	.....	1 57	..	„ „
„ „	..	...	−18	0 57 21	32 40	L	.....	2 43	I	„ „
„ „	..	...	..	1 25 17	28 2	U	.....	2 3	..	„ „
„ 22	A.M.	29.78	−18	0 55 34.5	32 52.9	U	.....	2 41.6	RC	Limbs tolb[ly]. def[d]. {Therm. in ☉ − 16½°.
„ „	Noon	29.79	−17	1 7 54	29 47	L	.....	1 29.5	..	„
„ „	..	...	..	1 36 20	25 50.4	U	.....	1 24.7	..	„
„ „	..	...	..	1 9 2	30 32	L	.....	2 22	I	„
„ „	..	...	..	1 37 20	26 18	U	.....	1 55	..	„
„ „	P.M.	...	..	0 48 22	35 48	L	.....	4 10	..	„

Table IV.—CONTAINING THE SOLAR REFRACTIONS, &c.—*continued.*

DATE		Barom.	Therm.	Apparent Altitude	Observed Refraction	☉'s Limb	Tables in		Instrument	REMARKS
1823.	Time of Day						Excess	Defect		
Jan. 22	P.M.	29.79	−17	0 40 22	0 37 25	L	.....	4 21	I	Limbs well def^d.—Clear w^r.
,, ,,	..	...	..	1 2 10	0 31 39	U	.....	2 27	..	,,
,, ,,	..	...	..	0 32 2	0 41 28	L	.....	6 37	..	Limbs much distort^d.–Cl^r. w^r.
,, ,,	..	...	..	0 51 0	0 35 9	U	....	4 5	..	,,
,, ,,	..	...	..	0 22 52	0 47 58	L	.....	11 9	..	,,
,, ,,	..	...	..	0 39 0	0 38 36	U	.....	5 14	..	,,
,, ,,	..	...	..	0 11 2	0 56 41	L	.....	17 3	..	,,
,, ,,	..	...	..	0 22 50	0 44 49	U	.....	8 6	..	,,
,, ,,	..	...	..	0 22 40	0 51 18	U	.....	14 0	..	,,
,, ,,	..	...	..	0 19 20	0 58 54	U	.....	21 22	..	,,
,, 23	A.M.	30.11	−28	0 8 40	1 21 19	..	.....	39 21	..	Fine clear weather—Limbs much distorted.
,, ,,	..	...	..	0 10 40	1 13 23	..	.....	32 0	..	,,
,, ,,	..	...	..	0 15 0	1 3 2	..	.....	22 51	..	,,
,, ,,	..	...	..	0 22 0	0 59 55	..	.....	21 24	..	Fine clear weather—Limbs tolerably defined.
,, ,,	..	...	−29	0 19 34	0 49 42.5	..	.....	10 41.5	RC	☉ much dis^d, LL nearly flat.
,, ,,	..	...	−28	0 26 40	0 55 29	..	.....	18 6	I	Limbs tolerably defined.
,, ,,	..	...	..	0 30 0	0 47 22	..	.....	15 46	..	,,
,, ,,	..	...	..	0 19 42	1 5 34	L	.....	26 32	..	,,
,, ,,	..	...	..	0 20 22	0 59 49	..	.....	20 53	..	,,
,, ,,	..	...	−29	0 16 18.3	0 53 55.8	..	.....	14 11.8	RC	Much distorted. (1 Rep^n.)
,, ,,	..	...	−28	0 41 30	0 42 50	U	.....	8 30	I	Limbs tolerably defined.
,, ,,	..	...	..	0 28 22	0 54 22	L	.....	17 22	..	,,
,, ,,	..	...	..	0 56 40	0 36 53	U	.....	5 37	..	,,
,, ,,	..	...	..	0 40 2	0 44 33	L	.....	10 6	..	,,
,, ,,	..	...	..	1 8 20	0 32 40	U	.....	3 31	..	,,
,, ,,	..	...	..	0 50 2	0 39 47	L	.....	7 21	..	,,
,, ,,	..	...	..	1 19 20	0 30 19	U	.....	2 36	..	,,
,, ,,	..	...	..	0 59 32	0 36 42	L	.....	6 3	..	,,
,, ,,	..	...	..	1 29 20	0 28 54	U	.....	2 35	..	,,
,, ,,	..	...	..	1 9 42	0 34 48	L	.....	5 38	..	,,

TABLE IV.—CONTAINING THE SOLAR REFRACTIONS, &c.—continued.

DATE 1823.	Time of Day	Barom.	Therm.	Apparent Altitude	Observed Refraction	☉'s Limb	Tables in Excess	Tables in Defect	Instrument	REMARKS
			°	° ′ ″	° ′ ″			′ ″		
Jan. 23	A.M.	30.11	−28	1 38 52	0 27 55	U	.....	2 54	I	Clear wr.—Limbs tolbly defd.
„ „	Noon	30.12	..	1 50 50	0 25 57	..	.....	2 16	..	„
„ „	..	...	..	1 22 42	0 30 21	L	.....	3 6	..	„
„ „	..	...	−29	1 22 38	0 31 33	..	.....	4 20.2	RC	„ (2 Repns.)
„ „	..	...	..	1 50 28.3	0 26 12	U	.....	2 31	..	„ ditto.
„ 24	A.M.	30.32	−28	1 10 40	0 32 55	..	.....	4 24	I	„ Limbs well defd.
„ „	.	...	..	1 19 40	0 31 8	..	.....	3 57	..	„ „
„ „	..	...	..	1 2 2	0 36 4	L	.....	6 17	..	„ „
„ „	..	...	..	1 33 10	0 29 5	U	.....	4 5	..	„ „
„ „	..	...	..	1 12 52	0 31 54	L	.....	3 44	..	„ „
„ „	..	...	..	1 45 0	0 26 53	U	.....	3 0	..	„ „
„ „	..	...	..	1 22 2	0 31 14	L	.....	4 17	..	„ „
„ „	..	...	..	1 52 40	0 25 16	U	.....	2 13	..	„ „
„ „	Noon	30.33	..	2 3 13	0 24 7	..	.....	2 8	..	„ Therm. in ☉ −26°.
„ „	.	...	..	1 34 54	0 28 20	L	.....	3 10	..	„ „
„ „	..	...	−30	2 2 38.5	0 23 29.3	U	.....	0 44.5	RC	„ „
„ „	..	...	..	1 33 17	0 27 25	L	.....	1 22.2	..	„ „
„ 25	A.M.	30.37	..	0 12 20	1 2 53	U	.....	22 37	I	Fine wr.—Limbs well defd.
„ „	..	...	..	0 18 40	0 56 19	U	.....	17 34	..	„ „
„ „	..	...	..	0 20 20	0 50 46	..	.....	13 46	..	„ „
„ „	..	...	..	0 17 2	1 0 19	L	.....	21 11	..	„ „
„ „	..	...	..	0 39 0	0 40 20	U	.....	7 17	..	„ „
„ „	..	...	..	0 24 22	0 48 10	L	.....	10 51	..	„ „
„ „	..	...	..	0 56 50	0 31 1	U	.....	4 5	..	„ „
„ „	..	...	..	0 39 32	0 42 2	L	.....	8 4	..	„ „
„ „	..	...	..	2 22 20	0 21 18	☾	.....	1 12	..	The moon below the Pole near the Meridian.
„ „	..	...	..	2 20 20	0 20 47	..	.....	0 32	..	Upper limb well defd.—Eq. Parallax cord for Ellipy $\frac{1}{312}$.
„ „	..	...	..	2 19 20	0 21 18	..	.....	0 59	..	
„ „	..	...	..	2 18 20	0 21 17	..	.....	0 54	..	
„ „	..	...	..	2 17 40	0 21 28	..	.....	0 54	..	

TABLE IV.—CONTAINING THE SOLAR REFRACTIONS, &c.—*continued.*

DATE 1823.	Time of Day	Barom.	Therm.	Apparent Altitude	Observed Refraction	☉'s Limb	Tables in Excess	Tables in Defect	Instrument	REMARKS
			°	° ′ ″	′ ″		′ ″	′ ″		
Jan. 25	..	30.37	−30	2 17 20	21 40	☾	.....	1 6	I	The moon below the pole near the meridian.
„ „	..	...	..	2 16 50	21 30	..	.....	0 54	..	„
„ „	..	...	..	2 17 0	21 50	..	.....	1 14	..	„
„ „	..	..	..	1 46 22	21 15	☾	.....	0 32	..	Hazy about moon's lower limb.
„ „	..	...	..	1 47 22	21 59	..	.....	1 35	..	„
„ „	..	...	..	1 48 2	25 22	..	.....	1 37	.	„
„ „	..	...	..	1 48 52	25 44	..	.....	2 2	..	„
„ „	..	...	..	1 49 22	25 42	..	.....	2 23	..	„
„ „	Noon	...	−28	2 15 9	21 30	U	.....	0 45	..	Rather hazy about ☉—2 Ob[s].
„ „	..	...	..	1 46 36	25 29	L	.....	2 48	..	„
„ „	..	...	..	2 15 4.5	21 45.2	U	.....	0 50.9	RC	Hazy and foggy.
„ „	..	...	..	1 45 11.4	24 27.7	L	.....	0 29.4	..	„
„ 26	..	30.52	−17½	2 2 39.3	27 1.3	..	.....	4 58.1	..	Calm and cloudy.—Thermometer rose 14° last 6 hours.
„ 31	A.M.	29.68	−19	0 18 42	46 21	..	....	8 31	I	Fine clear w[r].—Limbs well def[d].
„ „	..	...	..	0 35 2	37 59	..	.....	3 43	..	„
„ „	..	...	..	1 12 20	30 1	U	.....	2 12	..	„
„ „	..	...	..	0 54 42	32 10	L	.....	1 46	..	„
„ „	..	...	..	1 50 50	23 17	U	.....	0 24	..	„
„ „	..	...	..	1 35 52	25 14	L	.....	1 34	..	„
„ „	..	...	..	2 15 20	21 9	U	.....	0 42	..	„
„ „	..	...	−20	1 54 33.8	23 8.8	L	.....	0 42.8	RC	Hazy w[r].—Parhelion E. of ☉
„ „	..	...	−19	2 1 52	22 14	..	.....	0 26	I	„
„ „	..	...	..	2 14 7	20 58	..	.....	0 29.2	RC	„
„ „	..	...	..	2 50 40	18 34	U	.....	0 53	I	„
„ „	..	...	−18½	2 36 36.4	18 33.4	L	0 18	.....	RC	„
„ „	..	...	−18	2 55 8.9	17 33.3	..	.....	0 15.5	..	„
„ „	Noon	...	−17¾	3 11 5	15 55	..	0 19.1	.....	..	„
„ „	..	...	−16¾	3 42 2.9	14 12	U	0 18.6	.....	..	„
„ „	..	...	−19	3 12 32	16 57	L	.....	0 39	I	(2 Observ[ns].)
„ „	..	...	..	3 43 45	15 40	U	.....	1 6	..	„

TABLE IV.—CONTAINING THE SOLAR REFRACTIONS, &c.—*continued.*

DATE 1823.	Time of Day	Barom.	Therm.	Apparent Altitude	Observed Refraction	☉'s Limb	Tables in Excess	Tables in Defect	Instrument	REMARKS
			°	° ′ ″	′ ″		′ ″	′ ″		
Feb. 1	Noon	30.16	−16	3 58 27.6	14 4.0	U	.....	0 13.2	RC	2 Repns.—Rather cloudy.
„ „	..	...	..	3 27 7.6	15 38	L	.....	0 10.7	..	„ „
„ „	..	...	−10	3 59 25	14 29	U	.....	0 45	I	3 Observns. „
„ „	..	...	..	3 28 1	15 35	L	.....	0 13	..	„ „
„ 5	A.M.	30.39	− 5	0 40 2	36 52	L	.....	4 20	..	Clear wr.—Limbs well defined.
„ „	..	...	..	1 5 42	31 9	L	.....	2 57	..	„ „
„ „	..	...	..	1 49 40	24 26	U	.....	1 38	..	„ „
„ „	..	...	..	1 34 12	24 39	L	.....	0 14	..	„ „
„ „	..	...	..	2 17 20	20 33	U	.....	0 21	..	„ „
„ „	..	...	..	2 11 42	20 58	L	.....	0 25	..	„ „
„ „	..	...	..	3 3 40	17 14	U	.....	0 35	..	„ „
„ „	Noon	30.33	− 2	5 6 58	11 40	..	.....	0 35	..	„ „ 3 Observns.
„ „	..	...	..	4 35 25	12 35	L	.....	0 30	..	„ „ „
„ „	..	...	+ 1	5 5 33.5	11 6.4	U	.....	0 6.7	RC	2 Repns.—Calm and cloudy.
„ „	..	...	..	4 34 10.9	11 53.0	L	0 6.8	.....	..	„ „
„ 6	..	30.06	− 9	4 50 41	11 32.9	..	0 5.8	.....	..	„ Cloudy.
„ 10	..	30.12	− 9	6 38 6.2	9 12.3	U	.....	0 20.0	..	Fine and clear.—Limbs well defined.—3 Repetitions.
„ „	..	...	..	6 5 39.9	9 33.3	L	.....	0 0.4	..	„ „
„ 16	P.M.	29.32	−43	6 16 29.6	9 31.6	L	0 8.8	.....	.	„ Therm. in ☉ 21°.
„ „	..	...	..	5 52 18.3	10 12.3	..	0 7.8	.....	..	„ „
„ „	..	...	..	5 11 3.4	11 43.4	..	.....	0 14.3	..	„ Therm. in ☉ 26°.
„ „	..	...	..	4 42 36.1	12 50	..	.....	0 23.5	..	„ Therm. in ☉ 33°.
„ 17	A.M.	29.40	−39	6 51 40.5	9 1.9	..	.....	0 8.8	..	Hazy.—Parhel. E. and W. of ☉.—Therm. in ☉ 34°.
„ „	Noon	29.42	−38	8 24 59.5	7 39.3	..	.....	0 19.5	..	Brilliant Parhelia E. and W. of ☉.—5 Repetitions.
„ 18	A.M.	29.67	−27	0 12 22	53 0	..	.....	12 52	..	Fine clear weather.
„ „	..	...	..	0 29 52	42 52	..	.....	6 56	..	„
„ „	..	...	..	0 51 12	35 53	..	.....	4 15	.	„
„ „	..	...	..	1 15 22	30 49	..	.....	2 57	..	„
„ „	..	...	..	2 16 52	22 35	..	.....	1 56	..	„
„ „	..	...	..	3 23 22	16 55	..	.....	1 5	..	„

Table IV.—CONTAINING THE SOLAR REFRACTIONS, &c.—*continued.*

DATE 1823.	Time of Day	Barom.	Therm.	Apparent Altitude	Observed Refraction	⊙'s Limb	Tables in Excess	Tables in Defect	Instrument	REMARKS
			°	° ′ ″	′ ″			′ ″		
Feb. 18	Noon	29.67	−29	8 45 21	7 16.8	L	....	9 18.0	RC	6 Rep^{ns}.—Therm. in ⊙ −19°.
„ (18)	A.M.	29.92	−18	0 22 32	47 1	L	....	10 6	I	Fine clear weather.
„ „	..	...	..	0 38 2	38 59	L	....	5 24	..	„
„ „	..	...	..	0 59 22	32 48	..	....	3 12	..	„
„ „	..	...	..	1 28 42	27 28	..	....	1 59	..	„
„ „	..	...	..	2 14 2	21 32	..	....	0 58	..	„
„ „	..	..	..	2 41 52	18 30	..	....	0 5	..	„
„ „	..	...	..	3 21 22	16 5	..	....	0 17	..	„
„ 19	..	29.80	−40	0 16 9	59 52	..	....	18 55	..	„
„ „	..	...	..	0 51 0	40 12	U	....	7 19	..	„
„ „	..	...	..	0 37 12	47 4	L	....	11 14	..	„
„ „	..	...	..	0 51 2	38 33	L	....	5 40	..	„
„ „	..	...	..	1 36 20	28 8	U	....	2 12	..	Note.—Distant objects on the
„ „	..	...	..	1 37 22	29 22	L	....	3 32	..	N. and SE. points of the
„ „	..	...	−43	1 46 3	26 24.3	..	....	1 33.8	RC	horizon appeared very much
„ „	..	...	−40	2 33 0	21 32	U	....	1 32	I	distorted by refraction at
„ „	..	...	−43	2 18 3	22 8.1	L	....	0 43.4	RC	noon.
„ „	..	...	−40	2 31 2	21 20	..	...	1 23	I	
„ „	..	...	−43	3 24 5.9	16 54.9	U	....	0 34.8	RC	
„ „	..	...	..	3 19 15.9	17 0.9	L	....	0 18.4	..	
„ „	..	...	−40	3 40 42	16 31	L	....	1 13	I	
„ „	Noon	...	−38½	9 30 0.5	6 58.3	U	....	0 29.0	RC	5 Rep^{ns}.—Limbs well def^{d}.—Therm. in ⊙ −28°.
„ 20	..	29.64	−27½	9 27 46	7 22.4	L	....	0 13.4	..	5 Rep^{ns}.—Limbs well def^{d}.—Therm. in ⊙ −23°.
„ 21	..	29.50	−19	9 48 44.4	6 21.4	..	....	0 14.6	..	6 Rep^{ns}.—Fine weath^{r}.—Halo round ⊙.
„ 22	..	29.48	−13	10 10 17	5 56.0	..	....	0 6.0	..	5 Rep^{ns}.—Clear weather.
„ 23	..	29.67	−23	10 31 50	5 53.2	..	....	0 7.2	..	7 Rep^{ns}.—Clear weather.—Therm. in ⊙ −19°.
„ 24	..	29.79	−27	10 53 39	5 50.7	..	....	0 12.7	..	6 Rep^{ns}.—Fine weather.—Therm. in ⊙ −16°.
„ 25	..	29.83	−27½	11 26 26	5 49.6	..	....	0 22.3	..	6 Rep^{ns}.—Rather hazy.—Therm. in ⊙ −22°.
„ 26	..	29.46	−19	11 38 24	5 20.0	..	...	0 9.9	..	7 Rep^{ns}.—Thick weath^{r}. with much drift snow.—Halo round ⊙.—Th. in ⊙ −18½°.
„ 27	..	29.91	−30	13 0 22	5 20.5	..	....	0 18.3	..	7 Rep^{ns}.—Fine clear weath^{r}.—Therm. in ⊙ −27°.

TABLE IV.—CONTAINING THE SOLAR REFRACTIONS, &c.—*continued.*

DATE		Barom.	Therm.	Apparent Altitude	Observed Refraction	$\odot$'s Limb	Tables in		Instrument	REMARKS
1823.	Time of Day						Excess	Defect		
			°	° ′ ″	′ ″		′ ″	′ ″		
Feb. 28	Noon	29.98	−35	12 22 59	5 14.5	L	....	0 10.2	RC	8 Rep^{ns}.—Limbs well defined.—Therm. in $\odot$ −31°.
Mar. 1	..	29.73	−36	13 18 1	5 2.1	U	....	0 20.6	..	8 Rep^{ns}.—Limbs well defined.—Therm. in $\odot$ −32°.
„ 2	..	29.70	−35	13 8 0	4 54.5	L	....	0 10.0	..	8 Rep^{ns}.—Halo round $\odot$.—Therm. in $\odot$ −34°.
„ 3	..	29.92	−33	14 3 27	4 41.5	U	....	0 15.4	..	7 Rep^{ns}.—Fine clear weather.—Therm. in $\odot$ −24°.
„ 4	..	30.10	−37	13 53 44	4 45.1	L	....	0 12.5	..	8 Rep^{ns}.—Fine clear weather.—Therm. in $\odot$ −24°.
„ 10	..	29.81	−21	16 12 27	3 48.1	..	....	0 3.3	..	6 Rep^{ns}.—Hazy, but limbs tolb^{ly} defined.—Therm. in $\odot$ −16°.
„ 12	..	29.96	−22	17 32 19	3 41.9	U	....	0 13.9	.	7 Rep^{ns}.—Calm fine day.—$\odot$'s limbs tremulous and undulat^{g}. Therm. in $\odot$ $\begin{cases} -8° \\ -15° \end{cases}$
„ 13	.	29.90	−16	17 23 4	3 29.6	L	....	0 2.1	..	6 Rep^{ns}.—Clear weath^{r}.—Limbs well def^{d}.—Ther. in $\odot$ $\begin{cases} +3° \\ -8° \end{cases}$
„ 14	..	29.72	−10	18 19 9	3 26.2	U	....	0 13.0	..	6 Rep^{ns}.—Clear weath^{r}.—Limbs well def^{d}.—Ther. in $\odot$ +18°.
„ 15	..	29.98	−14	18 10 16	3 15.7	L	0 2.0	....	.	6 Rep^{ns}.—Hazy & cloudy—Lb^{s}. tolb^{ly} def^{d}.—Ther. in $\odot$ −5°.
„ 16	..	30.50	−23	19 6 20	3 29.2	U	....	0 12 7	..	6 Rep^{ns}.—Clear weath^{r}—Limbs well def^{d}.—Ther. in $\odot$ −10.
„ 17	..	30.77	−17	18 57 40	3 15.7	L	....	0 1.0	..	6 Rep^{ns}.—Hazy—Limbs well def^{d}.—Ther. in $\odot$ −14°.
„ 18	..	30.72	−18	19 53 27	3 21.2	U	.. .	0 16.5	..	6 Rep^{ns}.—Fine w^{r}.—Limbs well def^{d}.—Th. in $\odot$ very variable.
„ 19	..	30.38	− 6	19 41 51	3 1.4	L	...	0 0.4	..	6 Rep^{ns}.—Fine clear w^{r}.—Th. in $\odot$ sheltered from wind +44½°.
„ 20	..	30.10	− 7	20 40 30	3 1.7	U	...	0 12.9	..	6 Rep^{ns}.—Clear weath^{r}.—Ther. in $\odot$ very variable.
„ 21	..	30.06	− 4	20 30 58	2 59.3	L	....	0 0	..	6 Rep^{ns}.—Clear weath^{r}.—Ther. in $\odot$ +12°.
„ 22	..	30.00	− 2	21 28 13	2 54.3	U	...	0 12.9	..	6 Rep^{ns}.—Cl^{r}. weather . . Th. in $\odot$ $\begin{cases} +4° \\ +38° \end{cases}$
„ 24	..	30.00	− 6	21 42 48	2 37.7	L	...	0 0.2	..	5 Rep^{ns}.—Clear weath^{r}.—Ther. in $\odot$ +10.
„ 26	..	29.90	− 6	23 1 37	2 30.1	U	...	0 5.3	..	6 Rep^{ns}.—Calm hazy w^{r}.—Lbs. tolb^{ly} def^{d}.—Thr. in $\odot$ +12°.
„ 28	..	30.00	−13	23 48 9	2 30.1	U	.. .	0 7.9	..	4 Rep^{ns}.—Fine weath^{r}.—Limbs well defined.
„ 29	..	29.94	−13	24 12 4.5	2 31.7	..	....	0 8.2	..	6 Rep^{ns}.—Fine weath^{r}.—Limbs well defined.
„ 30	..	30.08	−11	24 35 54	2 25.2	..	....	0 2.8	..	5 Rep^{ns}.—Fine weath^{r}.—Limbs well defined.
May 30	Midn^{t}.	30.13	+12	1 18 56	25 5.8	L	....	0 4.3	..	3 Rep^{ns}.—Fine cl^{r} w^{r}.—Limbs undulating but well defined.
June 2	..	30.31	+16	1 41 31	22 32.3	..	....	0 15.1	..	4 Rep^{ns}—Clear weath^{r}.—Ther. +13° on the sea ice.
„ 23	..	30.33	+33	2 48 29.5	16 6.9	..	....	0 2.2	..	3 Rep^{ns}.—Fine clear weather.

TABLE V.

CONTAINING the OBSERVATIONS of the MERIDIAN ALTITUDES of STARS, by Lieutenant PALMER, with the Altitude Instrument by CAREY, made to determine the Sum of the Index and Collimation Errors in this Instrument (by which the Refraction of the Sun at Low Altitudes was determined by him, as given in Table II.) by the Comparison of the Observed Meridian Altitude, corrected for Refraction with the true Altitude of the Star, computed from the North Polar distance and Latitude of the Station.

DATE	Barom.	Therm.	Star	Compared Alt.	Observed Alt.	Error	REMARKS
		°		° ′ ″	° ′ ″	′ + ″	
1822. Nov. 27	29.55	−27	α Pegasi..	34 56 30	34 46 40	9 50	Middle of horiz[l]. wire.
″ " 28	29.77	−30	....	....	34 46 40	9 50	"
″ " 29	29.93	−20	....	....	34 47 0	9 30	"
" Dec. 30	29.76	−38	....	34 56 33	34 46 50	9 43	"
" " "	29.73	....	Rigel...	12 19 49	12 9 50	9 59	"
" " "	29.73	....	α Orionis .	28 3 33	27 53 40	9 53	"
" " 31	29.95	−40	α Pegasi..	34 56 31	34 46 40	9 51	"
" " "	.....	−41	Rigel...	12 19 53	12 10 20	9 33	"
" " "	.....	−41	α Orionis .	28 3 35	27 54 0	9 35	"
1823. Jan. 3	30.00	−43	α Pegasi..	34 56 31	34 47 0	9 31	Lower part of wire.
" " 4	29.97	−40	....	....	34 46 20	10 11	Upper do.
" " 23	30.45	−32	α Orionis .	28 3 32	27 54 12	9 20	Lower do.
" " "	.....	....	....	....	27 53 10	10 22	Upper do.

The Mean Error by these Observations is $+9' 47''$, which has been applied to the Observed Altitudes taken with this Instrument.

TABLE VI.

CONTAINING the OBSERVATIONS made with the REPEATING CIRCLE to determine the Latitude of the Observatory at Igloolik by Meridian Observations of Stars above and below the Pole, by which the Refraction of the Sun and Stars were determined at Low Altitudes, by a comparison of the Observed with the Computed Meridian Zenith Distances.

DATE		Therm.	No. of Repetitions	Star Observed	Latitude	REMARKS
		°			° ′ ″	
1823.	Jan. 23	−32	4	Aldebaran	69 20 46.7	Hazy.—✱ tremulous.
„	„ 24	−30	4	....	69 21 10.2	Clear weather.
„	„ 25	−22	6	....	69 20 51.1	„
„	„ 29	−14	3	Rigel...	69 21 1.1	„
„	„ 30	−20	4	Aldebaran	69 20 58.9	Hazy.
„	„ 31	−23	6	....	69 21 8.6	„
„	Feb. 21	−23	4	Rigel...	69 21 0.3	Clear weather.
„	„ „	−23	5	α Orionis..	69 20 57.6	„
„	„ 23	−33	5	....	69 20 58.8	„
„	„ 24	−37	4	....	69 20 59.6	„
„	„ „	−37	4	Rigel...	69 21 3.1	„
„	„ 25	−37	4	α Orionis..	69 21 3.3	Rather hazy.
„	„ 27	−43	6	....	69 21 0.2	Clear weather.
„	„ „	−43	6	Rigel...	69 21 2.8	„
„	Mar. 1	−40	5	α Orionis.	69 21 9.5	Much wind and drift snow.
„	„ „	−40	6	α Lyræ ...	69 21 9.2	„ „
„	„ 3	−43	8	....	69 21 0.3	Clear weather.
„	„ 7	−29	9	....	69 21 6.4	„
„	„ 10	−27	8	Procyon.	69 20 54.2	„
„	„ 18	−24	8	....	69 20 51.4	„
„	„ 29	−23	5	Regulus.	69 20 59.7	„

The Mean of these Observations give 69° 21′ 0″.62 N. for the Latitude of the Observatory.

TABLE VII.

CONTAINING an **ABSTRACT** of the **LATITUDES** of the **OBSERVATORY** at **IGLOOLIK**, by different Stars observed with the Repeating Circle.

Name of Stars	No. of Observations	Latitude	REMARKS
		° ′ ″	
Aldebaran.......	5	69 20 59.1	Above the Pole.
Rigel...........	4	69 21 2.1	„ „
α Orion......	6	69 21 1.5	„ „
Lyræ	3	69 21 0.2	Below the Pole.
Regulus.........	1		Above „
Procyon.........	2		Below „
Sun.............	3 U L 3 L L	69 20 59.5	Summer Sol. Declinations, per *Nautical Almanack.*
do.............	do.	69 20 56.5	do. do. per *French* do.

TABLE VIII.

CONTAINING the **MERIDIAN OBSERVATIONS** with the Star Sirius with the Repeating Circle to determine the Refraction; the height of the Instrument above the Level of the Frozen Sea being 40 feet.

DATE	Therm.	Barom.	Apparent Altitude	Observed Refraction	Tables in Defect	REMARKS
1823.	°		° ′ ″	′ ″	′ ″	
Jan. 19	−19	29.67	4 23 7.7	13 0.0	0 18.5	Fine moderate eveng.—Star in faint Aurora.
„ 31	−23	29.62	4 22 23.2	12 54.9	0 3.4	Clear weather.
Feb. 5	−13	30.26	4 22 50.3	12 48.2	0 2.1	Star in bright Aurora.—Clear weather.
„ 16	−45	29.32	4 19 42.5	14 13.0	0 53.2	Moderate evening.—Rather hazy about star.
„ 18	−39	29.73	4 18 36.3	13 38.3	0 13.2	do.
„ „	−39	29.73	4 22 53.6	13 46.8	0 24.0	do.
„ 21	−23	29.50	4 23 5.2	13 6.7	0 23.9	Fine weather.
„ 24	−37	29.82	4 21 39.3	13 34.3	0 17.4	Fine calm weather with light clouds.
„ 27	−43	30.20	4 23 30.6	14 10.2	0 40.6	Fine moderate weather.
Mar. 10	−27	29.95	4 23 8.9	13 16.2	0 16.4	Clear weather.

TABLE IX.

Containing the OBSERVATIONS upon the Star SIRIUS, made to the *Eastward* and *Westward* of the Meridian, with the REPEATING CIRCLE; arranged according to the Apparent Altitudes.

Apparent Altitude.	Observed Refraction.	Barometer.	Thermometer.	Tables in		REMARKS.
° ′ ″	′ ″		°		′ ″	
2 35 31.3	18 01.3	30.26	−13	Excess	0 51.6	Star E. of the Meridian.
3 16 35.1	15 33.1	30.26	−13	„	0 27.7	„ „
3 19 16.3	16 12.3	29.73	−39	„	0 19.8	„ „
3 21 08.8	15 40.8	29.82	−23	„	0 14.6	„ „
3 41 10	15 27	29.73	−39	Defect	0 10.2	„ „
3 49 43.8	15 01.8	29.32	−45	„	0 05.5	„ „
4 00 19.5	14 56.5	29.32	−45	„	0 43.2	„ „
4 07 20.1	13 58.1	29.73	−39	„	0 04.2	„ „
4 09 08.2	14 33.2	29.32	−45	„	0 54.6	„ „
4 10 56.3	13 24.3	30.26	−13	„	0 10.3	„ „
4 22 55.1	13 01.60	29.84	−21	„	0 10.36	Star on the Meridian (5 ob.)
4 21 20.5	13 52.52	29.76	−40.6	„	0 21.50	„ „ (5 obser.)
3 20 46	17 16	30.65	−24	„	0 53.6	Star W. of the Meridian.
3 07 33.7	17 25.7	30.65	−24	„	0 17.4	„ „
2 54 56.3	18 20.3	30.65	−24	„	0 24.2	„ „

NOTE.—The meridian observations of this star (Table VIII.) all give the tables in defect; but when the same star was observed at different azimuths, the refraction of the tables was in excess or defect, according as the star was to the eastward or westward of the meridian, as is shewn by the above table.

The star when observed in the direction of S.E. or thereabouts, was generally seen through a light haze or fog, arising from the exhalations from the sea, which was more or less open during the whole of the winter in that direction. Towards the S. and S.W. it was generally clear, as there was land covered with snow in those directions.

TABLES X. AND XI.

Containing the DIFFERENCE between the OBSERVED REFRACTION of the Star RIGEL from the TABLES, and also that of the Sun at about the same Altitude, in order to shew the difference between the Refractions of each.

TABLE X.——ERRORS of the TABULAR REFRACTION by the STAR RIGEL.

DATE.	Barometer.	Thermometer.	Apparent Altitude.	Tables in	REMARKS.
1823.	°		° ′	″	
January 29	−14	29.29	12 19	Excess 0.7	3 Repetitions. Fine Weather.
February 21	−23	29.50	. . .	Defect 0.2	4 ,, ,,
,, 24	−37	29.82	. . .	Excess 2.6	4 ,, ,,
,, 27	−43	30.00	. . .	,, 2.3	6 ,, ,,

TABLE XI.——ERRORS of the TABULAR REFRACTION by the SUN.

DATE.	Thermometer.	Barometer.	Apparent Altitude.	Tables in	REMARKS.
1823.	°		° ′	″	
February 24	−27	29.79	10 54	Defect 12.7	L.L. 6 Rep. Fine clear weather.
,, 25	−37	29.83	11 16	,, 15.5	L.L. 6 ,, ,,
,, 26	−19	29.46	11 38	,, 9.9	L.L. 7 ,, ,,
,, 27	−30	29.94	12 00	,, 18.5	L.L. 7 ,, ,,
,, 28	−35	29.98	12 23	,, 10.2	L.L. 8 ,, ,,
March 1	−36	29.73	13 8	,, 20.6	U.L. 8 ,, ,,
,, 2	−35	29.70	13 08	,, 10.0	L.L. 8 ,, ,,
,, 3	−33	29.92	14 03	,, 15.4	U.L. 7 ,, ,,
,, 4	−37	30.10	13 54	,, 12.5	L.L. 8 ,, ,,
,, 10	−21	29.81	16 12	,, 3.3	L.L. 6 ,, ,,
,, 12	−22	29.96	17 32	,, 13.9	U.L. 7 ,, ,,

TABLE XII.

Containing the MEANS of the RESULTS of the OBSERVATIONS of Lieutenant Palmer, to determine the SOLAR REFRACTION, with the Altitude Instrument by Carey.

Apparent Altitude.	Thermometer.	Barometer.	Observed Refraction.	Error of the Tables.	REMARKS.
° ′ ″	°		° ′ ″	′ ″	
0 10 11	— 22	29 92	1 5 40	Tables in defect 25 7	4 Obser. 2 U.L. 2 L.L.
0 13 31	— 24.5	29 89	0 55 43	,, 15 39	4 ,, 2 U.L. 2 L.L.
0 16 41	— 21.5	29 97	0 54 2.2	,, 15 5	4 ,, 2 U.L. 2 L.L.
0 17 55	— 25.4	29 89	0 55 54	,, 16 52	7 ,, 3 U.L. 4 L.L.
0 22 44	— 22.6	29 94	0 51 24	,, 13 49	8 ,, 3 U.L. 5 L.L.
0 27 33	— 27.7	29 90	0 49 27	,, 12 31	8 ,, 5 U.L. 3 L.L.
0 36 39	— 21.1	29 89	0 40 21	,, 5 50	10 ,, 2 U.L. 8 L.L.
0 44 12	— 20.4	29 90	0 38 52	,, 6 7	10 ,, 9 U.L. 1 L.L.
0 54 42	— 25 7	30 00	0 35 19	,, 4 3	12 ,, 5 U.L. 7 L.L.
1 5 48	— 18.5	30 00	0 32 19	,, 3 23	8 ,, 4 U.L. 4 L.L.
1 14 49	— 24.7	30 02	0 30 53	,, 2 42	8 ,, 4 U.L. 4 L.L.
1 25 37	— 24.0	30 06	0 29 12	,, 2 40	5 ,, 2 U.L. 3 L.L.
1 35 47	— 24.3	30 01	0 27 12	,, 2 3	9 ,, 4 U.L. 5 L.L.
1 47 5	— 20.4	30 36	0 25 36	,, 1 47	3 ,, 2 U.L. 1 L.L.
1 51 27	— 25.0	30 04	0 24 4	,, 1 9	3 ,, 3 U.L.
2 2 17	— 18.8	29 83	0 23 21	,, 1 32	3 ,, 1 U.L. 2 L.L.
2 15 1	— 16.7	30 04	0 21 24	,, 0 49	7 ,, 3 U.L. 4 L.L.
2 38 22	— 30.0	29 84	0 20 22	,, 1 5	4 ,, 1 U.L. 3 L.L.
2 57 10	— 12.0	30 03	0 17 54	,, 0 47	2 ,, 2 L.L.
3 8 28	— 23.0	29 64	0 17 8	,, 0 29	2 ,, 2 L.L.
3 25 28	— 16.7	29 87	0 15 57	,, 0 27	4 ,, 4 L.L.
3 42 13	— 29.5	29 74	0 16 7	,, 1 8	2 ,, 1 U.L. 1 L.L.
3 59 25	— 10.0	30 16	0 14 29	,, 0 50	1 ,, 1 U.L.
4 51 11	— 2.0	30 39	0 12 7	,, 0 32	2 ,, 1 U.L. 1 L.L.

Note.—Observations with this Instrument were not extended to Altitudes greater than about five degrees; the Observations at higher Altitudes were confined to Meridian Observation with the Repeating Circle.

TABLE XIII.

TERRESTRIAL

DATE.	Time of Day.	Barometer.	Thermometer in Shade.	Height above the Sea.	Observed Elevation or Depression of the Horizon.	Tabular Dip.	Tabular Dip in	SITUATION.
1821.	H.		°	Feet.	′ ″	′ ″		
July 17	10 A.M.	29.93	+40	3	Elev. 5 27.5	1 39	Exc^{ts}. 7 06.5	In ice, Hudson's Str^{ts}.
„ „	„ „	. . .	. .	5	„ 5 30.8	2 08	„ 7 38.8	„ „
„ „	11 „	. . .	+41	86.5	„ 1 49.7	8 52	„ 10 41.7	„ „
„ „	11½ „	. .	. .	103	„ 4 46.7	9 42	„ 14 28.7	„ „
„ 20	Noon.	29.90	+45	14	„ 2 49	3 34	„ 6 23	„ „
Aug. 2	Noon.	29.70	+39	14	Depr. 0 27	3 34	„ 3 7	„ „
„ 3	Noon.	29.80	+35	15	„ 2 34	3 42	„ 1 8	„ „
„ 5	Noon.	30.14	+41	14	„ 3 56	3 34	Def^{t}. 0 22	In ice, {Lat. 65° 27 N / Lon. 81 24 W.

XIII.

REFRACTINOS.

REMARKS, &c.

By four observations with circular transit; the alt. of the N.E. part of the horizon being 5′ 25″, and towards S.E., 5′ 30.″

By four observations with the dip sector, towards N.E. and S.W. parts of horizon.

Ditto Ditto Ditto Taken from the fore-top of the Fury.

Ditto Ditto Ditto Fore-top gallant-mast head.

The thermometer in ⊙ at noon this day, stood as high as 81° on board, but when suspended from a pole perfectly detached, at + 60°. The day calm and cloudless; objects upon the horizon were much distorted by refraction, causing the ice to assume a great variety of shapes, but generally of innumerable perpendicular columns, so that the ships appeared surrounded by a distant wall of ice, making the distant horizon to appear at an elevation instead of a depression, as the observations shew. From the mast-head the appearance of the ice was very singular, for besides the distant horizon having so great an elevation, yet the ice at about a mile distance from the ships, appeared considerably depressed, causing the surface of the ice to be concave, gradually sloping down from the ships, and becoming elevated as it approached the horizon. The ships were closely beset with ice, and no water in sight.

By a mean between the observations of Captain Parry and Mr. Bushnan, on the ice with false horizon, the apparent altitude of the ⊙'s L.L. was 48° 46′ 47″ close by the ship's side; at the same time the same limb of the sun was observed by myself from the ship's gangway to be 48° 43′ 58″ above the visible horizon, (which was a close and well-defined line of ice.) The thermometer freely suspended in the ⊙ + 74° Fahrenheit.

In the same way as the above.

In the same way as the above. A dark "sea blink" upon the horizon under the ⊙, and some open water between horizon and ship. The horizon was not distorted in the usual way, but was a well-defined line of ice all round.

Observed with artificial horizon upon the ice by myself and Mr. Hooper from the ship's deck. No appearance of extraordinary refraction. Some little open water in sight.

TABLE XIII.——TERRESTRIAL

DATE.	Time of Day.	Barometer.	Thermometer in the Shade.	Height above the Sea.	Observed Elevation or Depression of the Horizon.	Tabular Dip.	Tabular Dip in	SITUATION.
1821.			°	Feet.	′ ″	′ ″	′ ″	
Aug. 6	Noon.	. . .	. .	14	Depr. 1 42	3 14	Exc^{ss}. 1 52	Off Southamp. Island.
1822.	h.							
Mar. 22	2 P.M.	29 85	− 9	18	,, 7 54.2	4 3	Def^{t}. 3 51.2	At the Observatory, Winter Island.
,, ,,	,, ,,	. . .	. .	. .	,, 8 1.1	4 3	,, 3 58.1	,, ,,
,, 23	$0\frac{2}{3}$,,	29 98	−13	14	,, 8 29.0	3 34	,, 4 55	,, ,,
,, ,,	$3\frac{1}{4}$,,	29 99	. .	. .	,, 7 33.0	3 34	,, 3 59	,, ,,
,, 25	$0\frac{2}{3}$,,	30 27	−17	. .	,, 8 39.5	. .	,, 5 5.5	,, ,,
,, ,,	$2\frac{1}{4}$,,	30 29	. .	. .	,, 5 51.3	. .	,, 2 17.3	,, ,,
,, ,,	3 ,,	30 29	. .	. .	,, 16 40.0	. .	,, 13 6	,, ,,
,, ,,	$4\frac{3}{4}$,,	30 31	. .	. .	,, 15 40.0	. .	,, 12 6	,, ,,
,, 26	1 ,,	30 34	− 2	. .	Elev. 2 4.0	. .	Exc^{ss}. 5 38	,, ,,
,, ,,	$2\frac{1}{4}$,,	30 38	. .	. .	Depr. 5 3	. .	Def^{t}. 1 29	,, ,,
,, 30	1 ,,	29 26	+ 8	14	,, 2 53	. .	Exc^{ss}. 0 41	,, ,,
,, ,,	,, ,,	. . .	. .	. .	,, 2 23	. .	,, 1 11	,, ,,
,, ,,	$2\frac{1}{2}$,,	29 33	+ 7	. .	,, 1 19	. .	,, 2 15	,, ,,
,, ,,	,, ,,	. . .	. .	. .	,, 2 25	. .	,, 1 9	,, ,,

REFRACTIONS—*continued.*

REMARKS, &c.

By a comparison of the apparent altitude of the ⊙'s limb by Captain Parry, on the ice with artificial horizon, with the observed altitude of the same limb above the *ice horizon*, observed from the ship's gangway by myself. Ships closely beset with ice, but no particular appearance of refraction.

By comparing the mean of six altitudes of the ⊙'s lower limb over the visible sea horizon, with the mean of six simultaneous observations by Lieutenant Palmer with artificial horizon. The horizon a well-defined line of ice, and no open water in sight; the ⊙ bright and horizon free from haze; therm. exposed to ⊙ – 14° Fahrenheit.

By the same method as before. Six altitudes over the ice horizon by Lieutenant Palmer, and six altitudes with the artificial horizon. Light breezes from W.N.W. and clear.

By a comparison of the computed, with the observed altitude of the ⊙'s LL. The horizon a tolerably well-defined line of ice; the ⊙ bright and weather clear; thermometer in ⊙ + $3\frac{1}{2}$°; light breezes N.W.

By the same method as above; a mean of five observations; thermometer in ⊙ — $3\frac{1}{2}$°.

Ditto.	Ditto.	Thermometer in ⊙ — 7°; horizon free from haze.
Ditto.	Ditto.	No water in sight.
Ditto.	Ditto.	Clear weather; no haze upon horizon.
Ditto.	Ditto.	

By the same method as above. A white fog-bank upon the horizon, extending about 10° in altitude; but the horizon well-defined, the fog probably denoting the presence of open water a little beyond the extent of the visible horizon, although none in sight. Thermometer in ⊙ + 3°.

Cloudy weather, but horizon tolerably defined. Thermometer in ⊙ + 2°.

Lieutenant Palmer, with artificial horizon, compared with my own altitudes of the ⊙'s L.L. over the ice horizon which was well defined; three observations each; clear weather and much open water between the horizon and place of observation. Thermometer in ⊙ + 7°.

Lieut. Palmer over the ice horizon, and myself with artificial horizon as above; much open water.

Ditto. Stiff breeze, with much snow drift.

Lieutenant Palmer with artificial horizon, and myself over sea horizon, which was faint and distant.

TABLE XIII.—TERRESTRIAL

DATE.	Time of Day.	Barometer.	Thermometer in Shade.	Height above the Sea.	Observed Elevation or Depression of the Horizon.	Tabular Dip.	Tabular Dip in	SITUATION.
1822.	H.		°		′ ″	′ ″	′ ″	
April 1	1 P.M.	29.05	− 3	..	Depr. 19 52	. .	Def^{t}. 16 18	At the Observatory, Winter Island.
" "	" "	. . .	. .	..	" 21 12	. .	" 17 38	"
" "	" "	. . .	. .	..	" . . .	. .	" . . .	"
" "	5 "	29.07	− 6	..	" 16 24	. .	" 12 50	"
" "	" "	. . .	. .	..	" 15 34	. .	" 12 0	"
" 9	2½ "	29.68	+ 8	14	" 1 21	3 34	Exce^{ss} 2 13	"
" "	" "	. . .	. .	..	" 0 1	. .	" 3 33	"
" "	" "	. . .	. .	..	" . . .	. .	" . . .	"
" 16	9¾ A.M.	29.64	+24	80	" 8 34	8 32	Def^{t}. 0 2	From a hill on Winter Island.
" "	0¾ P.M.	29.62	+25	..	" 7 52	. .	Exce^{ss} 0 40	"
" "	4 57′ "	29.58	+22	..	" 7 37	. .	" 0 55	"
" 17	10 A.M.	29.51	+13	..	" 7 59	. .	" 0 33	"
" "	1 P.M.	29.58	+24	..	" 12 49	. .	Def^{t}. 4 17	"
" 18	9¾ A.M.	29.69	+20	..	" 7 18	. .	Exce^{ss} 1 14	"
" "	1 P.M.	29.72	+23	..	" 15 15	. .	Def^{t}. 6 43	"
" "	5½ "	29.76	+27	..	" 7 46	. .	Exce^{ss} 0 46	"
" 19	9¾ A.M.	29.67	+17	..	" 9 13	. .	Def^{t}. 0 41	"
" "	1 P.M.	29.73	+33½	..	" 8 27	. .	Exce^{ss} 0 5	"

REFRACTIONS—*continued.*

REMARKS, &c.

Lieutenant Palmer over sea horizon, compared with my own, with artificial horizon, three observations.

My own observations over sea horizon, compared with Lieut. Palmer's, with artificial horizon, do.

A white vapour over the horizon which was tolerably defined; no water in sight; the sun bright, and weather clear and fine.

Altitudes by Lieut. Palmer over the sea horizon, compared with my own, with the artificial horizon.

Ditto. Ditto. Ditto.

A considerable quantity of open water seen, but none between the horizon (which was a well-defined line of ice,) and place of observation. Weather, moderate and cloudy; light breezes from S.W.

By a comparison of the observations of Lieut. Palmer, with those made with the artificial horizon, by myself.

Ditto. With artificial horizon, and my own over the sea.

The horizon jagged with ice; ⊙ bright and clear; no haze on the horizon nor water in sight. Thermometer in ⊙ + 8°.

By a mean of five altitudes of the ⊙'s lower limb over the ice horizon, and compared with the computed. Fine calm morning; horizon distinct and well-defined; very little water in sight.

White flying clouds with fresh breeze from W. and fine weather; much open water between the horizon and place of observation. Thermometer in ⊙ + 34°.

In the same way as the above; horizon rather hazy but well-defined; no open water; the land appeared much refracted, although these observations agree with the tables nearly.

In the same way as the above; much haze upon the horizon, but tolerably distinct; no water in sight. Thermometer in ⊙ + 34°.

In the same way; much water in sight, particularly under ⊙.

Ditto. Cloudy weather, and some haze upon the horizon, and a little open water, but none under ⊙.

A considerable quantity of water in the direction of the ⊙. Hazy, thick, cloudy weather.

Fine clear weather, and a little open water in sight.

Cloudy with small light snow at times; some open water, but none under ⊙.

Warm fine day; thermometer + 65° in ⊙; cloudy at times. Distant land appeared much distorted by refraction, although the observed dip agrees nearly with the tables. A little water under ⊙.

Table XIII.—Terrestrial

DATE.	Time of Day.	Barometer.	Thermometer in Shade.	Height above the Sea.	Observed Elevation or Depression of the Horizon.	Tabular Dip.	Tabular Dip in	SITUATION.
1822.	h.		°	Feet.	′ ″	′ ″	′ ″	
Apr. 19	5 P.M.	29.71	$+12\frac{1}{2}$	80	Depr. 6 13	8 32	Exces. 2 19	From a hill on Wint. Is.
May 10	$10\frac{1}{4}$ A.M.	29.72	+33	..	„ 9 5	. .	Deft. 0 33	„ „
„ „	5 49′ P.M.	29.76	+39	..	„ 12 54	. .	„ 4 22	„ „
„ 13	10 A.M.	29.87	+27	..	„ 9 12	. .	„ 0 40	„ „
„ 14	$9\frac{3}{4}$ „	29.81	+44	..	„ 9 28	. .	„ 0 56	„ „
„ „	$5\frac{3}{4}$ P.M.	29.75	+36	..	„ 12 17	. .	„ 3 45	„ „
„ 22	10 A.M.	29.92	+40	22	„ 3 59.6	4 28	Exces. 0 28.4	Observy. Winter Island.
„ „	„ „	. . .	. .	..	„ 4 29	. .	Deft. 0 1	„ „
„ 31	9 „	29.84	+32	80	„ 9 37	8 32	„ 1 5	From the hill as before.
„ „	3 P.M.	29.94	+40	..	„ 6 0	. .	Exces. 2 32	„ „
June 3	3 „	29.82	+43	..	„ 8 21	. .	„ 0 11	„ „
„ 4	9 A.M.	29.70	+35	..	„ 8 43	. .	Deft. 0 12	„ „
„ „	9 22′ „	. . .	. .	..	„ 8 4	. .	Exces. 0 28	„ „
„ 6	3 P.M.	29.70	+40	..	„ 8 54	. .	Deft. 0 22	„ „
„ 7	9 A.M.	29.65	+45	..	„ 9 5	. .	„ 0 35	„ „
„ „	9 4′ „	. . .	. .	..	„ 9 26	. .	„ 0 54	„ „
„ 8	9 „	29.52	+27	..	„ 8 38	. .	„ 0 6	„ „
„ „	9 4′ „	. . .	. .	..	„ 8 26	. .	Exces. 0 6	„ „
„ „	3 P.M.	29.55	+32	..	„ 5 46	. .	„ 2 46	„ „
„ „	$3\frac{1}{6}$ „	. . .	. .	..	„ 6 0	. .	„ 2 32	„ „
„ 9	9 A.M.	29.60	+26	..	„ 10 22	. .	Deft. 1 50	„ „
„ „	10 „	. . .	. .	$17\frac{1}{2}$	„ 2 38	4 0	Exces. 1 22	From the Hecla's deck.
„ „	Noon.	29.63	+29	..	„ 3 19	. .	„ 0 41	„ „
„ „	3 P.M.	. . .	+32	80	„ 6 45	8 32	„ 1 47	From the hill.

REFRACTIONS—*continued.*

REMARKS, &c.
Cloudy weather; a little open water under ⊙.
A little open water; horizon distinct and well-defined.
Ditto, but none under ⊙.
No open water; clear weather and horizon well-defined. Thermometer exposed to ⊙ + 50°.
Hazy weather; a light fog bank upon the horizon. No open water.
Fine clear weather; a white fog upon the horizon. Ditto.
Cloudy weather; horizon well-defined; a little open water. Observations made on the N. W. part of the horizon.
Ditto. Observation made on the N.E. part of horizon. The above two observations were taken with the repeating circle.
Fine clear weather. Light breezes from W.
Ditto. Ditto.
Much open water. Light breezes from S.W. and hazy.
Ditto. Moderate breezes from N. and cloudy.
Ditto. Ditto.
A little open water. Fine clear weather; light winds from N.W., and cloudy.
Ditto. Light breezes from N., and clear weather.
Ditto. Ditto.
Much open water. Moderate breezes from N.W. and cloudy.
Ditto. Ditto.
Ditto. Cloudy weather. Fresh breezes from W.
Ditto. Ditto. Ditto.
Ditto. Fine clear weather; fresh breezes from N.
Much open water; but an ice horizon under ⊙. Fresh breezes from N. and fine.
Ditto. Ditto. Moderate breezes from N. and cloudy.
Ditto. Ditto. Ditto.

TABLE XIII.—TERRESTRIAL

DATE.	Time of Day.	Barometer.	Thermometer in Shade.	Height above the Sea.	Observed Elevation or Depression of the Horizon.	Tabular Dip.	Tabular Dip in	SITUATION.
1822.	H.		°		′ ″	′ ″	′ ″	
June 9	3⅓ P.M.	29 63	+32	17½	Depres. 2 29	4 0	Excess 1 31	From the Hecla's deck.
„ 10	9 A.M.	29 95	+29	80	„ 8 51	8 32	Defect 0 19	From the hill.
„ „	10 „	. . .	. .	17½	„ 4 0	4 0	„ 0 0	From the Hecla.
„ „	Noon.	30 00	+34	. .	„ 2 20	. .	Excess 1 40	„ „
„ 11	9 A.M.	29 84	+32	80	„ 7 16	8 32	„ 1 16	From the hill.
„ „	10 „	29 81	+36	17½	„ 3 9	4 0	„ 0 51	From the Hecla.
„ „	Noon.	29 80	+41	. .	„ 2 29	. .	„ 1 31	„ „
„ „	3 P.M.	29 70	+40	. .	„ 1 34	. .	„ 2 26	„ „
„ 12	9 A.M.	29 62	+33	80	„ 7 9	8 32	„ 1 23	From the hill.
„ „	9¾ „	. . .	+32	17½	„ 3 43	4 0	„ 0 17	From the Hecla.
„ „	Noon.	29 64	+33	. .	„ 2 53	. .	„ 1 7	„ „
„ „	3 P.M.	29 70	+30	. .	„ 2 32	. .	„ 1 28	„ „
„ 13	10 A.M.	29 95	+36	. .	„ 2 10	. .	„ 1 50	„ „
„ „	Noon.	30 00	+37	. .	„ 3 7	. .	„ 0 53	„ „
„ „	3 P.M.	. . .	+38	. .	„ 4 8	. .	Defect 0 8	From the Hecla's deck.
„ „	3⅙ „	. . .	. .	. .	„ 4 11	. .	„ 0 11	„ „
„ 14	10 A.M.	29 92	+40	. .	„ 3 26	. .	Excess 0 34	„ „
„ „	3 P.M.	29 90	+34	. .	„ 2 24	. .	„ 1 36	„ „
„ 22	Noon.	29 80	39	. .	„ 2 48	. .	„ 1 12	„ „

REFRACTIONS—*continued.*

REMARKS, &c.
A little open water; but an ice horizon under ⊙. Moderate breezes from N. and cloudy.
Ditto. Ditto. Moderate breezes from N.W. and clear weather.
Much water, very little ice upon the horizon. Moderate and cloudy.
Very little water; cloudy weather.
Much open water; some loose ice upon the horizon. Moderate breezes from N.W. and cloudy.
Ditto. Ditto.
Very little water; an ice horizon. Cloudy weather.
No open water. Ditto. Ditto.
Much open water, but an ice horizon. Light breezes from W. and cloudy.
Ditto. Loose ice upon the horizon. Hazy weather.
Much open water, but an ice horizon. Fresh breezes and cloudy.
Ditto. Ditto. Hazy weather.
Ditto. Ditto. Fine clear weather, and horizon well-defined.
Ditto Ditto. Ditto.
Much open water; loose ice upon horizon. Fine clear weather, and moderate breeze from N.W.
Ditto. Ditto. Ditto.
Ditto. Ditto. Ditto.
Much open water; horizon ill-defined from loose pieces of ice. Hazy weather, light breeze from S.W.
No open water in sight; an ice horizon. Hazy weather, and fresh breeze from E.N.E.

TABLE

Containing OBSERVATIONS for DETERMINING the

DATE.	Zenith Distance.	Observed Refraction of Object.	Observed Refraction in terms of the contained Arc.	Barometer.	Thermometer in Shade.	No. of Degrees fallen through in Leslie's Hygrometer, by moistening the Bulb with Alcohol.
1823.	° ′ ″	′ ″			°	
April 9 A.M.	89 35 18.3	1 16.5	$\frac{1}{2\cdot65}$	30 28	0	$10\frac{1}{2}$
,, ,, P.M.	00 36 10.8	0 24.0	$\frac{1}{8\cdot43}$	30 20	+ 7	$17\frac{1}{2}$
,, 11 A.M.	00 35 38.5	0 56.3	$\frac{1}{3\cdot61}$	30 16	− 3	$14\frac{1}{4}$
,, ,, P.M.	00 36 8.2	0 26.6	$\frac{1}{7\cdot64}$	30 15	0	$21\frac{1}{2}$
,, 12 A.M.	00 36 27.8	0 7.0	$\frac{1}{37}$	30 17	+ 3	$14\frac{3}{4}$
,, ,, P.M.	00 36 24.4	0 10.4	$\frac{1}{19\cdot3}$	30 27	0	$13\frac{1}{4}$
,, 14 A.M.	00 35 42.0	0 52.8	$\frac{1}{3\cdot84}$	30 30	−14	11
,, ,, P.M.	00 36 29.4	0 5.4	$\frac{1}{37\cdot6}$	30 16	− 3	$17\frac{1}{2}$
,, 21 A.M.	00 35 47.3	0 47.5	$\frac{1}{4\cdot27}$	29 89	− 5	15
,, ,, P.M.	00 36 3.5	0 31.3	$\frac{1}{6\cdot48}$	30 00	+ 5	$24\frac{3}{4}$
,, 22 A.M.	00 34 58.7	1 36.1	$\frac{1}{2\cdot11}$	30 18	+ 4	16
,, ,, P.M.	00 36 17.8	0 17.0	$\frac{1}{11\cdot9}$	30 20	+ 7	$27\frac{1}{2}$
,, 23 A.M.	00 36 35.0	0 00	0	30 13	+ 6	$14\frac{1}{4}$
,, ,, P.M.	00 36 21.2	0 13.6	$\frac{1}{14\cdot9}$	30 08	+13	26
,, 24 A.M.	00 36 15.5	0 19.3	$\frac{1}{10\cdot52}$	29 92	+ $1\frac{1}{2}$	12
,, ,, P.M.	00 36 13.9	0 20.9	$\frac{1}{9\cdot7}$	29 89	+ 8	$19\frac{1}{2}$
,, 25 A.M.	00 36 27.0	0 7.8	$\frac{1}{26}$	29 92	+ 8	$15\frac{3}{4}$
,, ,, P.M.	. . . . . .	. . .	. .	29 89	+ 8	25
July 29 A.M.	00 36 10.4	0 24.4	$\frac{1}{8\cdot32}$	29 60	+47	. .
,, ,, P.M.	00 36 11.4	0 23.4	$\frac{1}{8\cdot67}$	29 60	+47	. .

XIV.

TERRESTRIAL REFRACTION with the REPEATING CIRCLE.

REMARKS.
Fine weather; very light breeze from S.W., and rather cloudy.
Moderate and cloudy evening; light breeze from S.W.
Moderate and cloudy; light breeze from W. Halo round the sun.
Cloudy and overcast; very light breeze from S.E.
Moderate breeze from N.W., and cloudy weather.
Fresh breeze from N.b.W., and cloudy weather.
Light breeze from W., and clear weather.
Light breeze from S.W., and clear weather.
Ditto. N.W., Ditto.
Ditto. N., Ditto.
Calm, and fine weather; distant land appeared much distorted by refraction, therm. in sun + 40°.
Very light breeze from N.W., and clear weather; thermometer exposed to sun + 33°
Moderate breeze from N., thick foggy weather with small snow occasionally.
Ditto. Rather clearer than in the morning.
Fresh breeze from N.b.W. and clear weather; thermometer + 20° exposed to the sun.
Ditto. Brilliant halo and mock suns.
Fresh breeze from N.W., with snow; thick cloudy weather.
Fresh breeze from N.W., and clear weather.
Clear weather; light breeze from N.
Ditto. Ditto.

ABSTRACT

OF

EXPERIMENTS TO DETERMINE THE VELOCITY OF SOUND, AT LOW TEMPERATURE.

These Experiments were made by observing the number of beats made by three pocket chronometers by Arnold, during the interval between the report and the flash of a six-pounder. For this purpose, base lines were determined by several actual measurements upon the Frozen Sea, at both the Winter Stations. The gun had an elevation of about 10°, and was directed towards the observers, which were Captain Parry, Lieutenant Nias, and myself; and the observations denoted by the letters P, N, and F.

The Experiments	marked	*(a)*	were made	with a chronometer	making	8	beats in	3	seconds.
"	"	*(b)*	"	"	"	5	"	2	"
"	"	*(c)*	"	"	"	8	"	3	"

The following Tables present the whole of the Results.

DATE.	Bar.	Therm. Fhrt.	Winds.	Weather.	Length of Base in Feet.	No. of Experiments.	P. No. of Beats.	N. No. of Beats.	F. No. of Beats.	Velocity per second in feet.	REMARKS.
1821. Dec. 29	30.17	$-27\frac{1}{2}^{\circ}$	W.N.W.	Moderate & clear.	2880	2	(a) 8.5		(a) 7.5	960	Wind against the sound.
„ 30	30.16	−30	N.W.b.N.	„ „	2880	7	(a) 7.536		(a) 7.714	1007.2	„
1822. Jan. 9	29.93	$-25\frac{1}{2}$	N.	Light „	5632	5	(a) 14.9		(a) 14.65	1016.5	„
Feb. 9	28.96	−25	N.W.	„ „	5645	15	(a) 14.817		(a) 14.9	1013.3	„
„ 27	29.83	−34	W.N.W.	Fresh breeze „	5645	10	(a) 15.8		(a) 15.795	952.9	„
May 20	29.97	+11	N.	Light „ clear	5343	7	(a) 13.821		(a) 13.571	1010.3	Wind four points against the sound.
„ 22	29.86	+28	S.S.W.	„ cloudy	5343	8	(a) 13.344		(a) 13.406	1065.3	Wind with the sound.
1823. Jan. 4	29.80	−13	N.W.	„ clear	8166	2	(a) 21.75		(a) 21.1	1053.1	In the following experiments the gun was to the W. of the observers.
„ 8	29.76	−22	N.N.W.	„ cloudy	..	7	(a) 21.757	(a) 21.95		1033.1	„
„ 11	29.99	−19	S.	„ clear	..	7	(a) 21.429	(b) 21.214	(a) 21.786	1028.6	„
„ 18	29.80	− 5	S.	„ cloudy	..	7	(a) 21.536	(b) 21.071	(a) 21·607	1032.1	„
„ 20	29.81	−22	N.W.	„ clear	..	7	(a) 21.679	(b) 20.786	(a) 21.786	1031.9	„
„ 23	30.21	−31	N.W.	„ „	.	8	(a) 22.063	(b) 21.250	(a) 22.019	1014.7	„
Feb. 13	29.85	−15	W.S.W.	Fresh cloudy	..	7	(a) 21.321	(a) 21.643		1050.9	„
„ 16	29.38	−45	N.W.	Moderate clear	..	7	(a) 22.411	(b) 21.929	(a) 22.917	985.5	„
„ 21	29.83	−31	N.N.W.	„ „	.	7	(a) 22.179	(b) 21.286	(a) 22.179	1009.9	„
June 17	29.90	+33	N.N.W.	„ cloudy	..	7	(a) 20.75		(b) 19.51	1085.6	„
„ 18	29.91	+39	E.b.N.	Fresh, with snow	..	5	(a) 21.18		(b) 20.125	1058.8	„

The

The following are the results of the foregoing observations, arranged according to their temperatures, and also upon the supposition that the accuracy of each day's observations, is in the joint ratio of the number of guns fired, and the number of observers.

Thermr. Fahr.	Mean Velocity per Second.
$-$ 41°.3	985.9 feet.
$-$ 33.3	1011.2 „
$-$ 27.2	1009.2 „
$-$ 21.0	1031.0 „
$-$ 2.0	1039.8 „
$+$ 33.3	1069.9 „

By comparing the observations made at the temperature of $-$ 41°.3, with those at $+$ 33°.3, it appears that, between these limits, the velocity of sound per second diminishes, as the temperature of the atmosphere diminishes, at the rate of 1.126 foot, for each degree of temperature. From experiments made by Mr. Goldingham at Madras, during the summer months, it appears that at $+$ 87° Fahrenheit, the velocity per second 1158.7 feet, by comparing this result with the observations at $-$ 41.3, the velocity is diminished at the rate of 1.35 foot, for each degree of temperature, supposing the change of velocity proportional to the change in the temperature.

The Experiments on the 9th February, 1822, were attended with a singular circumstance, which was—the officers' word of command "fire," was several times distinctly heard both by Captain Parry and myself, about one beat of the chronometer *after* the report of the gun; from which it would appear, that the velocity of sound depended in some measure upon its intensity. The word "fire" was never heard during any of the other experiments; upon this occasion the night was calm and clear, the thermometer 25° below zero, the barometer 28.84 inches, which was lower than it had ever been observed before at Winter Island. Upon comparing the intervals between the flash and report of a musket with the gun, upon other occasions, there appears to be no assignable difference.

ON THE ANALYSIS OF THE ATMOSPHERIC AIR FROM THE POLAR REGIONS.

The air, the subject of these experiments, was collected in two glass bottles closed by caps, cemented in the usual way, with brass stop-cocks; it was analyzed by Mr. Faraday of the Royal Institution, and the following are his results:

100 of air from one bottle gave, by Doberiener's Eudiometrical process	20.364 of oxygen
Another experiment with the same air, gave	20.42 per cent of oxygen
At the same time, 100 of air from the atmosphere of the Laboratory, by the same process, gave	22.045 of oxygen
Again 100 of air from the other bottle, gave	20.72
By another experiment	20.85
At the same time 100 of air from the Laboratory gave	21.88

The following is a copy of the letter accompanying the foregoing analysis.

Royal Institution, 13*th February*, 1824.

Dear Sir,—I send you an account of the air which you gave me for examination. There is a decided and constant difference between it and the air of this place, which difference cannot depend on errors in the experiments. Perhaps you will be able to recollect the circumstances under which you collected it. If the mode by which it was obtained and preserved until it reached this place be unexceptionable, then the difference between the Polar Air and that of this climate will be established, at least to my satisfaction.—I am, Dear Sir, Your's very truly,

To Rev. George Fisher. (Signed) M. Faraday.

I have merely to state, in reference to this letter, that the circumstances attending the collecting of the air were simply as follows: the bottles in which it was preserved had been open the whole of the winter on shore, at the observatory at Igloolik, at the last winter's station, and were closed in the spring; they were then packed up in oakum by myself in a chest, which was opened by Mr. Jones and myself in his shop at Charing-Cross, and by him sent immediately to Mr. Faraday for examination. There had not been a fire in the place in which the bottles were kept for a considerable time before they were closed; so that I conceive the air was collected in as unexceptionable a way as could be.

It appears from a mean of the experiments, that the air in the bottles contained 20.5885 per cent. of oxygen, and the atmosphere in Laboratory of Royal Institution at the same time, 21.9625 per cent., which exceeds therefore the quantity of oxygen contained in the air of the Polar Regions, by 1.374 per cent.

ON THE EFFECT OF COLD UPON THE GASES AND DIFFERENT SUBSTANCES.

The gases experimented upon, were confined in long cylindrical vessels of thin glass, hermetically sealed. Other specimens of the gases were also sent out in large glass spheres, and condensed by pressure, to render the circumstances of the experiments, when combined with very low temperatures, more favourable; some of these spheres were provided with stop-cocks of brass, and the others of glass, which circumstances are mentioned in the experiments; and to prevent mistakes, all the vessels had the names of the gases they contained, engraved upon them with a diamond. The results here given, are those occasioned by simple exposure to the atmosphere (unless stated.) The vessels before exposure, were wiped perfectly clean and dry upon the outside, and the spots and blemishes in the glass, or any particular appearance within, (if any,) were carefully written down; so that no effect upon the gases should be registered, but what was due to the change of temperature. It may be observed here, that a minute crystallization appeared in every one of the vessels upon the exposure to low temperatures; which may, in some, have been occasioned by some previous humidity in the vessels, although every precaution was taken in filling them in England to prevent it. However this may be, I have given the appearances and circumstances connected with them as well as I was able, so as to enable others to form their own judgment.

Sulphurous Acid Gas,

Upon exposure to $-26°$ Fahrenheit, is condensed into a perfectly white fluid; when exposed to $-40°$, the condensation is increased, and the liquid runs in streams down the sides of the vessel. Two or three drops of a brilliant orange-coloured fluid was also formed, together with a minute scattered crystallization upon the upper part of the vessel.

Nitrous Acid Gas,

Condensed by pressure in a glass sphere, after exposure to $-26°$ Fahrenheit becomes colourless, and is formed into a brilliant yellow-coloured fluid at the bottom of the vessel, of the appearance and consistence of thick oil; at $-40°$, part of this fluid was frozen, and formed into brilliant yellow crystals; much crystallization also forms upon the upper part of the vessel, without colour, which dissolves at − 20°. When the tubes containing this gas (in a gaseous state), are kept from the light at the temperature of − 46°, although the fluid is formed, yet it is not frozen until it is brought to the light.

Silicated Fluoric Gas

Was not affected by the greatest degree of artificial cold I could produce, by means of a mixture of alcohol and snow, combined with a natural temperature of 45° below zero. A few white depositions on the sides of the glass tubes took place during the voyage.

Carbonic Acid Gas

Was not rendered fluid when tried as above, but several detached spots of tree-shaped crystallization, upon different parts of the tubes, forms at very low temperatures, which is not the case at temperatures above zero.

Ammonia.

After three days exposure to − 26° Fahrenheit, the gas contained in the glass sphere, in which it had been condensed by pressure, was found to be in a fluid state on the upper part of the sphere, in small globules; but there was no liquid formation in the glass cylinder containing this gas, nor any appearance of crystallization in either. Upon exposing both of them to − 40°, the liquid formation in the sphere was much increased, and ran down the sides of the vessel upon moving it. There were also formed seven or eight spots of beautiful clear bluish-green drops of fluid, together with an irregular streak of crystallization upon the upper part of the vessel. In the cylinder was a slight appearance of moisture, like that caused by breathing, but no crystallization: this, therefore, appears to be the temperature nearly at which this gas assumes the liquid form, when not assisted by pressure.

Sul. Hydrogen.

Upon exposing this gas in the sphere to −45°, there was exhibited, at the bottom of it, a dark-coloured gaseous fluid, which disappeared immediately the finger was applied to the vessel. There was much crystallization upon the upper part of the vessel, which also disappeared upon bringing it into a temperature of about zero, without assuming a liquid shape. By exposing this gas to the cold during the winter, a great many black depositions took place upon every part of the vessels.

Olefiant Gas.

No difference of appearance in this gas, with the greatest degree of cold produced, excepting a very minute crystallization upon the upper part of the tubes.

Nitrous Oxide.

After three days' exposure to a temperature of 40 and 45° below zero, a long drop of fluid was formed upon the top of the sphere, colourless, of a thick viscid appearance. A minute crystallization also takes place of the appearance of flies' legs, and by rubbing the vessel with a silk handkerchief (of the same temperature), they move about with great rapidity from the electrical excitation produced by the friction: they disappeared at a temperature of about zero.

Nitric Oxide.

After a considerable exposure to — 45°, no change took place, excepting a minute crystallization upon the top of the sphere. There were some round bluish-green spots also upon the bottom of the vessel, but as the stop-cock was of brass, it probably might have arisen from some action upon the metal, as the same appearance was not exhibited in the cylindrical vessel containing this gas.

Fluoric Gas.

After exposing this gas three days in a temperature of — 26°, in a glass sphere, several white patches or depositions were formed in different parts of the vessel, and also one at the bottom of the sphere, of a dull greasy appearance, like a drop of melted tallow, which after three days' exposure to between 40 and 45° below zero, became clear and transparent, and a condensation in a liquid shape took place upon the top of the vessel like that caused by breathing, but not in quantity sufficient to run down the sides of the sphere. There was no appearance of any liquid formation, in the glass cylinder containing this gas, nor was there the least appearance of crystallization in either.

Oxygen.

No alteration appeared in the vessels containing this gas, though exposed to — 47° Fahrenheit, excepting a small patch of crystallization upon the upper part of each of them.

Chlorine.

This gas, contained in the cylinder, became quite colourless when exposed to — 45° Fahrenheit, but no appearance of any liquid formation nor any crystallization. But in the sphere into which it was condensed by pressure, it was formed into a bright yellow liquid when exposed to — 26°, with a considerable quantity of crystallization upon the upper part of the vessel; on bringing it into an atmosphere at the temperature of — 20°, the yellow liquid assumed the gaseous state, and the crystallization remained; but upon applying the finger to the sphere, this rapidly diminished, and the crystals, during the time of their dissolution, were surrounded by rings of a clear colourless fluid, which also quickly disappeared. Upon exposing, however, the sphere afterwards to — 20°, it appears that the crystallization will not form at that temperature, but the gas becomes almost colourless.

Muriatic Gas.

After exposure to — 26°, a long drop of yellow was formed upon the top of the sphere into which this gas condensed by pressure. At — 40°, several large drops were formed upon the top of the tube. In the cylinder containing this gas, no liquid formation appeared at — 45°, nor any crystallization in either of the vessels.

EXPERIMENTS TO DETERMINE THE EXPANSION OF AIR, AT LOW TEMPERATURES.

For this purpose was used a glass cylinder of 1.7 inch in diameter, and 2.6 inches in length; into this was fitted a long tube or stem of ten inches in length, and nearly half an inch in diameter, graduated into 140 equal parts. The cylinder was also fitted with a ground-glass stopper, for the purpose of filling it readily. The relative capacity of the whole, and the several parts of the stem, *viz.*, every ten divisions, were determined by many trials, by weighing the contained quantities of water and mercury. By inserting the extremity of the stem into mercury, (the stopper being securely fitted,) and carried from a warm atmosphere into a cold one, the mercury rises in the stem, till the force of elasticity of the contained portion of air, together with the weight of the incumbent column of mercury within the stem, is equal to the pressure exerted by the atmosphere without. The vessel was fitted to a stand, so that the end of the stem could be immersed into a basin of mercury at pleasure. When the whole, therefore, had acquired a steady temperature in a warm atmosphere, a delicate mercurial thermometer was introduced into the centre of the cylinder by means of the glass stopper, and the temperature of the air within determined; the stopper was then slowly fitted in, so as to cause no depression of the mercury in the stem below the surface of that without. In this state, the height of the surface of the mercury was carefully read off upon the stem, and then gently taken into the cold; and after it had been exposed long enough to acquire the temperature of the atmosphere, the height to which the mercury in the stem had risen was also read off. By knowing the capacities to the corresponding parts of the vessel, the ratio of the densities of the contained portion of air, before and after exposure, is known. As the air within the cylinder is under a pressure equivalent to the height of the mercury in the barometer, *minus* the height in the stem, above the surface of the mercury without; to reduce therefore the density thus determined, to what it would be under the atmospheric pressure at the same temperature, we must increase it in the ratio of the compressing forces. Or if A and a be the spaces occupied by the air, before and after exposure, β the height of the mercury in the stem above the level of that without, B the height of the barometer at the time, and d the density of the air required under the pressure, B, then the bulk before exposure, being equal to unity;

$$\text{then } d = \frac{A\ B}{\alpha\ \{B - \beta\}}.$$

As all the experiments made with this apparatus are nearly at the same temperatures, it will be sufficient to take the mean between the observed heights of the mercury within the stem, and also the corresponding temperatures, and compute it as one result. By a mean of fifteen different trials upon different days during the last winter, it appears that at a mean temperature of $+55°.5$ Fahrenheit, Barometer 29.946, that the space occupied by the air before exposure was equivalent to 2059,854 grains of distilled water; and the same portion of air at the temperature of $-34°.5$ was equivalent to a space of 1924,261; the height of the mercury in the stem, above the level of the mercury without, being 3,702 inches. Both the glass cylinder, and the observed height of the mercury in stem, require each a small correction, to reduce the experiments to the same temperature. According to General Roy, a glass vessel of the capacity of 10,000,000 will become 10,000,129, by an increase of 1° Fahrenheit in the temperature. And by my own experiments it appears, that the rate of expansion of pure mercury from near its freezing point, to the freezing point of water, is about $\frac{1}{110}$th part of its bulk in glass vessels. By applying these two small corrections, the space occupied by the air after exposure was more accurately represented by 1922,03, and under a pressure of 26,210 inches; but which reduced to the mean height of the mercury in the barometer, *viz.* 29,946, becomes 1682,24.

It appears therefore, from the whole, that a volume of air at the temperature of $+55°.5$ Fahrenheit, equivalent in bulk to 2059,854, will at the temperature of $-34°.5$, occupy a space equivalent to 1682,24, under the same pressure; which is about $\frac{1}{440}$th part for 1° Fahrenheit. The same conclusion is obtained, by taking a mean of the results deduced from the experiments computed separately.

EXPERIMENTS UPON THE EXPANSION OF METALS, AT LOW TEMPERATURES.

These experiments were made with bars of different metals, of ten feet in length, *viz.*, cast iron, wrought iron, steel, hammered copper, cast brass, and plate brass; they were placed parallel to each other, about two inches apart, in a strong case made of two-inch deal, eleven feet in length. Each of the bars was attached, by means of a screw, to a transverse iron bar fixed to one extremity of the case, the other ends being left that they might expand or contract according to circumstances. To each of these moveable ends of the bars was attached a finely-divided vernier, each moving in a corresponding dove-tailed groove in a large brass plate firmly screwed to the same end of the case, and upon which was graduated a scale of inches divided into tenths; these divisions were also subdivided by the verniers into hundredths: by this means any relative change in the lengths of the bars might be observed with great distinctness, to less than 1000th part of an inch. For the more perfect observing the coincidence of the verniers with the divisions upon the fixed place, a microscope was attached to the instrument, which sliding upon a transverse bar, and having a motion parallel to the bars themselves, could be brought exactly over either of the verniers.

The bars were about three-quarters of an inch in breadth and depth (excepting the cast-iron one, which was somewhat larger), and were supported in several places by pieces of wood fixed within the case, cut so as to receive them, allowing sufficient room for a slight lateral motion, so that their motion lengthways should not be in the least obstructed. They were nearly adjusted (with the exception of the cast-iron one) to the same length, *viz.* ten feet, at +66° Farenheit, at which temperature the zeros upon the verniers nearly coincided with the zeros upon the plate. It was intended to adjust them accurately to the temperature of +62°, but the warmth of the weather, the number of persons in the room, and the haste necessary in framing the instrument, previous to the sailing of the expedition, prevented it. Subsequent examinations of the bars at very steady temperatures, rendered any dependence upon this adjustment unnecessary, although the range of temperature was not quite so great.

As the accuracy of the results obtained with this instrument must necessarily depend upon the ends of the bars, which were screwed to the transverse bar, remaining in exactly the same position with respect to each other, I had a contrivance very neatly constructed by the ship's armourer; which was, a strong bar of copper fixed in a transverse direction exactly over the heads of the screws (by which the bars were confined), but at the same time perfectly detached from them. In this transverse bar, and over the others, were made square holes, two sides of which were chamfered or sloped off to a fine edge and polished, as were the corresponding parts of the other bars over which it was fixed. Upon these edges were made fine marks at right angles to the bars, by means of a sharp steel point; corresponding ones also were made upon the bars themselves, and by means of a sliding microscope attached to another transverse bar, the coincidence of these lines were observed before and after the readings of the verniers at the other end of the case were taken. They at all times, however, perfectly agreed, and coincided exactly, after the arrival of the instrument in England. The necessity of this precaution was first suggested to me by a curious circumstance which takes place in the contraction of the metals at very low temperatures, which is this: if after a set of readings be obtained with this instrument, either of the bars be gently tapped, as with a key, *&c.*, an immediate change in its length takes place, as indicated by the vernier. This at first naturally appeared to arise from the screws not confining the ends of the bars firmly in their places, and from the friction arising from the supports and verniers; the observations were, therefore, rejected, and the above precaution immediately resorted to. As the free motion of the verniers, and also of the bars upon their supports, were always particularly examined, and which could easily be ascertained by the lateral motion occasioned by pressing gently upon them, this way of accounting for the circumstance appears inadmissible; nor could it have arisen from any gradual change in length produced by an alteration of temperature, as the same was constantly observed after the bars had been exposed to steady temperatures for two or three days. To this rigidity or sluggishness in the powers of contraction in the metals, may be added another property they acquire at low temperatures, which is—that of extreme brittleness. This was continually exemplified in the frequent fractures of the adjusting screws of the different instruments when very slightly handled, also of knives, the clinching of nails, together with the loud complaints of the carpenters, that their tools were either fractured and rendered totally unserviceable, or that their edges were immediately destroyed by using them in those temperatures.

It is evident, from the construction of the instrument, that the differences between the readings of the verniers, at different temperatures, will give the relative variations in length of the different bars due to the change of temperature (since these differences are not affected by any variation in length of the deal case, as this is common to each); and if the absolute rate of expansion of either of them, or of the deal case itself, be known, then the absolute rate of expansion of the others becomes known. The deal was a well-seasoned piece of wood, and had been in the possession of Mr. Bate, the maker of the instrument, for twelve years. The temperature of the bars was ascertained by three thermometers, one placed at each end of the case, and the other in the middle. The instrument was fixed upon the heads of three casks, fixed firmly upon the ground, so that their upper edges should be in an horizontal line, and by this means was supported in six nearly equi-distant places. To protect it from the drift snow, it had, besides its own cover of wood, a strong canvass one made for it. In this state it was left, together with the thermometers, exposed for a considerable part of the winter, a few yards in front of the observatory, and was always ready for observation when steady temperatures occurred. The following observations are the means of a great many readings, taken at various times; those made at temperatures not differing from each other more than five or six degrees, are classed together, and their mean given as one result:—

METALS.	Readings at + 52°.	Readings at + 6°.4.	Readings at − 13°.9.	Readings at − 40°.
Plate Brass . . .	119.95550	119.87638	119.86250	119.83140
Cast Brass . . .	119.96350	119.88325	119.86942	119.84227
Hammered Copper	119.96550	119.88750	119.87775	119.85427
Steel	119.97100	119.90950	119.90150	119.89458
Wrought Iron . .	119.97650	119.91188	119.90858	119.89981
Cast Iron . . .	120.00200	119.93688	119.93375	119.92910

The simplicity of the instrument renders any explanation of the numbers contained in this table almost unnecessary; it will be sufficient only to say, that if the numbers in the column under +52° represent the relative lengths of the bars at that temperature, then will the numbers in the other columns represent the relative lengths at the respective temperatures under which they are placed.

By comparing the observations with this instrument, after its arrival in England, with its first adjustment by the maker to the temperature of +66°, I found the cast-iron bar somewhat in excess. Although I had not comparisons at so high a temperature, yet by observing the law of the differences between it and the other bars, the circumstance was plain; the others agreed very well. This adjustment, therefore, is altogether rejected, and those observations only retained which have been made at very steady natural temperatures. The discrepancy arose, no doubt, either from the weight of the bar acting upon the screw which held it, from the pitching of the ship in crossing the Atlantic; or, what is more probable, from this bar being the largest, it had not acquired the same temperature as the others, in the unavoidable hurry necessary in the completion of the instrument.

For the purpose of again comparing the bars, after the voyage, at steady temperatures, the instrument was kept in a large room without a fire at the Admiralty, and the comparisons made by Mr. Jones, the optician, and myself, at a mean temperature of +52°, which is higher than any other I had before an opportunity of observing it at. The ends of the bars held by the screws had not in the least started, since the precaution was taken of constantly observing them, as the lines upon them and the corresponding ones upon the detached transverse bar exactly coincided. In the following table I have given the comparisons of the plate brass with the other metals, as its absolute rate of expansion is the best known, and at the same time more convenient, on account of its rate of expansion being greater than the rest. If the differences between the plate brass and the other metals be supposed to increase uniformly as the temperature diminishes, that is from +52° Fahr. to −40°, and if x represent the absolute rate of contraction of the plate brass in parts of the length between those limits; then will the contraction of the other metals be represented by the quantities in this table.

Table of the comparative contractions of Plate Brass and the other metals, for 1° Fahr., in parts of the length.

METALS, &c	From +52° to −40° Fahr. Mean Temperature +6°.
Cast Brass	x − .000000860
Hammered Copper . . .	x − .000001166
Steel	x − .000004319
Wrought Iron	x − .000004894
Cast Iron	x − .000004037

By a mean of ten of the most unexceptionable authorities, it appears that the rate of expansion, or contraction, of plate brass in parts of its length, is .00001027 for 1° Fahr.; if this quantity be substantiated for x, the following will be the absolute rates of expansion or contraction of the other metals, and which are also compared with those deduced from other authorities:—

METALS.	Contractions for 1°.	Contractions for 1° by other Authorities.	AUTHORITIES.
Cast Brass . . .	.000010010	.000010443	Comm. on Weights & Measures, 1821; & Smeaton.
Hammered Copper	.000009104	.000009444	Smeaton; Philosophical Transactions, 1754.
Steel	.000005951	.000006396	9 Authorities—but agreeing with Lavousier and Laplace; Biot; Traité de Phys.
Wrought Iron . .	.000005976	.000007039	4 Authorities, but agreeing with neither.
Cast Iron. . . .	.000005633	.000006312	" " "

The great difference between these results and those obtained by absolute measurements is very apparent, and seems in a great measure to arise from a variation in the rate of contraction of plate brass and the other metals at different temperatures. If the relative variations in length of the bars, between the temperatures of +52° and +6°.4, be compared with those between +6°.4 and −40°, it appears that the differences between the plate brass bar and the others are the greatest at the lowest temperatures, which must be owing to the plate brass, and also the cast brass, retaining their powers of contraction, at those temperatures, in a greater degree than the less expansible metals.

By dividing the difference of the readings of the vernier attached to the plate brass bar, at the temperatures of +52° and +6°.4, by the difference of temperature, *viz.*, 45.6 degrees, it appears that the contraction of the brass exceeded *that* of the deal by the quantity .0017351 inch for each degree; and dividing this by 120 inches (the whole length nearly), this excess in parts of the length for 1° Fahr. is .00001446: but since this quantity is far greater than that which can be assigned for the expansion of the brass itself, it is evident that the deal must have *expanded* upon the whole, and that at the rate of .000004 nearly in parts of its length for each degree. It is most probable, however, that this expansion is confined only to a few degrees of temperature, arising from the freezing of the moisture within the pores of the wood. By a similar comparison between the temperatures of +6°.4 and −40°, the excess of the deal above the plate brass bar for 1° in parts of its length, is

.00000808; between these limits, therefore, the deal had *contracted* at the rate of .000002 nearly for 1° in parts of its length. The same circumstance appears by comparing it with the other metals; and upon the whole, that a piece of deal, of 120 inches in length, will, by a change of temperature, amounting to 100° Fahr. *i. e.*, from +60 to −40°, *expand* $\frac{1}{100}$th of an inch, or $\frac{1}{12000}$th part only of its length, whatever its law of variation in length may be at the intermediate temperatures.

This curious property of wood, *viz.*, of its alternate contraction and expansion at low temperatures, seems singularly adapted for its preservation when growing in its natural state in high latitudes, particularly in its low and stunted state of growth in these places; for by reason of the dissolving of the snows in the height of summer, it becomes so incrusted with ice, and cemented to the rocks and soil for the greater part of the year, and at the same time exposed to natural temperatures, from the freezing point to 80° below it, that if the same rate of contraction were to continue at these temperatures as it has at moderate ones, it must be fractured in almost every place.

That fir does not upon the whole contract, between the freezing point and zero, I had, before these experiments were made, every reason to expect, from the going of a fir pendulum belonging to the clock. And as I had no other means of determining the absolute rate of contraction in either of the metals, I endeavoured to do it by observing the number of vibrations made in a given time by an invariable brass pendulum, vibrating upon knife edges in hollow cylinders of agate, by the method of coincidences; but the clock with which it was compared, by reason of the cold, would not go well enough for the purpose, although it was taken to pieces and oiled throughout with the unfrozen part of the oil of sassafras (which is the only substance of an unctuous quality that remains fluid at this temperature); it would not go sufficiently regular to be depended upon. I had, before leaving England, suggested this way of determining the contraction of the metals to Capt. Kater, but the time allowed before the sailing of the Expedition was too short for a proper arrangement to be made for this purpose. Several trials, however, of this method were made by Lieut. Palmer and myself, by counting the vibrations, and measuring the intervals with a chronometer; but the want of agreement in the results, when reduced either from the irregular going of the chronometer at that temperature, or by mistakes in counting the vibrations, together with the long exposure necessary for the purpose, rendered it both useless and impossible to repeat them with confidence.

ON THE CONTRACTION OF MERCURY.

These experiments were made with the same glass vessel with which those upon the expansion of air were made, which being nearly filled with mercury, became a thermometer upon a large scale, but open at the end of the stem. The relative capacities of the whole vessel, and the several parts of the stem, were determined by many trials, by weighing the contained portions of mercury with a delicate hydrostatic balance (made by Newman, of Lisle-street), in very small scales, or cups, of platinum. The mercury experimented upon, had been distilled for the purpose of chemical experiments; and by a mean of five different trials with the same instrument, its specific gravity in distilled water of the temperature of + 58° Fahrenheit, was 13.64. The experiments were confined to temperatures not lower than — 30° Fahrenheit, as there is some uncertainty arising from a suddenness in the contraction of the mercury near its freezing point. If, upon exposing the vessel filled with mercury to these temperatures, and after a considerable time, when it appears to have reached its lowest point in the graduated stem, the vessel be then touched, the mercury immediately descends, and this not from any change in the curvature of its upper surface only, since it is seen to descend in every part of the stem. The same circumstance was constantly observed in the common mercurial thermometers; the same thermometer seldom indicating the same temperature when its contained mercury was frozen, which was generally from — 36° to — 38° when frozen in an horizontal position. If it is frozen at lower temperatures, as at 45° Fahrenheit, it still indicates about the same temperature, *viz.*, 36° to 38; but if in this state it be held in a vertical position, and a slight shake be given it, the mercury immediately descends, so as to indicate nearly the same temperature of the atmosphere (as shewn by those spirit thermometers with it previously agreed, at temperatures between 20° and 30° below zero). This circumstance does not appear to arise from any apparent separation of the mercury, either in the stem or in the bulb, at least as far as could be seen with a common magnifying glass; neither can it arise from any sudden contraction of the glass, as it would have caused a contrary effect, and, moreover, would have been apparent in the spirit thermometers, which was not the case. It appears, therefore, that though the power of mutual adhesion between the particles of mercury is considerably diminished by low temperatures, yet it still retains its power of contraction.

As one end of the stem was ground, and fitted into the bulb of the vessel, so as to be taken out at pleasure, the temperature of the contained mercury could be readily ascertained by putting a mercurial thermometer into it. This thermometer, together with a spirit one (for very low temperatures), had been compared with many other mercurial ones, and a correction applied to each to reduce them to the mean of all; and they were kept as standard ones by which the temperatures were registered. As the experiments were made at nearly the same temperature, the means of the observations before and after exposure are taken and computed as one result. By which it appears, that a portion of mercury equivalent in bulk to 2060.65 at + 29° Fahrenheit, will have in the glass vessel an apparent bulk equivalent to 2048.36 at — 29° Fahrenheit, which is a contraction at the rate of .0001027, or $\frac{1}{9730}$th part of the whole for 1° Fahrenheit.

If the contraction of the glass vessel be allowed for, then, according to General Roy's experiments upon the cubical expansion of glass vessels, the bulk of the mercury after exposure will be more accurately represented by 2046.83 instead of 2048.36 at — 29°, which is a contraction at the rate of .0001156, or $\frac{1}{8648}$th part of the whole for 1° Fahrenheit, between these limits, or at a mean temperature of about zero.

From the experiments of Sir George Schuckburgh with a similar apparatus, it appears that from the freezing to the boiling point of water, the expansion of mercury in glass is .0000872, or $\frac{1}{11470}$th part of the bulk, and correcting for the expansion of the glass .0001011, or $\frac{1}{9891}$th part of the whole for 1° Fahrenheit.

ON THE CONTRACTION OF ALCOHOL.

These experiments were also made with the same apparatus. The specific gravity of the alcohol was determined by weighing it in two thin glass flasks, fitted with ground glass stoppers in the usual way, and weighed in the hydrostatic balance before-mentioned. One bottle contained 925 grains of distilled water, and the other 1050 grains, at + 60° Fahrenheit. The temperature of the alcohol was ascertained by introducing a delicate mercurial thermometer into the necks of the flasks, before and after it was weighed, and a mean taken. By several trials at each end of the beam, with different sets of platina weights, the specific gravity with the 925 grain bottle was .8162 at + 61°, and with the other, .815 at + 62°; the mean between which is, .8156 for its specific gravity, at + 61$\frac{1}{2}$ Fahrenheit.

The experiments were made in the same way as with the mercury, by exposing the alcohol to moderate, and then low temperatures; and a mean of the readings, before and after exposure, taken, to obviate any error that might possibly have arisen from evaporation during the experiments; which, however, was not perceptible. By a mean of several experiments made at nearly the same temperature, it appears, that a quantity of the alcohol, equivalent in bulk to 2060.65, at + 49$\frac{1}{2}$° Fahrenheit, will, at the temperature of − 36$\frac{1}{2}$° Fahrenheit, occupy a space equivalent to 1974.85, which is a contraction in bulk at the rate of .000484, or $\frac{1}{2065}$th part of the whole for 1° Fahrenheit, or at the rate of $\frac{1}{11.4}$ for 180°.

Allowing for the contraction of the glass as before, the bulk after exposure is more accurately expressed by 1972.66, instead of 1974.85. With this correction, the contraction of alcohol in bulk is at the rate of .000496, or $\frac{1}{2014}$th part of the whole for 1° Fahrenheit, or $\frac{1}{11.2}$ for 180°. According to Dalton, the expansion $\frac{1}{9}$ for 180° at higher temperatures.

The apparent contraction of alcohol in barometer tubes, appears to differ considerably from the above determination. The result, however, by this method is very exceptionable, compared with the above, since the capacity of the stem of the apparatus is very small compared to the bulb; and as the tubes were of greater diameter than the stem, not so much accuracy could be attained in observing the exact height of the contained alcohol, the rise and fall of which, by the change of temperature, was determined by paper scales pasted upon the tubes, the divisions of which, as well as the whole length of the tubes, were determined by a two-foot brass scale, divided to an hundredth of an inch.

By two trials with a barometer tube, at the temperatures of $+46\frac{1}{2}°$ Fahrenheit, and $-40°$, the space fallen through by the upper concave of the alcohol was exactly equal to $\frac{1}{20}$th of the whole length of the original length of the column, or $\frac{1}{1730}$ for 1° Fahrenheit, or at the rate of $\frac{1}{9.6}$ for 180°. By two trials with another tube, at a different time, the space fallen through by exposure to the temperatures of $+42°$ and $-26°$, was $\frac{4\frac{1}{4}}{100}$th of the length, of $\frac{1}{1600}$th part for 1° Fahrenheit, or at the rate of $\frac{1}{8.9}$ for 180°. The mean between these results in the tubes, is $\frac{1}{1665}$ for 1°, or $\frac{1}{9.2}$ for 180°.

By experiments with the hydrostatic balance, the bottle which held 925 grains of distilled water at $+60°$, contained 755 grains of the alcohol at $+61°$, and the contained alcohol at $+5°$ weighed 787.1 grains. Also the other bottle, which contained 1050 grains of distilled water at 260°, contained 855.6 grains of the alcohol at $+62°$, and 873.1 grains at $+8\frac{1}{2}°$. By a mean of both, and making a small correction also for the contraction of the glass, amounting to about 0.6 grain in each bottle for the difference of temperature, it appears that its specific gravity was .8156 at $+61\frac{1}{2}°$, and .8418 at $+6°.7$ Fahrenheit, which is a contraction in bulk at the rate of .000567, or $\frac{1}{1760}$th part for 1° Fahrenheit, or at the rate of $\frac{1}{9.8}$ for 180° between these temperatures.

In the same way, spirit of wine of the specific gravity of .9270 at $+46°$ Fahrenheit, was found to acquire a specific gravity of .9445 at $+4°$ Fahrenheit, which is a contraction at the rate of .000331, or $\frac{1}{3000}$th part of the bulk for 1° Fahrenheit.

The following are the comparative indications of several thermometers filled with different fluids. The thermometers were of the same length and construction; they were freely suspended, and the comparisons made at steady natural temperatures.

Mercury.	Carburet of Sulphur.	Chloride of Carbon.	Sulp. Æther.	Oil of Sassafras.	Nitric Acid.	Alcohol.	Sp. Wine.	REMARKS.
°	°	°	°	°	°	°	°	
+58	+53	+58.2	+47	+56	+56.6	+53	+57	
+50.2	+43.7	+46	+40.2	+42.5	+48.2	+44	+45.8	
+49	. .	+42.6	. .	. .	. .	. .	. .	
+32	. .	. .	. .	. .	+32	. .	. .	The freezing point of these two thermometers was ascertained to be correct by melting snow.
+ 3	+ 2.5	− 9	− 4.4	− 0.7	+ 0.7	− 0.5	− 2.2	
− 3	− 6.2	−11.7	−10.2	− 9.2	− 1	−10	− 8.7	
−12	−12.6	−27.3	−16.7	−18	−15	−18	−19.2	The oil of sassafras opaque and partly frozen in the *upper part* of the bulb of the thermometer containing it. The sulp. æther was also partly frozen, having an horizontal layer of ice at the *bottom* of the bulb.
−16	. .	−34	. .	. .	−16	−24	−24.5	
−30	−27.5	−44	. .	. .	−31	−36.5	−36.0	

Carburet of Sulphur.

The effect of intense cold upon this singular fluid, depends entirely upon its being in immediate contact with the atmosphere, instead of being exposed to low temperatures in perfect thermometers, or in stopped bottles. For instance, two thermometers containing this fluid, one of which was perfect and the other broken, were exposed for several days to $-26°$ Fahrenheit. The fluid in the perfect thermometer was clear, and did not appear to be in the least affected by the exposure; but in the imperfect one, several pieces of a white substance were floating in the bulb, like white wax or camphor.

This effect was subsequently observed upon a much larger scale. Upon taking a glass bottle capable of containing about three pints, and in which was about a pint of the carburet of sulphur into a temperature of $-30°$ Fahrenheit, no effect was produced upon it, so long as the glass stopper was kept in, except the trickling down upon the sides of the bottle of some of the more volatile part of the fluid which had accumulated there. But upon taking the stopper out, a curious effect was instantly produced, for not only was the surface of the fluid covered with pieces of this white substance, but the sides of the bottle were also covered with a coating of this substance. It would appear, therefore, that it was the more volatile part of the fluid that was affected and congealed. The remaining portion of the carburet of sulphur, which retains its fluidity after the exposure, distinctly divides itself into two portions: the upper part of it had the appearance and consistence of oil; the lower part was a fluid of a dull white appearance, like soapy water. The oily part was very brilliant, and of great refractive power. The white substance which is formed is not very volatile, as I kept a small piece for several days between Zero and -20 Fahrenheit, without any apparant diminution of its bulk. It dissolves instantly in a small drop of concentrated sulphuric acid, but with some difficulty in alcohol.

Chloride of Carbon

Was not in the least affected by an exposure of two or three days to $-45°$ Fahrenheit, nor with this degree of cold, assisted by the evaporation of alcohol and nitric ether in the receiver of an air-pump, by wrapping the bulb of the thermometer containing it in fine wool, previously soaked in these liquids, which was kept moistened, by the wool being in contact with a portion contained in a small evaporating dish, placed under the thermometer upon a small glass stool. The thermometer was cemented in the perforated brass cap of a small receiver in the usual way.

Sulphuric Ether

Is partly frozen at $-12°$ Fahrenheit, and more or less according to the temperature, but not perfectly after two or three days exposure to $-46°$.

Nitric Ether.

A bottle of this exposed as above to $-46°$, was not frozen, with the exception of a very minute portion, like a small feather, floating about in it; but it acquires the consistence of oil. It was firmly frozen by a mixture of snow and alcohol; but I had not the means of determining accurately the temperature at which this took place. A thermometer filled with alcohol placed near it, stood at between -60 and $-63°$.

Oil of Syssafras

Is completely frozen when exposed to the atmosphere at $-23°$, but that in a perfect thermometer was not completely frozen at $-40°$. If the frozen oil be exposed to a temperature of $-10°$, a portion of it becomes fluid, of a brilliant yellow colour. If the oil be now separated into two parts, by pouring off this dissolved part of it, the remaining part consists of large white crystals in the form of rectangular parallelograms, which would not dissolve, though kept at

+50° for several days. The yellow part is frozen into long fine spiculæ, like needles, and the action of light upon it very singular, for it freezes when exposed in a shallow evaporating dish to the light at −16°, but if kept in the dark it will not freeze at −45°. I had frequent opportunities of observing this, as I kept a quantity of each for a considerable time during the winter in a box at the Observatory, where a fire was occasionly kept, by which the temperature was generally such as to dissolve them both when frozen. Upon afterwards opening the box at 30° and 40° below Zero, (at which it had been exposed often for several days) that portion of it which forms into large white crystals, was always found frozen; but the part which forms into fine yellow spiculæ was fluid, but not longer than two or three seconds after the box was opened, as it freezes almost immediately, scarcely giving time to observe its previous fluidity. Upon exposing the yellow part, in a fluid state, to low temperatures at night, during the time of a splendid Aurora Borealis, it acquires the consistence of honey, yet no regular crystallization takes place, but which was the case at twilight when there was less light.

Nitric Acid.

A thermometer filled with this concentrated acid, did not freeze at −40° Fahrenheit, excepting a very small portion (not bigger than a pin's head), and which was observed at −30°. At −47° the portion of it in the stem of the thermometer was opaque and appeared frozen, but that contained in the bulb was still clear and not frozen. It was firmly frozen a few degrees lower by means of alcohol and snow, but the freezing point could not be accurately ascertained; but from the appearance of it before-mentioned, it appears that it is about −48° Fahrenheit. Nitric acid of the specific gravity of 1.260 was firmly frozen at −20°, and fluid at −15°. The rate of contraction of this acid appears to be very uniform; the thermometer filled with it, agreed nearer to the standard mercurial one than any of the others, (though more sluggish) and it never differed from it, more than about 2° from natural temperatures of +60° to −30° Fahrenheit.

Sulphuric Acid.

A small quantity of concentrated sulp. acid exposed in a shallow evaporating dish, was firmly frozen at −40°, and was fluid at −35°. The same acid diluted with 50 per cent. of water, by measure, was partly frozen round the sides of the dish at −26, and firmly frozen at −30° Fahrenheit.

Chloride of Tin and Chloride of Carbon,

Were neither in the least affected by a considerable exposure to a natural temperature of $-45°$ Fahrenheit; nor by the greatest degree of artificial cold I could produce, combined with this low temperature.

Chloride of Phosphorus

Is not in the least affected at $-30°$ Fahrenheit, at -40 it appears like thick oil, and at -47 it is frozen, and acquires the appearance of honey of firm consistence, but without any apparent crystallization.

ON THE FREEZING POINT OF DISTILLED MERCURY, THE AMALGAMS, &c.

To determine the freezing point of pure mercury; a portion of it was put into a shallow glass evaporating dish, and placed upon a support consisting of a slender rim of copper, with three glass legs. The bulbs of two spirit thermometers were placed upon each side of the dish, and the bulb of another in the centre of the mercury, the thermometer being attached to the stand, and in a vertical position. These thermometers had each been compared frequently with the standard mercurial one, when the temperature was not lower than $-30°$ Fahrenheit, and their respective errors applied at lower temperatures. The great difference between spirit thermometers at very low temperatures, renders any dependance upon them, when accuracy is required, very precarious, without a comparison with the mercurial ones, a few degrees above the freezing point of mercury. Among eighteen spirit thermometers, frequently compared nearly at the same time, there was a difference often amounting to twenty degrees at temperatures between 40° and 50° below Zero; and to show how much this was the case even in those made by the same maker and of the same length and construction, the following is a comparison of ten of them. They were placed in parallel and vertical positions, upon a board fixed to two upright supports about three feet above the frozen sea, and each of them was freely suspended at the end of a nail. The temperature at the time of comparison had been very steady for a considerable time.

No. 1	$-56°$ Fahr.	Mean $-52°.4$ Fahr. – Thermo. alcohol (uncoloured).
2	-56 ,,	
3	-49 ,,	
4	-49 ,,	
5	-52 ,,	
6	-40 ,,	Mean $-42°.8$ Fahr. – ,, ,, (coloured).
7	-40 ,,	
8	-44 ,,	
9	-44 ,,	
10	-46 ,,	

It appears from this comparison, that there was nearly ten degrees difference between the means of the thermometers filled with the uncoloured alcohol and those which were coloured, and the greatest difference is sixteen degrees. By a mean of several comparisons of the thermometers No. 5 and No. 10, between the temperatures of $-26°$ and $-30°$, No. 5 was lower by $2°.2$; and No. 10 was higher by $4°$ than a mean of seven mercurial ones; by applying these corrections, the true temperature by No. 5 is $-49°.8$, and by No. 10 it is $-50°$ Fahrenheit; or a mean temperature of $-49°.9$ Fahrenheit. The temperatures, as indicated by the thermometers with the uncoloured spirit, appear to be more correct than the coloured ones, in which the power of contraction of the spirit appears rapidly to diminish, and when suddenly taken from moderate to very low temperatures, most of the colouring matter was left in the upper part of the stem; they do not therefore seem so fit for use at very low temperatures as the others.

By a great many observations made each winter, pure mercury begins to freeze at $-38°.5$ Fahrenheit. A watch-glass full of it will be firmly frozen in about three or four hours when taken from a temperature of $+32°$ to $-39°$, but it remains fluid at a steady temperature of $-38°$ Fahrenheit. It begins to freeze first at the bottom and in the centre of glass, and generally assumes a kind of a tree-shaped crystallization, or somewhat like the ribs and vertebræ of fish when arranged in parallel positions close to each other; but the crystals composing the mass are so ill-defined, as to present no regular determination of figure, nor the least similarity between them.

An amalgam of 200 grains of distilled mercury, and twenty grains of lead, was firmly frozen at $-35°.5$, and fluid at $-31°.5$ Fahrenheit.

An amalgam of 100 grains of mercury and three grains of tin, is firmly frozen at $-35°.5$, and is fluid at $-34°.5$ Fahrenheit.

An amalgam of 200 grains of mercury and as much silver as it would dissolve, was partly frozen after a considerable exposure to -35.5 Fahrenheit.

An amalgam of 200 grains of mercury and twenty grains of zinc, is partly frozen after a long exposure to $-35°.5$ Fahrenheit.

These mixtures were exposed in small thin glass cylinders at steady and natural temperatures, and the above are the nearest limits of the freezing points of each that could be obtained by this means. Nearer limits might probably have been obtained by varying the degree of cold by artificial means, but some uncertainty would have been introduced, arising from the difficulty of maintaining an uniform temperature by this means. The metals were obtained perfectly pure for the purpose of experiment before leaving England; and it appears that the amalgam of mercury and lead is most easily frozen.

AN ABSTRACT

OF THE

VARIATION, DIP, &c. OBSERVED ON SHORE AT THE WINTER STATION UPON WINTER ISLAND, NORTH COAST OF AMERICA, DURING THE YEARS 1821—2, IN LATITUDE 66°.11'.35" N., AND LONGITUDE 82°.53' W.

THE first column contains the date; the second, the times of the day when the observations were made, which were generally about nine o'clock, A.M. and three o'clock, P.M. The third column contains the variation. This was observed with an instrument made by Dolland, for the purpose of observing the diurnal motion as well as the variation of the needle. It consisted simply of a long slender needle with a sliding weight to adjust it horizontally, and turned upon a fine steel point in an agate cup attached to the centre of the needle. To this instrument was also attached a telescope with cross hairs, which had a small vertical motion, and the whole having azimuth motion, the telescope could be referred to a distant well-defined object, by which the stability of the instrument could be ensured. The needle was covered with a brass frame which had a glass top, carrying with it a vernier, reading off to minutes upon the graduated arc, upon the fixed part of the instrument. The magnetic azimuth of the object to which the telescope was referred, was determined by making two fine lines drawn upon the moveable part of the instrument coincide with the north and south ends of the needle; and for the better observing the coincidence, a microscope with a single wire was attached to it for the purpose. As a line drawn through the Zero (upon the fixed part of the instrument) and the centre of the needle was parallel to the line of collimation of the telescope, the readings of the vernier compared with the true azimuth of the object gives the variation.

The true azimuth of the distant object, from the place where the instrument was fixed, was determined by placing the centre of a small transit instrument (having complete motion in azimuth) exactly over the place where the centre of the needle was placed, and observing the sun's transit over the vertical wires when it had the same azimuth as the object, which was therefore completed from the known error of the chronometer with which the observation was taken from apparent time, sun's declination and latitude of the place. When the needle was first fixed at Winter Island, and before the true azimuth of the distant object was determined, the stand upon which the needle was placed was thrown down and removed from its first situation by the wolves, so that the variations between Nov. 26th and Dec. 13th, were not accurately determined, and they are registered therefore, only to shew the difference between the variation in the morning and afternoon. It was afterwards fixed more securely, by filling up the space between the legs of the stand, and *banking* it round with snow. The precaution was also taken of determining the true azimuth of the object, before the series of observations at each station was commenced, and by repeating the operation when the observations were completed.

The fourth column contains the magnetic dip, which was observed with a new and excellent instrument made by Dolland. The observations here registered, were made with a needle which consisted of two long slender cones, put together at their bases, forming together a needle of about eight inches in length. The centre of this needle was perforated in two places, at right angles to each other, into which was fitted a moveable axis, which by this means could be placed in four different positions with respect to the needle, and afford a greater number of observations than one of the common construction. There was another needle also fitted to this instrument, known by the name of Meyer's needle, consisting of a long rectangular parallelogram, with the corners of the extremities rounded off; to the centre of it was attached a small stem, fixed at right angles to the needle, and having a moveable weight attached to it; by moving the weight near to, or farther from, the axis of motion, the needle may be brought to deflect more or less from its true dipping position of the needle at pleasure. If the dip be observed with this needle in one position, and again when it is inverted (estimating, in each case, the dip from the same point of the horizon), it is easily shown that the cotangent of the true dip is an arithmetical mean, between the cotangents of the observed dips in these positions of the needle, provided the centre of gravity is perpendicular to the axis of motion. This condition is not necessary in this (nor in the common needles) if the poles be inverted, and the dip in each position of the needle be observed; but the calculation is not near so simple*. If the weight be so adjusted that the needle may be perpendicular, then upon turning the instrument 90° (either way) in azimuth, the needle will shew the true dip without any calculation. If the instrument be moved 180° in azimuth, the needle will shew the magnetic latitude of the place in any part of the world, which is confirmed by experiment. By unscrewing and taking away this perpendicular stem, and the attached weight, the needle becomes, and may be used as one of the common construction. The needles turned, or vibrated upon horizontal edges of agate, and the instrument was adjusted by means of cross levels for the purpose, in the usual way, by means of foot screws; two distant marks were fixed, one towards the magnetic north, and the other towards the south, to which the instrument was always referred at the time of each observation. The axis of motion of the needle was centrically adjusted by means of a contrivance to elevate or depress it at pleasure, so that it might be placed gently upon the agate edges at each observation, by means of finger-screws conveniently placed for the purpose; the ends of the needle moved along a graduated circle in the instrument, divided to 20 minutes, and the divisions were large enough to be subdivided to 2 or 3 minutes, by means of two lenses, fixed at the extremities of a moveable arm, concentric with the needle.

The fifth column contains the time taken by the needle, to complete 100 vibrations. The whole arc described in the first vibration was 80°, and the last arc not less than 5°. The number of vibrations between the limits were generally from about 180 to 210, and the time of completing 100 vibrations determined by proportion. There was a contrivance attached to the graduated rim of the instrument, by which either end of the needle could be confined, and let fall through any extent of arc, at any given time, with con-

* If the centre of gravity is not perpendicular to the axis of the needle, but make with the vertical an angle β, and S and D be the sum and difference of the co-tangents of the observed dips, then cot. true dip $= \frac{S}{2 \pm \text{Tan.}\, \beta.\, D.}$ If when the poles are inverted, the co-tangents should be found to differ from the former ones (d' and d''), by the quantities x and y, then the co-tangent of the true dip will be represented by an equation of the form of $\frac{y \text{ cot. } d' + x \text{ cot. } d''}{y + x}$, a result which depends, however, upon the supposition that the line passing through the centres of gravity and suspension makes the same angle with the magnetic axis of the needle before and after the poles are inverted. I have not seen the investigation of M. Meyer, but as the formula given in his paper " de usu accuratiori acûs inclinatoriæ Magneticæ," is immediately deduced by eleminating β upon this supposition, it appears to depend upon the same hypothesis.

siderable precision, by holding a chronometer in one hand, and the string attached to the trigger in the other. One needle was kept for this purpose throughout the voyage; the poles were, of course, not reversed, and the needle was made to vibrate always upon the same side of the axis of motion.

The other columns contain the state of the barometer and thermometer, and also Kater's hygrometer when it was affected; for, at very low temperatures, it became so coated with ice by exposure, as to remain stationary for many days together.

DATE.	Variation W.	Dip.	The Time of describing 300 Vibrations.	Barom.	Therm.	Kater's Hygr.	REMARKS.
1821.	° ′ ″	° ′ ″	″		°		
Oct. 15 A.M.	. .	87 45 43	. .	29.77	+ 8	. .	Moderate breeze from N. and cloudy W.
„ 16 „	. .	. .	295.5	30.14	+ 9	. .	Ditto S. and snow at times.
„ „ P.M.	. .	. .	298.7	30.13	+13	. .	Squally wind S.E. (but variable).
„ 17 A.M.	. .	87 40 18	303.6	29.94	+10	. .	Light breezes from S.W. and cloudy. Snow at times.
„ „ P.M.	. .	87 59 50	298.4	29.76	+ 8	. .	Ditto ditto. Ditto.
„ 18 A.M.	. .	87 55 57	302.1	29.40	+23	. .	Calm and cloudy. Snow occasionally.
„ 20 P.M.	.	87 42 5	. .	30.02	+ 1	. .	Fine weather. Moderate breeze from N.b.W.
„ 21 „	. .	88 3 40	. .	30.12	+ 3	. .	Moderate breeze from S.E. Small snow at times.
Nov. 26 „	59 56 12	. .	. .	29.82	− 1	3.83	Moderate breeze from N.W. with sleet. Aurora very bright shortly afterwards from S.E. to W., not higher than about 10° above the horizon, shooting out bright rays towards the zenith. One of Kater's compasses was continually examined till midnight; but it was not in the slightest degree affected by the aurora,
„ 27 A.M.	55 47 10	. .	. .	29.92	−18	3.83	Faint aurora two hours before this observation in every part of the heavens, particularly from the East through the zenith to the West.
„ „ Noon	54 18 48	. .	. .	29.94	− 19	3.83	Stiff breeze from N.W., and clear weather.
„ 28 P.M.	55 19 12	. .	. .	. .	.	3.83	Fresh breeze from N.W., and clear weather with faint aurora in the S.E.
Dec. 1 A.M.	57 43 12	. .	.	29.76	−24	3.88	Aurora in every part of the heavens, but particularly in the zenith. Kater's compass examined as before, but was not influenced by the aurora. Moderate breeze from the N.W.
„ „ P.M.	57 19 10	. .	.	29.80	−24	3.88	Fresh breezes from N.W. Clear weather.

DATE.	Variation W.	Dip.	The Time of describing 100 Vibrations.	Barom.	Therm.	Kater's Hygr.	REMARKS.
1821.	° ′ ″	° ′ ″	″		°		
Dec. 2 P.M.	55 45 12	. .	. .	29.88	−25	. .	Moderate breeze from N.W., and clear weather.
„ 6 A.M.	56 20 36	. .	. .	29.76	− 2	. .	Fresh breeze from S.E. and cloudy.
„ 7 A.M.	56 22 36	. .	. .	29.89	− 1	. .	Moderate breeze from S.E., cloudy.
„ 8 A.M.	56 24 24	. .	. .	29.81	− 2	. .	Cloudy with fog. The wind just changed from S. to N.
„ „ P.M.	55 6 24	. .	. .	29.78	− 9	. .	Moderate breeze from N., and clear weather.
„ 9 P.M.	54 50 8	. .	. .	29.69	−19	. .	Moderate breeze from N., clear weather.
„ 10 A.M.	56 3 0	. .	. .	29.60	−20	. .	Moderate breeze from N.W., cloudy.
„ 11 A.M.	55 37 36	. .	. .	29.72	−26	. .	Moderate breeze from N., clear weather.
„ 12 A.M.	55 54 36	. .	. .	29.70	−25	. .	Ditto, ditto.
„ 13 A.M.	56 0 0	. .	. .	29.91	−31	. .	Light breeze from N., clear weather.
„ 14 A.M.	56 50 0	. .	. .	30.09	−33	. .	Brilliant aurora at night from the E. to the zenith. Compass tried as before, but not affected.
„ 17 A.M.	57 49 36	. .	. .	29.23	− 9	. .	Moderate breeze from S.E., cloudy.
„ 16 A.M.	56 58 24	. .	. .	29.18	−18	. .	Light breeze from N., fine weather.
„ „ P.M.	54 37 12	. .	. .	29.60	−15	. .	Moderate breeze from N.E., clear weather.
„ 19 A.M.	56 22 36	. .	. .	29.47	−20	. .	Fresh breeze from N.W., fine weather.
„ „ P.M.	55 39 48	. .	. .	29.45	−17	. .	Moderate breeze from N.b.E., fine weather.
„ 20 A.M.	56 25 24	. .	. .	29.65	−16	. .	Moderate breeze from N.E., fine weather. Brilliant aurora at night from S. to W.S.W.
„ 21 A.M.	56 12 0	. .	. .	29.88	− 8	. .	Strong breeze from N.W., and cloudy.
„ 22 A.M.	57 28 36	. .	. .	29.46	− 9	. .	Light breeze from W. with sleet.
„ „ P.M.	55 36 40	. .	. .	29.41	− 9	. .	Thick cloudy weather with light snow, but cleared up shortly afterwards with faint aurora in S.E.
„ 24 A.M.	56 46 24	. .	. .	29.60	−10	. .	Light breezes from N.W., and cloudy.
„ „ P.M.	54 52 50	. .	. .	29.80	−10	. .	Moderate breeze from N.N.W., cloudy. Brilliant aurora at night.

DATE.	Variation W.	Dip.	The Time of describing 100 Vibrations.	Barom.	Therm.	Kater's Hygr.	REMARKS.
1821.	° ′ ″	° ′ ″	″		°		
Dec. 26 A.M.	56 58 0	. .	. .	29.28	− 5	..	Strong breeze from S.E. and cloudy.
„ 27 A.M.	56 27 36	. .	. .	29.53	− 7	..	Light breeze from N.E., fine weather. Faint aurora this morning before these observations from E. through the zenith to the W.
„ „ P.M.	54 31 12	. .	. .	29.57	− 8	..	Light breeze from N.E., fine weather. Faint aurora in N.W.
„ 31 A.M.	57 35 48	. .	. .	29.80	−30	..	Moderate breeze from N.W., fine weather. Faint aurora at S.S.W. early in the morning.
1822.							
Jan. 2 A.M.	57 16 12	. .	. .	29.58	−24	..	Moderate breeze from N.W., fine weather.
„ „ P.M.	55 21 0	. .	. .	29.61	−27	..	Ditto, ditto.
„ 3 A.M.	56 36 24	. .	. .	29.74	−27	1.05	Light breezes from N.E., and thick weather.
„ 4 A.M.	57 6 36	. .	. .	29.45	−15	0.12	Fresh breeze from W., cloudy.
„ 5 A.M.	57 3 12	. .	. .	29.72	−31	..	Fresh breeze from W., clear weather.
„ 7 A.M.	57 1 40	. .	. .	29.66	−26	9.45	Moderate breeze from N.W., clear weather.
„ 9 A.M.	57 1 36	. .	. .	30.00	−28	9.65	Ditto, ditto.
„ „ P.M.	55 43 36	88 14 20	. .	30.00	−27	..	Light breeze from N.b.W. Streams of aurora from S.E. part of horizon towards the zenith.
„ 10 A.M.	56 14 24	89 13 33	306.1	29.60	−15	..	Moderate breeze from N.E., and cloudy.
„ „ P.M.	54 54 36	88 6 55	303.1	29.47	−13	..	Strong breeze from E., and cloudy.
„ 12 A.M.	55 19 24	86 57 40	304.6	29.85	−24	..	Moderate breeze from N.W., and cloudy.
„ „ P.M.	54 59 0	87 10 40	300.9	29.87	−24	..	Strong breeze from W.b.N., cloudy. Aurora shortly afterwards to the E. and W. in vertical streams.
Apr. 16 A.M.	57 3 16	87 44 45	301.1	29.72	+23	..	Calm, fine weather.
„ „ Noon.	57 4 40	88 9 26	303.3	29.70	+26	..	Fresh breeze from W., fine weather.
„ „ P.M.	55 5 28	87 40 41	283.1	29.68	+22	..	Fresh breeze from W., and cloudy. Bright aurora to the S. from E. to W. nearly, with much motion about an hour after these observations.
„ 17 A.M.	55 45 52	87 47 53	288.2	29.81	+13	2.06	Light breeze from N.W. Fine snow occasionally.
„ „ Noon.	55 35 4	88 1 30	302.2	29.62	+24	2.09	Ditto. Ditto.
„ „ P.M.	55 16 52	88 9 41	301.1	29.69	+20	4.04	Moderate breeze from S.W. Thick cloudy weather.

DATE.	Variation W.	Dip.	The Time of describing 100 Vibrations.	Barom.	Therm.	Kater's Hygr.	REMARKS.
1822.	° ′ ″	° ′ ″	″		°		
Apr. 18 A.M.	56 36 28	88 2 15	302.2	29.80	+20	3.08	Moderate breeze from S.W. Thick, cloudy weather.
„ „ Noon.	55 50 26	87 39 19	296.1	29.80	+23	3.08	Ditto. Ditto.
„ „ P.M.	55 23 28	87 45 15	305.6	29.83	+27	4.04	Ditto. Ditto.
„ 19 A.M.	56 18 28	87 48 7	303.7	29.78	+17	4.03	Calm, thick, cloudy weather.
„ „ Noon.	56 11 52	87 46 56	296.7	29.80	+33½	2.02	Ditto.
„ „ P.M.	56 1 16	87 41 41	301.1	29.77	+12½	2.00	Ditto.
May 10 A.M.	58 4 15	87 48 53	297.0	29.80	+3[illegible]	2.61	Moderate breeze from N.W. Fine weather.
„ „ P.M.	57 59 27	87 29 56	295.5	29.83	+39	2.46	Ditto. Ditto.
„ 13 A.M.	58 33 3	88 13 31	301.2	29.97	+27	2.25	Light breeze from N. Fine weather.
„ 14 A.M.	57 51 27	88 7 15	297.2	29.87	+44	1.93	Hazy weather. Light breeze from S.
„ „ P.M.	57 4 3	87 48 37	291.4	29.80	+36	1.92	Clear weather. Ditto.
„ 15 A.M.	58 3 3	87 57 7	295.9	29.57	+30	3.03	Hazy with light snow. Moderate breeze from S.E.
„ 20 A.M.	57 59 16	87 51 56	298.8	29.86	+26	2.96	Light breeze from N.N.W. Clear weather.
„ „ P.M.	59 21 1	87 12 45	291.8	30.00	+48	2.82	Ditto. Ditto.
„ 21 A.M.	58 26 53	88 3 37	294.6	30.04	+28½	2.61	Light breeze from N. Ditto.
„ „ P.M.	59 39 47	87 32 41	290.3	30.06	+53½	2.53	Ditto. Ditto.
„ 22 A.M.	57 21 51	88 1 37	301.2	29.97	+40	2.29	Light breeze from W. Cloudy at times.
„ „ P.M.	58 44 51	87 49 30	296.2	29.92	+44	2.24	Ditto. Cloudy weather.
„ 23 A.M.	58 12 51	87 57 19	291.8	29.71	+43	2.39	Moderate Breeze from W. Thick, cloudy weather.
„ „ P.M.	57 51 15	87 49 34	292.2	29.64	+47	2.32	Ditto. Ditto.
„ 24 A.M.	58 36 15	87 59 53	299.0	29.40	+43	2.55	Moderate breeze from N.N.E. Cloudy. Much snow the preceding night.
„ „ P.M.	56 55 51	88 8 52	297.9	29.37	+54	2.46	Ditto. Ditto. Ditto.

DATE.	Variation W.	Dip.	The Time of describing 100 Vibrations.	Barom.	Therm.	Kater's Hygr.	REMARKS.
1822.	° ′ ″	° ′ ″	″		°		
May 27 A.M.	57 20 27	87 28 7	288.8	29.62	+39	2.36	Light breeze from S.W. Thick, cloudy weather.
„ „ P.M.	57 59 15	87 56 37	292.4	29.60	+40	2.33	Ditto. Dark, cloudy weather.
„ 28 A.M.	55 50 27	87 40 18	289.6	29.64	+28½	2.51	Fresh breeze from N.b.E. Cloudy.
„ „ P.M.	58 8 27	87 44 45	286.3	29.70	+35	2.45	Moderate breeze from N. Fine weather.
„ 29 A.M.	58 37 51	87 47 30	297.7	29.77	+36½	2.38	Light breeze from N.W. Fine, clear weather.
„ „ P.M.	57 27 3	88 2 45	299.0	29.80	+58	2.34	Light breeze from W.b.N. Ditto.
„ 30 A.M.	59 1 15	87 58 11	294.1	29.81	+37½	2.12	Light breeze from N.b.W. Ditto.
„ „ P.M.	57 26 15	88 43 11	295.5	29.82	+57½	2.05	Calm. Ditto.
„ 31 A.M.	59 27 15	87 31 53	292.9	29.89	+42	1.90	Light breeze from N.W. Ditto.
„ „ P.M.	59 25 3	87 54 56	293.2	29.95	+51½	1.86	Ditto. Cloudy at times.
June 1 A.M.	58 35 3	87 29 19	290.2	29.95	+41	1.96	Light breeze from S.W. Dark, cloudy weather.
„ „ P.M.	58 31 15	87 46 23	288.2	29.91	+44	1.98	Ditto. Ditto.
„ 3 A.M.	55 21 53	87 49 41	285.2	29.82	+41	2.93	Moderate breeze from N.W. Ditto.
„ „ P.M.	56 42 27	87 43 26	289.2	29.82	+45½	2.52	Ditto. Ditto.
„ 4 A.M.	58 10 15	88 5 49	293.4	29.79	+43½	2.65	Light breeze from S.W. Thick, cloudy weather.
„ „ P.M.	55 53 27	87 40 23	292.0	29.80	+46½	2.44	Ditto. Ditto.
„ 5 A.M.	55 11 15	87 47 49	291.5	29.70	+37	2.69	Fresh breeze from N.W. Cloudy weather.
„ „ P.M.	58 37 39	87 54 11	292.3	29.60	+34	2.53	Fresh breeze from N.b.E. Ditto.
„ 6 A.M.	56 11 51	87 41 7	291.5	29.70	+35	2.70	Moderate breeze from N. Fine weather.
„ „ P.M.	57 46 39	87 29 19	289.7	29.70	+35	2.32	Moderate breeze from N., but a heavy squall at the time of observation. Cloudy weather.
„ 7 A.M.	58 7 51	87 24 37	289.0	29.64	+47½	2.53	Light breeze from N.W. Fine weather.
„ „ P.M.	57 37 39	87 53 41	283.5	29.61	+37½	2.20	Ditto. Ditto.

ON THE VARIATION, DIP, &c. ISLAND OF IGLOOLIK, N.E. COAST OF AMERICA, 1822—3.

THE observations were made in the same manner as those at Winter Island; with the addition of a column containing the space fallen through by the coloured liquid in Leslie's hygrometer, from the evaporation of pure alcohol applied to one of the bulbs with a camel's-hair brush. Though Kater's hygrometer was extremely sensible at moderate temperatures, yet when exposed to low ones, it often acquired a coating of ice, which obstructed its motion for several days together; whereas Leslie's has the advantage of indicating similar results under the same circumstances; yet the difficulty with this instrument, is the separation of the hygrometric influence arising from the absorbing power of the atmosphere, from that occasioned by the difference of temperature of the bulbs of the instrument, one being at the temperature of the surrounding atmosphere, and the other at a lower temperature arising from the cold produced from the evaporation: the effect produced by this latter circumstance is so considerable, that the instrument (although a very ingenious one) appears to be more a thermometer than an hygrometer at low temperatures. I have endeavoured, however, to correct the indications for the difference of temperature, by a comparison with Kater's hygrometer when the temperatures were above + 32° Fahrenheit. At different temperatures, when Kater's hygrometer indicates the same degree of humidity, the difference between the contemporary indications of Leslie's will be the effect due to the difference of temperature; and by frequent comparisons of this kind, the indications are corrected and reduced to what they would have been at the temperature of + 32° Fahrenheit, and are given in a separate column. As these corrections may be considered somewhat objectionable, forasmuch as the other hygrometer is supposed not to be affected by a change of temperature, I have also given the observations just as they were taken, that they may be corrected upon any other supposition. The alcohol used was of the specific gravity of ·815 at +62° Fahrenheit.

DATE.	Variation W.	Dip.	Time of 100 Vibrations.	Barom.	Therm.	Space fallen through by Leslie's Hygr.	Ditto corrected.	Kater's Hygr.	REMARKS.
1822.	° ′ ″	° ′ ″	″		°	°	°		
Nov. 13 P.M.	. . .	87 53 0	301.7	29.90	−29	. .	. .	. .	Light breeze from N. Fine weather.
„ 14 P.M.	. . .	88 18 11	303.4	30.10	−25	. .	. .	. .	Moderate breeze from N.N.W. Cloudy.
„ 16 A.M.	. . .	88 0 48	301.7	29.52	−23	. .	. .	. .	Light breeze from N.W. Clear.
„ „ P.M.	. . .	. . .	297.0	29.50	−23	. .	. .	. .	Ditto. W.
„ 18 A.M.	. . .	87 46 13	296.0	29.91	−24	. .	. .	. .	Light variable winds. Clear weather.
„ „ P.M.	. . .	. . .	301.7	29.90	−22	. .	. .	. .	Light breeze from S.W. Ditto.
„ 19 Noon	. . .	87 57 13	303.0	29.83	− 9	. .	. .	. .	Ditto. Hazy.
„ 22 A.M.	. . .	87 42 17	301.7	29.58	−37	. .	. .	. .	Light breeze from N.W. Clear.
„ 23 Noon	. . .	87 46 53	297.7	29.79	−41	. .	. .	. .	Calm, clear weather.
1823. Apr. 9 A.M.	84 4 0	87 39 49	286.8	30.28	0	10.5	23	. .	Light breeze from S.W. and cloudy. Aurora the preceding night, and faintly this morning in S.E.
„ „ P.M.	83 49 30	87 47 28	282.0	30 20	+ 7	17.5	35.2	. .	Same weather.
„ 11 A.M.	81 34 15	88 8 37	288.2	30.16	− 3	14.2	27.2	. .	Light breeze from W. and cloudy. Halo round ☉.
„ „ P.M.	83 27 20	87 59 49	290.6	30.15	0	21.2	33.6	. .	Light breeze from S.E. Dark, cloudy weather.
„ 12 A.M.	83 54 30	87 42 0	285.8	30.17	+ 3	14.7	35.0	. .	Moderate breeze from N.W. Snowing all night, but now clearing up.
„ „ P.M.	84 34 0	87 56 0	288.7	30.27	0	13.2	35.6	. .	Fresh breeze from N.b.W., and cloudy.
„ 14 A.M.	83 12 15	88 2 0	284.1	30.30	−14	11	41	. .	Light breeze from W. Clear weather.
„ „ P.M.	83 43 36	87 58 6	287.0	30.16	− 3	17.5	41	. .	Light breeze from S.W. Ditto.
„ 21 A.M.	82 45 20	87 57 34	279.8	29.89	− 5	15	39.2	. .	Light breeze from N.W. Ditto.
„ „ P.M.	83 15 45	87 49 15	319.3	30.00	+ 5	24.7	44.3	. .	Light breeze from N. Ditto.
„ 22 A.M.	83 12 40	87 45 49	281.2	30.18	+ 4	16	35.6	. .	Calm and fine weather. Thermometer in ☉ + 40°.
„ „ P.M.	83 32 20	88 3 15	286.2	30.20	+ 7	27.5	42.9	. .	Light breeze from N.W. Clear weather. Thermometer in ☉ + 33°.
„ 23 A.M.	80 35 40	88 0 23	282.6	30.13	+ 6	14.2	32.5	. .	Moderate breeze from N. Thick foggy weather. Snow occasionally.
„ „ P.M.	83 19 30	88 4 19	281.5	30.08	+13	26	41	. .	Ditto. Ditto.
„ 24 A.M.	82 23 40	87 57 30	281.7	29.92	+ 1.5	12	35	. .	Fresh breeze from N.b.W. Clear weather. Thermometer in ☉ + 20°.
„ „ P.M.	83 24 40	88 10 19	288.6	29.89	+ 8	19.5	36.5	. .	Ditto. Brilliant Halo with mock suns.
„ 25 A.M.	82 54 40	87 53 26	284.4	29.92	+ 8	15.7	32.7	. .	Fresh breeze from N.W. with snow.
„ „ P.M.	82 58 20	88 5 41	286.3	29.89	+ 8	25	42	. .	Ditto. Clear weather.

„ 26 A.M.	81 57 20	87 54 30	285.9	30.05	+ 6	14.5	32.5	. .	Strong breeze from N.W. Cloudy weather.
„ 28 A.M.	83 52 0	87 57 19	286.2	30.00	+25	21.7	28	. .	Moderate breeze from S. Ditto.
„ „ P.M.	84 11 0	88 7 0	288.0	29.83	+25.5	31.5	37	. .	Fresh breeze from S., and clear weather.
„ 29 A.M.	82 54 0	87 51 15	281.4	29.78	+31.5	23	23.5	. .	Light breeze from N.W. Thick foggy weather, with snow.
„ „ P.M.	83 25 20	88 4 4	286.5	29.60	+20	28	37.6	. .	Ditto. Clearing up.
„ 30 A.M.	81 56 20	88 1 26	287.0	29.99	+ 8	12.5	39.5	. .	Strong breezes from N.W. Clear weather.
„ „ P.M.	83 7 45	88 9 41	288.4	30.08	+10	21.5	37.6	. .	Strong breezes from N.W. Clear weather.
May 1 A.M.	82 9 20	88 0 37	279.2	30.06	+12	23.7	39.2	. .	Light breezes from N.W. and cloudy. Halo round ⊙.
„ „ P.M.	83 39 0	88 19 4	292.2	30.00	+14	34.2	48.2	. .	Ditto. Parhelion E. and W. of ⊙.
„ 2 A.M.	82 19 40	88 3 11	267.1	29.95	+15	17	30	. .	Moderate breeze from E., thick weather with snow.
„ „ P.M.	82 12 20	88 7 56	281.6	30.00	+14	21.5	35.5	. .	Fresh breeze from N.E. Weather clearing.
„ 3 A.M.	82 22 20	88 10 19	273.9	30.03	+ 8	15.5	32.5	2.39	Fresh breeze from N.b.E. Thick, cloudy weather.
„ „ P.M.	82 0 0	88 11 34	282.1	30.02	+16	20.2	32.7	2.23	Ditto. Ditto.
„ 7 A.M.	82 44 30	88 25 19	281.8	29.97	+36	27.5	24	4.80	Fresh breeze from E. Foggy, with snow and rain.
„ „ P.M.	83 59 0	88 8 27	289.3	30.05	+37	40.7	36.2	3.31	Ditto. Ditto.
„ 8 A.M.	82 16 40	88 22 30	284.5	30.31	+42	30	21	4.34	Moderate breeze from S.E. Thick, cloudy weather.
„ „ P.M.	84 14 40	88 19 53	286.9	30.40	+46	40.2	27	2.74	Light breeze from S.E. Ditto.
„ 9 A.M.	83 28 30	88 19 45	287.0	30.46	+42	31.5	22.5	3.54	Light breeze from N.W. and cloudy.
„ „ P.M.	84 4 40	88 8 0	286.0	30.45	+46	45.5	36.7	2.41	Ditto. Ditto.
„ 10 A.M.	82 40 30	88 12 49	261.2	30.41	+35	31	27	3.07	Moderate breeze from W. Cloudy. Halo round ⊙. A dense white fog at the end of observation.
„ 12 A.M.	. . .	88 23 56	283.2	30.16	+28	24.7	28	3.32	Fresh breeze from N.W., and cloudy.
„ „ P.M.	. . .	88 26 37	284.5	30.15	+25	26	32	3.06	Ditto, ditto.
„ 13 A.M.	. . .	88 20 0	282.7	30.02	+22	20.5	28.5	3.25	Ditto. Clear weather.
„ „ P.M.	. . .	88 34 30	284.0	30.10	+29	27	29.5	3.07	Ditto. Ditto.
„ 14 A.M.	84 11 20	88 18 40	281.7	29.95	+22	24.5	32.5	3.03	Light breeze from W.b.S., and hazy.
„ „ P.M.	85 3 20	88 23 4	282.7	29.88	+35	36.5	33.5	2.36	Fresh breeze from S. Thick weather, and much snow.
„ 15 A.M.	83 56 20	88 36 43	286.2	29.76	+39	27.5	21.5	2.95	Light breeze from S.b.E. Thick cloudy weather with snow.
„ „ P.M.	83 47 20	88 21 30	288.8	29.75	+38	36.5	31	2.32	Ditto. Ditto.
„ 17 A.M.	82 30 40	87 55 49	283.8	29.46	+26	18.5	23.5	4.56	Strong breezes from N. Cloudy weather.
„ „ P.M.	82 32 40	88 13 23	280.4	29.47	+32	24.2	24.2	3.66	Moderate breezes from N. Cloudy.

DATE.	Variation W.	Dip.	Time of 100 Vibrations.	Barom.	Therm.	Space fallen through by Leslie's Hygr.	Ditto corrected.	Kater's Hygr.	REMARKS.
1823.	° ′ ″	° ′ ″	″		°	°	°		
May 19 A.M.	83 26 40	8o 10 49	283.7	29.74	+23	19	26.5	3.63	Fresh breezes from N.W. Clear.
,, ,, P.M.	83 15 40	88 17 7	283.5	29.73	+28	28	31.2	3.33	Ditto.
,, 20 A.M.	83 32 45	88 10 30	275.3	29.73	+14	20	34	3.26	Light breeze from W.b.N. Cloudy.
,, ,, P.M.	85 7 40	88 5 7	284.4	29.66	+25	28	34	3.09	Light breeze from W.b.N. Cloudy.
,, 21 A.M.	82 50 20	88 14 11	285.3	29.59	+17	19.5	30.5	3.61	Strong breezes from W.N.W. Thick, cloudy weather.
,, ,, P.M.	82 47 0	88 17 53	287.3	29.59	+21	20	29	3.32	Ditto, with snow.
,, 22 A.M.	83 18 15	88 21 45	286.6	29.55	+28	24	27.2	3.57	Calm, with light snow.
,, ,, P.M.	84 3 20	88 18 11	284.5	29.55	+39	39.5	33.5	2.58	Light breeze from S.E. Thick, cloudy weather.
,, 23 A.M.	82 22 15	88 20 19	283.2	29.55	+31	26.5	27.5	3.45	Moderate breeze from S.E. Thick weather, with snow.
,, ,, P.M.	83 3 0	88 26 4	261.6	29.65	+33¼	37	35.5	2.73	Ditto.
,, 24 A.M.	82 28 40	88 11 19	283.4	29.69	+33	31.5	30.5	3.26	Ditto.
,, ,, P.M.	81 14 20	88 20 45	278.0	29.64	+37	37	32.5	2.64	Ditto.
,, 26 A.M.	84 21 20	88 18 13	278.5	29.80	+40	32.5	25.2	3.71	Light breeze from S.E. Thick, cloudy weather.
,, ,, P.M.	84 51 0	88 24 49	287.0	29.84	+48	52	36	2.37	Ditto. Ditto.
,, 27 A.M.	83 11 20	88 24 56	274.8	30.00	+25	20.2	26.2	2.83	Moderate breeze from W.b.N. Fine clear weather.
,, ,, P.M.	83 21 20	88 9 53	279.1	30.10	+40	42.5	35.2	2.51	Very light breeze from W. Ditto.
,, 28 A.M.	82 33 40	88 25 30	279.0	30.05	+38	33	27.6	2.61	Light breeze from N. Thick, cloudy weather.
,, ,, P.M.	83 27 40	88 22 37	283.1	29.97	+45	46.5	34.5	1.66	Moderate breeze from S.b.W. Ditto.
July 16 A.M.	82 8 31	88 19 49	282.8	29.84	+56	51	26	2.94	Calm, fine weather.
,, 17 A.M.	81 48 11	88 19 23	282.9	29.81	+57	48.5	22.5	3.05	Calm and cloudy.
,, ,, P.M.	82 32 11	88 18 41	283.4	29.81	+60	53.5	23	2.84	Ditto.
,, 18 A.M.	80 51 51	88 27 19	280.9	29.75	+55	39	15	3.17	Calm. Cloudy, rainy weather.
,, ,, P.M.	82 11 11	88 16 56	285.1	29.72	+63	58	23	2.92	Moderate breeze from S.E. Rather cloudy.
,, 19 A.M.	82 50 51	88 36 26	291.2	29.68	+60	43.5	13	3.08	Light breeze from W. Fine weather.
,, ,, P.M.	83 19 11	88 3 15	291.5	29.68	+68.5	67.5	26	2.30	Light breeze from S.W. Thermometer in ⊙ + 114° Fahr.
,, 21 A.M.	80 43 11	88 20 30	275.9	29.36	+41	31	23	4.56	Moderate breeze from S.E. Cloudy weather.
,, ,, P.M.	81 42 31	88 24 45	278.6	29.38	+47	34.5	19.5	4.11	Ditto.

AN ABSTRACT OF THE MAGNETICAL OBSERVATIONS.

DATE.	Latitude N.	Long. W.	Variation W.	Dip.	Time of 100 Vibrations.	REMARKS.
	° ′	° ″	° ′	° ′ ″	″	
1821.	. .	. .	. .	69 59 44	333.3	Mean of observations in and near London, before and after the expedition.
July 4	61 13	64 43	52 45	83 58 51	. .	Upon a floe of ice in Hudson's Straits.
Aug. 3	65 8	79 35	52 12	87 9 11	. .	Ditto.
„ 17	65 30	85 15	47 7	87 27 52	. .	On shore. Duke of York's Bay. Southampton Island.
„ 22	66 31	86 28	48 33	88 7 28	. .	On shore. North side of Repulse Bay.
„ 29	66 13	84 40	52 20	87 30 35	. .	On shore. Duckett Cove.
Sept. 6 } „ 13 }	66 38	84 11	54 0	87 51 55	. .	Lyon's Inlet.
1822.	66 11	82 54	57 24½	87 51 9	297.3	Mean of all the observations made at the winter station, Winter Island.
July 6	66 37	81 39	62 17	87 47 13	299.6	Upon the sea ice.
„ 23	69 34	81 14	82 32	87 37 9	293.9	Ditto.
Aug. 6	69 32	81 23	86 6	88 6 28	. .	Ditto.
Sept. 9	69 48	83 28	89 18	88 21 21	. .	Fury and Hecla's Straits. Upon the ice.
1822-3.	69 21	81 37	83 1½	88 9 49	286.7	Mean of all the observations made at the Winter Station, Island of Igloolik.

TABLE

Of the MEAN RESULTS of the MAGNETICAL OBSERVATIONS at both WINTER STATIONS.

I.—AT WINTER ISLAND IN 1821—2.

Lat. 66° 11′ N. Long. 82° 54′ W.

DATE.	No. of Times of Observation.	Variation W.	Dip.	Time of completing 100 Vibrations.	Mean State of Thermometer.
		° ′ ″	° ′ ″	″	°
1821—Middle of October . . .	3	. . .	87 51 15	299.7	+ 9
1822—Beginning of January . . .	5	. . .	87 56 38	304.9	− 24
„ Middle of April	12	56 1 6	87 51 25	298.7	+ 22
„ Middle of May	12	58 18 20	87 52 17	296.2	+ 38
„ End of May	12	57 47 16	87 51 20	293.7	+ 43
„ Beginning of June . . .	14	57 32 50	87 43 57	290.6	+ 45½
Means		57 24 23	87 51 8	297 3	

II.—AT THE ISLAND OF IGLOOLIK. 1822—3.

Lat. 69° 21′ N. Long. 81° 37′ W.

DATE.	No. of Times of Observation.	Variation W.	Dip.	Time of completing 100 Vibrations.	Mean State of Thermometer.
		° ′ ″	° ′ ″	″	°
1822—Middle of November . . .	9	. . .	87 54 55	300.4	− 25½
1823—Middle of April	18	83 9 0	87 58 47	285.3	+ 2
„ Beginning of May . . .	17	82 59 37	88 8 43	284.9	+ 17
„ Middle of May	17	83 45 23	88 18 28	283.6	+ 32
„ End of May	14	83 11 0	88 19 45	282.2	+ 38
„ Middle of July	9	82 3 12	88 20 17	283.6	+ 60
Means		83 1 32	88 9 49	286.7	

In order to compare the following observations with the formula, expressing the relation between the magnetic force and the dip, *viz.*, $f \propto \left\{\frac{1}{4 - 3 \sin.^2 d}\right\}^{\frac{1}{2}}$ where f and d represent these quantities. The time of completing 100 vibrations by many observations (with the needle employed for this purpose,) in and near London, in April, 1821, was 330″.1; and on the return of the Expedition it was 336″.5; the mean between these results is 333″.3, for the time of making 100 vibrations. By many observations also, with the same instrument, before and after the voyage, by myself, with a great many others, (with another instrument of the same construction belonging to the Board of Longitude,) made by Professor Rigaud, Captain Home, R. N., and myself, at several places near London with seven different needles, two of which were of Meyer's construction, the dip was found to be 69° 59′ 44″, for January, 1823, (which is about the middle time of the observations) which nearly agrees with Captain Sabine's determination. From this data, it appears that the *computed* time of making 100 vibrations at Winter Island is 309″.5, the dip being 87° 51′ 9″; whereas by a mean of all the observations made during the winter and summer at that place, the *observed time* was 297″.3; the time therefore of completing the 100 vibrations at Winter Island was less than that computed from the formula by 12″2. In the same way, at the second Winter's Station at the Island of Igloolik, the mean of all the observations gives the time of completing 100 vibrations 286″.7, the dip being 88° 9′ 49″; whereas the time computed from the formula is 309″.4. In this case also, the time of completing the 100 vibrations was *less* than that computed from the formula, by the quantity 22″.7. At each place, therefore, the vibrations of the needle indicated a greater intensity of force than that deduced from the above formula, which assigns a difference of 0″.1 only between the times of completing the 100 vibrations at each Winter Station; but by observation it was 10″.5.

The great difference observed in the times of making the vibrations during the winter and summer times, was very considerable at each of the Winter Stations, and therefore hinders any rigid comparison of this kind from being made. For instance, in the middle of Winter, at Winter Island, the time of completing the 100 vibrations was 304″.9, but which gradually diminished as the summer advanced, and in the following June, it was 290″.6, the difference being 14″.3. Also at the second Winter Station at Igloolik, in the winter, the time of making 100 vibrations was 300″.4, but in the following June it was 283″.0, the difference being 17″.4; at both places the intensity of the force was considerably greater during the summer than in the depth of winter, as the abstract of the observations themselves (page 276) will shew; and the time of making the 100 vibrations in the winter time nearly agrees with the computed time.

The great irregularity in the results of the observations for determining the variation, renders it difficult to form any idea of the quantity of its daily change, between the hours of observation in the morning and afternoon, although each result is a mean of never less than 5, and often 10 or 12 readings of the needle. The fixed telescope of the instrument was always referred to the distant object, put up for the purpose of ensuring the stability of the instrument, before the readings were taken, and the sluggish motion of the needle assisted by gently tapping upon its cover, as well as every other possible precaution taken to ensure an accurate result. At Winter Island during the months of November, December, and January, the westerly variation in the morning was *greater* than in the afternoon by 57′, from a mean of more than 300 observations; by a mean of all the observations at this place both winter and summer, the morning exceeded the afternoon variation by 13′.24″. But at Igloolik, the second Winter Station, the variation in the morning was *less* than in the afternoon by 38′.54″, from a mean of near 600 observations made during the spring and summer months at that place. At Winter Island the dip was 19′ greater; and at Igloolik 1′ less in the morning than in the afternoon. The time of completing 100 vibrations was 1″.3 *greater* in the morning than in the afternoon at Winter Island; but at Igloolik, it was 2″.3 *less* in the morning than in the afternoon; so that with respect to the variation, dip, and the time of completing 100 vibrations, contrary results were obtained at the Winter Stations in the morning and afternoon observations. The number of observations for determining the dip amount to 143 made at different times, and each of these a mean of from 8 to 16 different readings of the needle, in its different positions: the observations upon the vibrations of the needle have been taken at as many different times; most of the results are means between two sets of vibrations, and many of them (when they have differed) means of three or four sets.

The only agreement which appears, by comparing together the observations made at each Winter Station, is the increase in the magnetic force as the summer advances, which is very apparent; and as the time of completing the 100 vibrations by the same needle was about six seconds *greater* after the return of the Expedition, than before it left England it does not seem probable that it arose from any change in the degree of saturation, with respect to the magnetism in the needle itself, as, in that case, the time of completing the 100 vibrations would have been diminished instead of increased. The great range in the temperatures in which the summer and winter experiments were made, (which in some of them was not less than 110° Fahrenheit, and in most of them 90°,) appears at first to suggest itself as a simple and natural cause for this variation, but if this is the case, it seems to take place chiefly at temperatures below Zero.

OBSERVATIONS of the IMMERSIONS and EMERSIONS of JUPITER'S SATELLITES.—OBSERVATORY, *Winter Island*, 1821—2.

DATE.		Immersion or Emersion.	Mean Time at Observatory.	Mean Time at Greenwich.	Longitude of Observatory in Time.	REMARKS.
1821.			H. M. S.		H. M. S.	
December	13	Em. 1st Satellite	4 10 43.1	9 42 16	5 31 32.9	Weather calm and clear—good observation
„	20	„ „ „	6 6 37	11 38 9	31 32.0	Weather calm and clear—rather hazy
„	27	„ „ „	8 2 38.6	13 34 6	31 27.4	Fine and clear
1822.						
January	3	„ „ „	9 58 39.2	15 30 5	31 25.8	„
„	5	„ „ „	4 27 20.5	9 59 4	31 43.5	„
„	12	„ „ „	6 23 12	11 55 5	31 52	„
„	18	„ 3d „	5 27 16.5	10 58 10	30 53.5	„
„	„	„ 2d „	9 30 54.5	15 2 16	31 11.5	„
„	19	„ 1st „	8 19 40.5	13 51 8	31 27.5	„
„	25	Imm. 3d „	6 23 41.5	12 53 26	29 44.5	„
February	4	Em. 1st „	6 40 27.9	12 12 12	31 44.1	Rather hazy—but distinct and steady
„	11	„ „ „	8 37 .15	14 8 10	30 55	In different observation—tremulous from the wind
„	19	„ 2d „	9 12 6.4	14 43 40	31 33.6	Calm and clear—good observation
„	27	„ 1st „	8 57 37	12 28 53	31 16	Uncertain to three or four seconds—very tremulous
MEAN, Long. Observatory, Winter Island by 1st & 2d Satellites					H. M. S. 5 31 31.5	Or 82° 52′ 52″.5 W. in space

OBSERVATIONS of the IMMERSIONS and EMERSIONS of JUPITER'S SATELLITES.—OBSERVATORY, *Island of Igloolik*, 1822—3.

DATE.	Immersion or Emersion.	Mean Time at Observatory.	Mean Time at Greenwich.	Longitude of Observatory in Time.	REMARKS.
1822.		H. M. S.	H. M. S.		
October 6	Imm. 1st Satellite	10 29 32.6	15 55 53	5 26 20.4	Fine and clear—good observation
November 16	„ 2d „	9 53 25	15 19 46	21	Rather hazy—but distinct and steady
December 9	Em. 1st „	5 45 0.7	11 11 37	36.3	Fine and clear
1823.					
January 24	„ „ „	6 14 29.7	11 40 22	52.3	„
February 23	„ „ „	8 26 37.5	13 53 32	54.5	„
				H. M. S.	
MEAN, Long Observatory, Igloolik				5 26 36.9	Or 81° 39′ 13″.5 W. in space.

	H. m. s.		H. m. s.
Longitude of Observatory at Winter Island by Jupiter's Satellites .	5 31 31.5	Captain Parry's Longitude by Lunar's	5 32 40.1
Do. at Igloolik	5 26 36.9	Do.	5 27 36
Difference of Meridians by Jupiter's Satellites	m. s. 4 54.6	By the Lunars . . .	m. s. 5 4.1

It will appear from the above comparison, that there is a very considerable difference between the longitudes of each Winter Station, as determined by the lunar observations of Captain Parry, Messrs. Hooper and Ross, (from which the charts were constructed,) and my own determination deduced from the eclipses of Jupiter's Satellites; thus, the lunars were no less than 17′.10″ to the westward at Winter Island, and at the next Winter Station at Igloolik, they were 15′ (in space) more to the westward, than by the eclipses, and they make the difference of longitude a little greater. The chronometrical determination of the difference of the meridians, is probably more accurate than either, from the number of the chronometers, and the interval (between leaving Winter Island, and the time of making the first observations at Igloolik) being not more than 25 days, and upon returning to Winter Island, 26 days;

the following are the results, leaving out those chronometers whose rates, from their irregularity, were not to be depended upon.

	m. s.	
By 11 Chronometers in the Fury, taking a mean of last *fortnight's* rates	4 53.85	Proceeding from Winter Island to Igloolik, interval 25 days.
By the same, taking a mean of the last *months'* rates	4 48.62	
By 2 Chronometers in the Hecla	4 32.0	
By 6 ,, in the Fury	5 2.4	Returning interval 26 days.
By 3 ,, in the Hecla	5 26.0	

By a mean of the determinations upon leaving and returning to Winter Island, the difference of longitude by the Fury's chronometer is $4^m\ 56^s.8$, and by the Hecla's chronometers, $4^m\ 59^s$. The difference between the meridians, therefore, by the chronometers, is $4^m\ 57^s$ very nearly, which agrees within $1^s.5$ of that by the eclipse of the satellites of Jupiter, which were observed with a 45 inch achromatic telescope, with a triple object glass by Dollond. The times of immersion and emersion are taken from the *Connaissance des Tems*, allowing $9^m\ 20^s$ for the difference of the meridians of Greenwich and Paris. The only corresponding observation of the satellites I can find made upon a known meridian, is an immersion of the second satellite, which was observed at Greenwich, with a similar telescope, on the 16th of November, 1822, at $15^h\ 21^m\ 7^s.4$ mean time; the same was observed by myself at the observatory at Igloolik, at $9^h\ 53^m\ 25^s$, which makes the longitude $5^h\ 27^m\ 42^s.4$ W. By comparing three observations made at Greenwich on the 8th, 22d, and 29th of October, 1822, the observed times are respectively 6, 17, and 6 seconds less than the times as computed from the almanack; by applying the mean of these (*viz.*, 10 seconds) as a correction to an immersion of first satellite on the 6th of October, the time of immersion on that day at Greenwich, is $15^h\ 55^m\ 43^s$; the same was observed by myself at Igloolik, at $10^h\ 29^m\ 32^s.6$ mean time at place, which makes the longitude $5^h\ 26^m\ 10^s.4$. In the same way by applying a correction of $-$ 14 seconds to an emersion of the first satellite, on December 9th, 1822, the time of emersion at Greenwich on that day was $11^h\ 11^m\ 23^s$, and the observed time at Igloolik was $5^h\ 45^m\ 0^s.7$, the longitude by this being $5^h\ 26^m\ 22^s.3$. The mean of the emersions of the first and second satellites gives the longitude of this place, $5^h\ 26^m\ 56^s.4$, and by the emersions of the first satellite, $5^h\ 26^m\ 43^s$, and by a mean of both immersions and emersions, it is

$5^h\ 26^m\ 49^s.7$, instead of $5^h\ 26^m\ 36^s.9$, as deduced immediately from the almanack, without applying any correction.

The great difference between the results obtained from near 10,000 lunar observations, and that from the eclipses of the satellite is remarkable, for though most of the lunar observations were taken at temperatures about $-30°$ Fahr., yet as nearly an equal number of them were made with stars both east and west of the moon, it appears from this circumstance, as well as from the experience and care of the observers, that it cannot well arise from errors of observations, at least so much as depends upon the apparent distances of the moon and stars. This difference became apparent during the first winter, (at Winter Island,) but from whatever cause it arises, it is certain that those observers, who continued their lunar observations with the sun and moon during the following spring and summer at the same place, obtained a very different result, agreeing very nearly with that which I had previously deduced from the eclipses of Jupiter's satellites. In those observations which are registered, although none of them were made after 30th of March, yet a mean of the December ones, including about 2500 observations, differ no less than 14 minutes from a mean of the last 2500 observations, made chiefly in the following March; the December observations making the longitude 83° 16′ W., and those in March, 83° 2′ W.; a mean of a great many observations in the following summer by different observers, both of the Fury and Hecla, gave the longitude 82° 52′, which is 10 minutes further to the eastward, and agreeing with eclipses of Jupiter's satellites, but differing from the December lunar observations, by 24 minutes of longitude.

The same circumstance occurred the following year; the lunar observations, consisting of near 3000 thousand made in the winter time, making the longitude 15′ more to the westward than the eclipses. In consequence of this, no opportunity was lost the ensuing summer, of obtaining lunar observations at the same place, by Lieutenants Reid, Palmer, and myself. The result of Lieutenant Reid's observations, is 81° 40′ 13″; Lieutenant Palmer's, 81° 40′ 12″; and my own, 81° 42′ 12″ W.; the mean of which is 81° 40′ 13″ W., or $5^h\ 26^m\ 41^s$; which agrees within a few seconds of the longitude determined by the eclipses. Those, however, who have corresponding observations upon a known meridian, will be best able to decide which is correct; and also of the following occultations of the moon in the Pleïades, taken principally with a view of a comparison with corresponding observations in other latitudes, to determine the figure of the earth by Cagnoli's method.

DATE.	Mean Time at Place.	Star.	REMARKS.
	H. M. S.		
1822—March 26	7 19 40	η Pleid.	Immersion in S. part of Moon's dark limb—distinct and instantaneous. Observed at the observatory, Winter Island.
1823—Jan. 21	8 17 21	Taygata.	Immersion in Moon's dark limb—doubtful to 2 or 3 seconds. Observed at the observatory, Igloolik.
,, ,,	8 20 6	Maïa.	Ditto— distinct and instantaneous.
,, ,,	8 42 49	120 Mayer.	Ditto— doubtful to 2 or 3 seconds.
,, ,,	8 44 30	119 ,,	Extremity of Moon's upper Cusp exactly in contact with *.
,, ,,	9 5 7	122 ,,	Immersion in Moon's dark limb—doubtful to 4 or 5 seconds.
,, ,,	9 12 53.5	η Pleid.	Ditto— very distinct and instantaneous.
,, ,,	8 57 12	Taygata.	Emersion—tolerably distinct.
,, ,,	9 22 52	Maïa.	Ditto— doubtful to 8 or 9 seconds.
,, ,,	9 44 7	η Pleid.	Ditto— doubtful to 2 or 3 seconds.

Among other objects had in view during this Expedition, was the determination of the position of the planet Mars, by means of a reference to fixed stars near the path of its orbit, at the time of its opposition in February, 1822, in order to determine its parallax by a comparison with other observations; but I regret that I was not able to effect this, as the weather was not sufficiently clear as to render the stars visible when the wires of the micrometer were sufficiently illuminated to make them distinct.

A TABLE

Shewing the RATES of the CHRONOMETERS on Board the FURY, at different Periods during the Expedition.

Nos AND MAKERS.	The Maker's rates.	In the River before sailing eight days interval.	At the Orkneys eight days interval.	From May 4th to July 18th.	From July 18th to Oct. 10th.	Mean Rate during the Winter from October to April.	From May 4th to June 29th.	Mean Rate during the Winter from November to April.	From May 13th to Aug. 5th.	From Aug. 5th to Oct. 18th.	REMARKS.
	″		″	″	″	″	″	″	″	″	
No. 259, Fordsham & Parkinson	+0.42	going mean time.	+ 0.33	+ 0.59	− 1.9	+ 5.44	+10.18	+ 9.7	+10.14	+ 9.78	The rates of the three Pocket Chronometers by Arnold, as they were constantly employed in boat-service, as well as in making astronomical observations, and much exposed during the winter to very low temperatures, frequently lower than − 40° Fahrt., are not therefore registered. The range of temperature to which the others were exposed, (whose rates are here given) was in middle of summer, generally between + 66° and + 52°, and in the winter from + 60° to + 40°, seldom as low as + 32°.
„ 228, „ „	+4.0	″ +2.9	+ 3.1	+ 1.81	+ 2.1	+ 2.96	+ 3.28	+ 5.8	+ 8.49	+ 7.4	
„ 253, „ „	+0.03	−1.1	+ 0.6	− 1.37	− 6.05	− 8.47	− 6.18	+14.97	+17.41	+24.2	
„ 251, „ „	−2.0	+2.1	−31.8	−46.6	−80.2	−84.32	−82.17	−79.6	−76.7	−63.8	
„ 460, „ „	−1.0	−0.2	−12.3	−13.1	−26.5	−43.74	−42.25	−45.82	−44.3	−46.34	
„ 458, „ „	+1.1	−4.6	+ 3.05	− 0 08	− 1.8	− 9.24	−11.74	−14.61	−14.18	−14.0	
„ 405, Molyneaux and Cope	+2.93	+6.2	+ 8.8	+ 8.21	+12.7	+19.58	+19.03	+28.61	+30.16	+31.2	
„ 281, Finer and Noland	−2.5	−0.96	− 1.83	− 4.03	− 5.6	− 2.83	+ 5.56	+ 8.73	+ 8.63	+ 7 3	
„ 369, Arnold	−4.5	−4.4	− 6.72	− 7.43	− 4.9	− 1.75	− 1.66	stopt.	. . .	. . .	
„ 326, „	+8.0	not on board.	+ 2.4	+ 3.0	+ 9.9	+16.31	+ 7.27	+10.1	+ 6.9	+12.24	

III.

NATURAL HISTORY.

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ZOOLOGICAL APPENDIX.

No. I.

ACCOUNT OF THE QUADRUPEDS AND BIRDS,

BY

JOHN RICHARDSON, M.D., M.W.S.

THE object principally kept in view in drawing up the following zoological notices has been, to give a popular account of the animals that frequent the coasts within Hudson's Straits, visited on the present voyage. That the many interesting facts scattered through Captain Parry's able narrative may be more readily found, the pages of that work are regularly referred to, and my friend Mr. John Edwards, Surgeon of the Fury, having, during the three successive voyages of discovery under Captains Ross and Parry, made copious and accurate descriptions of the subjects of natural history that came under his observation, a free use has been made of his notes, which were liberally submitted to me for that purpose. The excellent scientific papers of Joseph Sabine, Esq., in the Zoological Appendix to Captain Franklin's Narrative, and of Captain Edward Sabine, in the Supplement to the Journal of Captain Parry's voyage in 1819—20, and in the 12th Vol. of the Linnean Transactions, have been regularly quoted, together with some of the other original writers upon the zoology of the Arctic Regions.

The arrangement given in the *Règne Animal* of Cuvier is adopted in describing the Mammalia, and Temminck's *Manuel d'Ornithologie*, second edition, is followed in the account of the Birds.

The colours used in the descriptions are to be found in an excellent little work entitled, *Werner's Nomenclature of Colours*, by Patrick Syme, Edinburgh, 1821, now frequently referred to by several eminent naturalists and comparative anatomists of this country.

May 1, 1824.

MAMMALIA.

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1. Ursus Maritimus. (*L.*) *Polar Bear.*

Ursus maritimus. *Supplement to Parry's First Voyage*, clxxxiii. *Appendix to Franklin's Journey*, 648.

Bear. *Parry's Narrative, Second Voyage*, pp. 61, 230, 324, 329, 372, 406, 512.

This animal, termed by the Cree Indians *waw-pusk*, by the Esquimaux *nannook* or *nennook*, and by the Greenlanders *nennok*, is remarkable for the enormous size that it attains, far above the other species of bear, and if some of the older navigators may be credited, sometimes exceeding all other known quadrupeds. Later observers state the maximum length at about thirteen feet, and those seen by the Expedition did not in general exceed seven or eight feet. Captain Lyon has given the dimensions of one which was considered to be unusually large, being 8 feet 7½ inches long, and weighing 1600lbs.* A female, which was attended by two cubs, was killed on the 31st of August, 1822, and was so small that two or three men were able to lift her into a boat, yet she must have attained the period at which she was capable of propagating her kind on or before the autumn of the preceding year.

The Polar Bear, being a frequent inmate of the menageries which travel through Great Britain, is generally known, so that a minute description is unnecessary; and it may be sufficient to mention that its long and very thick fur is every where of a yellowish white colour, but that the naked end of the snout, the tongue, the margins of the eye-lids, and claws are deep black; the lips purplish-black, and the interior of the mouth pale violet.

The character by which it is most readily distinguished from the three other species of the genus known to naturalists, is its long and thick neck, terminated by a narrower tapering and flattened head. In *l'Histoire Naturelle des Mammiferes*, where a comparison is instituted betwixt it and the brown bear, (*U. Arctos*,) its distinctive characters are stated to be, its narrow head and long

* Private Journal of Captain Lyon in the Voyage of Discovery under Captain Parry, p. 14.

muzzle, not separated from the flat forehead by a depression, but forming with it a continuous line; the greater length of its body in proportion to its height; the length of its neck; the soles of its hind feet being equal in length to one sixth of its body; and, lastly, the length and fineness of its fur.

Figures from living or recent specimens of the Polar Bear are given in Marten's *Voyage to Spitzbergen*, and in Captain Cook's last voyage. The first has a strong resemblance to the rude attempts made by the Esquimaux to etch on the walls of their snow-houses the forms of the animals with which they are familiar: the latter, though not accurate in all points, conveys a good general idea of the animal. It has been copied into Shaw's *Zoology*, and the third edition of Pennant's *History of Quadrupeds*. Correct drawings by Marechal and Lasteyrie of a young bear kept at Paris, are engraved in the *Menagerie du Museum d'Histoire Naturelle*, and in *l'Histoire Naturelle des Mammiferes*.

Detailed accounts of the manners of these animals are to be found in Marten's work already quoted, and in the *Fauna Grœnlandica*, Othonis Fabricii. Pennant* has compiled an interesting article on the subject, from a great number of original writers, and many additional anecdotes may be collected from the more recent and excellent *Account of the Arctic Regions*, by Captain Scoresby.

It is still a question amongst naturalists whether the polar bear hibernates or not. In the journal kept by the seamen who wintered at Spitzbergen†, it is recorded, that at the commencement of winter, when the sun set, the bears disappeared, and the white foxes came about their huts; but that on the return of day-light, the bears again visited them, and the foxes retired. Considering this and similar facts to be conclusive, modern writers have expressed their belief that the polar bears become torpid in winter. Otho Fabricius, on the contrary, asserts that they go abroad in that season to seek their prey; and Hearne‡ states, more at length, that the males leave the land in the winter time, and go out on the ice to the edge of the water in search of seals, whilst the females burrow in the deep snow-drifts from the end of December to the end of March, remaining without food, and bringing forth their young during that period. "When they leave their dens in March, their young," says he, "which are generally two in number, are not larger than rabbits, and make a foot-mark on the snow no bigger than a crown piece." Our navigators confirm the

* *Arctic Zoology*, vol. i. p. 56, and *Introduction*, p. lxxxix. and p. cxciii.

† Churchill's *Collection of Voyages*, vol. iv. p. 808.

‡ *Journey from Hudson's Bay to the Northern Ocean, in 1769-1772*, p. 366-368.

statements of Fabricius and Hearne, having occasionally seen polar bears in the winter, and actually pursued one in December. It is mentioned in the narrative, (p. 406,) that the Esquimaux killed eight or ten in the winter of 1822, and Mr. Edwards learnt from the hunters that they often saw and killed the males when roaming at large during that season, and as often dug the dams with their cubs from under the snow. These facts seem to be conclusive as to the uniform hibernation of the gravid females, and the, at least, occasional appearance of the males abroad in the winter. It is possible, however, that the latter may also become torpid in the winter, when the local circumstances of their native districts are such as to preclude them from reaching open water at that season, and thus the opposite opinions of naturalists may be in some degree reconciled. An accommodation of habits to variety of situation has been remarked in the history of the *black* or *brown bear* of America, (U. Americanus, *Cuv.*) This animal regularly hibernates in the Hudson's Bay territory, where numbers of males and females are annually dug from their winter retreats; but the same species, inhabiting a more southerly district, from whence it can, upon the approach of severe cold, migrate to a milder climate, and procure food, follows a different law. Then the pregnant females alone retire to hide themselves in secluded caverns, whilst the great majority of the others travel to the south. And here we may adduce the often quoted fact, noticed by Catesby, that in one winter five hundred bears, that had come from the northward, were killed in Virginia, amongst which there were only two females, and they were not pregnant.

The Indian hunters remark, that a bear, if prevented by any cause from becoming fat at the commencement of winter, cannot hibernate; and if it does not make its escape to a more fortunate climate, it is speedily destroyed by the severity of the season.

It has been ascertained that the period of gestation of the brown bear is about one hundred days, and that it produces from one to five young, according to its age*. The Indians say that the dams are followed by the cubs for two years,

* The female black or brown bears conceal their retreats with such care that they are extremely rarely killed when with young. Hence the ancients had an opinion that the bear brought forth unformed masses, and afterwards licked them into shape and life. Sir Thomas Brown cites many facts in opposition to this notion, some of which are quoted in SHAW's *Zoology*, and similar and more recent facts are noticed in WARDEN's *Account of the United States*, i. p. 195. After numerous inquiries amongst the Indians of Hudson's Bay, only one was found who had killed a pregnant bear. He stated that the den she had constructed was smaller than that usually made by the unimpregnated female.

and that they do not produce oftener than once in three years. Precise information on these points is still wanting to complete the history of the polar bear.

The polar bears are not uncommon in the autumn, as low as latitude 57°, and probably frequent the shores of Hudson's Bay, still farther to the southward. As the summer temperature of these districts rises, occasionally, to 87° Fahrenheit, these animals cannot, in the wild state, be so impatient of heat, as the captive one on which F. Cuvier made his observations*.

The favourite prey of the polar bear appears to be seals, and other marine animals; but in the autumn, when the absence of ice renders these less easy of capture, it frequents the shores in search of berries and other vegetable matters. Captain Cartwright† saw a polar bear diving in deep water after salmon, and succeeding in capturing that active fish.

A bear, shot in Captain Parry's former voyage, and examined by Mr. Edwards, had been labouring under violent inflammation of the intestines which were already partly sphacelated.

The Northern Indians will not eat the flesh of the bear, nor will their women even tread on the skin, but the Esquimaux have no such scruples.

It is known that a large *brown*, and, at certain seasons of the year, somewhat *hoary* variety of the American bear (U. Americanus, *Pall.*) frequents the coast of the Arctic sea in the summer time, to feed on seals, fish, and on the roots of the different species of *hedysarum* and *astragalus*, that grow in those quarters‡. This animal is occasionally confounded, both by the Traders and the Indians, with the polar bear. It is noticed by Hearne and Pennant under the denomination of the *grizzly bear*, but it is quite distinct from the *grizzly bear (U. ferox)* of Lewis and Clark, which is the *U. cinereus* of M. Desmarest§, and the *U. horribilis* of M. Say‖.

The polar bear, with the other two that have been incidentally mentioned, (U. Americanus and U. ferox,) are the only species known to inhabit North America, whose distinctive characters have been in any degree ascertained. Many *varieties* of the U. Americanus have been described, founded chiefly upon differences of colour. The *brown* variety is further distinguished in the United

* *L'Histoire Naturelle des Mammiferes.*

† *Journal of Sixteen Years' Residence in Labrador*, by G. Cartwright.

‡ Franklin's *Journal, &c.*, pp. 373, 377, 379.

§ *Mammalogie, Encyclopédie Methodique*, p. 164.

‖ James's *Expedition to the Rocky Mountains*, pp. 241 and 351.

States by the epithet of *ranging*, and the *black* variety has been divided into the *long-legged* and *short-legged* kinds*; but the vague descriptions that have been hitherto given of these varieties lead to no certain conclusions. It may be noticed that the white ring round the neck which the European species exhibits in youth, is, at least, occasionally observed in the American one†.

The Cree-Indians term the black bear *cuskeeteh-musquaw*, and a tawny coloured variety *oosaw-wusquaw*. They call a little bear *muscoosees*.

2. Gulo Luscus. (L.) *Wolverene.*

Gulo luscus. *Supplement to Parry's First Voyage*, p. clxxxiv. *Appendix to Franklin's Journal*, p. 650, and *Narrative*, p. 90.

Gulo arcticus, var. A. *Desmarest Encyclopédie, art. Mammalogie*, No. 267.

Quickhatch. *Ellis's Voyage to Hudson's Bay*, p. 40, t. 4.

Kablee-arioo. *Parry's Narrative, Second Voyage*, pp. 184, 497, 512.

Is termed by the Crees or Southern Indians *ommeethatsees* and *okee-coohawgees*, (whence *quickehatch*) by the Copper Indians *nagh-hai-æh*, by the Esquimaux *kablee-aree-oo*, and by the Canadian voyagers *carcajou*. The latter appellation having been applied to many different animals, numerous mistakes have arisen.

A figure and description of a living wolverene received by Sir Hans Sloane, from Hudson's Bay, were given to the world by Edwards. The figure, with slight alterations, has been copied by Pennant and Shaw, and succeeding naturalists have added little or nothing to the information derived from that source. It is proper to observe that although these figures give a tolerable idea of the general form of the animal, they err much in the shape of the head, and in some other details. The head is very broad and compact, and is suddenly rounded off on every side to form the nose, not tapering gradually as represented. The ears are rounded, and project less than in the figure. In the form of the head and muzzle the wolverene does not resemble the bear, with which from its plantigrade motion it has been sometimes classed. The specific name applied to this animal by Linnæus originated in Sir Hans Sloane's specimen having through accident lost an eye.

Cuvier remarks that the specific differences betwixt the *wolverene* of the new, and the *glutton* (Ursus gulo, L.) of the old continent, do not appear to be sufficiently determined, but that the colours of the American species are in

* Warden, opere citato. † Cartwright, opere citato.

general paler, and Pallas and Desmarest have described them as mere varieties. Scarcely any two wolverenes are exactly alike in the distribution and intensity of their colours, some being almost black, whilst others have a dull brown for the predominating hue. A litter of four young ones, taken near Cumberland-house in latitude 54°, were of a cream colour. We are ignorant whether this is the common hue of the cubs, as it is the only instance that has come to our knowledge of their being captured at a tender age. Pennant refers to the European species, white and yellow varieties, which occur in Kamtschatka, and whose furs are much prized by the natives.

To the wolverene, in common with the glutton, has been attributed the habit of destroying deer, by dropping upon their backs as they pass beneath its lurking places in trees; but this is certainly not one of its common modes of procuring subsistence. It lives chiefly upon the carcasses of animals that have been killed by accident, or left by other beasts of prey, rejecting no kind of carrion. In the summer time it digs up the *marmot*, and according to Indian report, proves destructive to the *beaver*, but the frozen walls of the winter habitations of these animals defy its utmost efforts. It is extremely annoying to the hunters, by devouring their stores of provision and carrying off the baits of their marten traps; whilst its strength and cunning are such that it is rarely caught itself. It has been known to visit daily a line of traps extending upwards of two miles, and to rob the whole of them of the baits, and of such animals as had been caught. In such cases, if the hunter does not succeed in destroying his enemy, it is absolutely necessary for him to move his hunting quarters beyond its range. The strength of the wolverene is well described by Hearne, and not exaggerated; but caution seems to be its predominating character, not ferocity. It does not hibernate; and, although its pace is slow, it wanders to a considerable distance in search of food, even in the winter time, (as we have often ascertained by tracing its path,) and when it finds a bone or other prize drags it to its retreat, a task which the shortness of its legs renders sufficiently laborious when the snow is deep. If the glutton has similar habits, it may have assisted in accumulating the bones in the caverns examined by Professor Buckland.

The Esquimaux of the Welcome carry the skins of this animal to the trading post on Churchill River, and the skull of one was in the former voyage found as far north as Melville Island*. The expedition saw some of its bones in the possession of the natives of Melville Peninsula, and a piece of its skin brought home

* Appendix to PARRY's First Voyage, p. clxxxiv.

by Mr. Edwards, has been identified with specimens in the Edinburgh Museum. Its fur, as an article of commerce, is at present of no great value.

The animal noticed by Crantz and Egede, under the name of *amanki* or *amarok*, is not the wolverene, as it is supposed to be by Fabricius†, but undoubtedly that large variety of the wolf, known to the Esquimaux of America, by the name of *amarrok*. This is a striking instance of the Greenlanders having preserved the name and description of an animal which does not now exist in the country they inhabit. Captain Sabine relates a similar fact in his notice of the musk-ox.

3. Mustela Erminea. *Ermine or Stoat.*

Mustela Erminea. *Supp. to Parry's First Voyage*, clxxxv. *Appendix to Franklin's Journey*, p. 652.
Ermine. *Parry's Narrative, Second Voyage*, pp. 52, 101, 152.
Terree-ya. *Esquimaux*. Seegoos. *Cree-Indians.*

Three specimens of this pretty little animal, noted as males, were received. They were all killed on the 16th of September, yet one of them is in the perfect brown summer dress, another in its snow-white winter habit, and the third is in an intermediate state.

Ermines abound in the neighbourhood of Hudson's Bay, but although a few of their skins are occasionally sent home by the residents in presents, they do not seem to have attracted the attention of the Fur Company. The English market is supplied with them from other quarters; and from the revolutions of fashion, they at present bear a high price.

It is probable that the *lemmings* hereafter mentioned, form a considerable part of the food of the ermines, on the barren shores of Lyon's Inlet. In the interior of the country they feed chiefly upon the meadow-mouse, (arvicola xanthognatha, *Sabine*,) and as the latter take up their abode in the log-houses of the traders as soon as they are built, the ermines also become frequent inmates of the houses, and boldly chase their prey during the night, even through the sleeping apartments. In December, 1821, an ermine was caught on board the Hecla, led thither in pursuit of a new prey, the English domestic mouse which then for the first time visited those quarters, and which is still unknown in the interior of the fur countries.

† *Fauna Grœnlandica*, p. 24.

4. Canis Lupus. (*L.*) *The Wolf.*

Canis lupus. *Supplement to Parry's First Voyage*, p. clxxxv. *Appendix to Franklin's Journey*, p. 654.

Wolf. *Parry's Narrative, Second Voyage*, p. 157, 162, 180, 230, 372, 446, 512, 514, 516.

Icon. *Franklin's Journal*, p. 312, *opt. var. albæ.*

The wolf is termed *mah-haygan* by the Crees, *yes*, by the Northern Indians, and *ămărŏk* by the Esquimaux, which latter appellation, the origin of the *amanki* and *amarok* of the Greenlanders has given rise, as has been already noticed, to exaggerated descriptions of a ferocious animal, said to inhabit the interior of Greenland, and which Crantz and Fabricius erroneously conjectured to be the *gulo luscus* or *wolverene* *.

A pack of thirteen wolves attending the movements of a horde of Esquimaux, made their appearance in the neighbourhood of the ships in February, 1822, and it is remarked in the Narrative †, that it was difficult at a little distance to distinguish them from the Esquimaux dogs. Observations of a similar nature have been made in other parts of the world. James has noticed the resemblance which the Indian dogs of the Missouri bear to a species or variety of wolf (*canis latrans*,) common in that quarter ‡; and on the line of Captain Franklin's route, the dogs were observed to be similar in their general physiognomy, and in the prevailing markings of their fur to the wolves of the same districts. Nor are facts of this kind confined to the Northern hemisphere, for I am informed by my friend Dr. Knox, that the native dogs of Southern Africa exhibit the same general aspect of the hyæna that those of Northern countries do of the wolf, and that in the course of a few generations, dogs imported from Europe, assume the habit and appearance of the native races.

These facts bear upon the often agitated question of the origin of the domestic dog, and seem to support the opinion of Buffon §, lately advocated by M. Desmoulins ||, that the dog, the wolf, the jackal, and corsac, are, in fact, but modifications of the same species; or that the races of the domestic dog ought to be referred, each in its proper country, to a corresponding indigenous wild species, and that the species thus domesticated, have in the course of their

* *See article Wolverene of this Appendix.* Egede, *Description of Greenland*, p. 60. Crantz, p. 99, and *Fauna Grœnl.* p. 24.

† P. 514—516.

‡ James' *Expedition to the Rocky Mountains*, vol. i. p. 153, 332. *Eng. edit.*

§ Buffon, vol. xiv. p. 350.

|| Desmoulins, *Mem. du Mus. d'Hist. Nat. tom.* 10.

migrations, in the train of man, produced by their various crosses with each other, with their offspring and with their prototypes, a still further increase of distinct races of which about fifty or sixty are at present cultivated*.

The wolf (*c. lupus,*) the fox (*c. vulpes,*) and jackal (*c. aureus, L.,*) are supposed to have given rise to the varieties of Europe, and of the West of Asia, the *c. cancrivorus,* DESMAREST, to be the origin of the dog domesticated by the Caribs, previous to the discovery of America, and the *papua* of Australasia, to be the stock of the domestic races in that quarter. With equal justice, the connexion betwixt the wolves of the Arctic districts of America, and the Esquimaux dogs, may be considered to be equally intimate, especially when we take into account not only their near resemblance in physiognomy, but also the great similarity of their woolly furs, which on their annual renovation fall off in large flakes.

That the fox occasionally couples with the domestic dog, has been stated as long ago as the time of Aristotle, and the productive intercourse of the wolf and dog, and even the fertility of their offspring, have also been established by the observations of Buffon † and Pallas. But John Hunter ‡, Pallas, Guldenstadt, and Tilesius §, consider the jackal of Caucasus as the most probable stock of the European dog. Cuvier, however, remarks, that the descendants of dogs which have been left upon desert islands, resemble neither the fox nor the jackal, and M. Lindecrantz || states, that the domestic dog is permanently characterized as distinct from the wolf, hyæna, fox, *&c.*, not only by the disposition of the sutures or ridges formed by the meeting of the courses of hair on

* Other naturalists taking into account the frequency with which accidental varieties of structure in an individual have been observed to recur in his descendants, have supposed that there was originally created a single species of dog, and that the domestic varieties which are the only traces we have left of it, have been produced by the influence of climate, and the treatment received from man. Various researches have accordingly been made, and much reasoning employed, to indicate this primitive race.

Some authors have even gone the length of conceiving, that most of the species of natural genera of animals, may have, in the course of ages, risen from varieties to their present rank; and that a primary species, or the germ of a genus, was all that was originally created. The subject is interesting, and intimately connected with the study of the fossil remains of extinct species, but it is involved in an obscurity not likely to be soon dispelled.

† BUFFON, *Supp.* 7. The readiness with which the wolf in the wild state copulates with the domestic dog, has been recorded by Captains Sabine and Franklin.—*Supp.* PARRY's *First Voyage*, p. clxxxv. FRANKLIN's *Journey*, p. 654.

‡ *Philos. Trans.* vol. lxxvii. p. 253—266, and vol. lxxix. p. 160, 161.

§ TILESIUS, *Nov. Act. Nat. Cur.*, 1823, tom. xi. Second Part.

|| LINDECRANTZ, *Ammæn. Acad.* vol. iv. No. 53. See *also Captain* PARRY's *Second Voyage*, p. 515.

various parts of the body, but by the number and situation of the veruccæ or warty risings on the face. In these respects eleven varieties of the dog were found to agree. Subsequent zoological writers have not, however, considered these marks in the same important light, and M. Desmarest, disregarding most of them, is disposed to rely for a distinctive mark chiefly upon the white of the tail of the domestic dog, being invariably terminal whenever that colour occurs associated with another in that part of the animal. This observation he hopes will lead to the discovery of the primitive species*. Professor Buckland found no difference between the bones of the dogs and wolves taken from the diluvian mud of the caves he examined, and those of the existing races of these animals †.

Many anecdotes tend to prove that there is nothing incompatible between the dog and wolf in natural disposition. In *L'Histoire Naturelle des Mammiferes*, there is a very interesting account of a wolf, whose good qualities having been elicited by kind treatment, which shewed a degree of affection for its master, equalling or exceeding that displayed by any variety of dog. It may be stated on the other hand, for the purpose of shewing how the dog may degenerate, that it is a remark of the Canadian voyagers, in speaking of their dogs, which are of the Indian breed, " quand ils sont egarès ils deviennent fous." When they have strayed away and been absent only a few days without obtaining proper nourishment, they lose almost totally their domestic qualities, and although driven by the pressure of hunger, to hover like the wolves around an encampment, yet they fly from the face of man, and do not even recognise the voice of their master. They differ in this state but little from wolves, except in a deficiency of strength and intellect, necessary for procuring their prey; and indeed the manners and appearance of the Indian dog of those northern districts are such as one would expect from wolves recently and imperfectly domesticated. They have little of the docility of the European races, possess no courage, hunt in packs, and prey upon almost every kind of carrion. Upon the first introduction of a small Orkney cow to one of the trading posts, we witnessed the whole of the dogs of

* DESMAREST, *Mammalogie, Ency. Meth.*

† The number of caudal vertebræ seems to vary both in the wolf and the dog, but the lumbar vertebræ appear to be seven in both species, at least this was found to be the case with the skeletons of the Arctic and other wolves examined by us, as well as in the skeletons of domestic dogs of various races. CUVIER, in his *Comparative Anatomy*, has stated the lumbar vertebræ of the dog to be only six in number, and this statement has been copiedin to FLEMING'S *Philosophy of Natural History*, and other works.

the establishment, to the amount of fifty or more, forming themselves into a crescent and approaching the cow, which was enfeebled by her recent voyage, in the same timid and cautious manner that a pack of wolves would do, stopping or retreating the moment that the object of their attack raised its head. The cow exhibiting no signs of fear, they desisted from the attempt, but had it become alarmed, and sought for safety in flight, they would have tormented it until it was exhausted, and at length torn it in pieces. These dogs not only form an obstacle to the rearing of poultry, hogs, *&c.*, at the different fur posts, but they frequently destroy foals, although they have been previously accustomed to the presence of horses.

The Esquimaux dogs seen by the Expedition under Captain Parry, seem to be a more generous race than the Indian dogs, which may be, perhaps, ascribed to the greater kindness shewn to them, and to their being companions to their masters nearly the whole year. In the fur countries, on the contrary, the dogs are much neglected in the summer, and left to a scanty subsistence upon such eggs, young birds, frogs, *&c.*, as they can pick up.

Wolves vary much in size*, but in general those living within the Arctic circle are of large dimensions. Many of the Arctic wolves are entirely white in winter, but they have most generally bluish-gray backs. The natives assured us, that the white varieties became coloured in summer. A variety totally black (*c. lycaon, L.* ?) is found as far north as Cumberland House, (lat. 54°,) and is said to be frequent in Canada. The black wolves are fierce, but not larger than the common kind.

On the sandy plains betwixt the branches of the Saskatchawan, the wolves bring forth their young in burrows that have more than one outlet. The badgers are very numerous in that quarter, and it is probable that the wolves take advantage of their labours, and by enlarging or uniting their holes form suitable abodes for themselves. On the barren grounds where the soil is not adapted for burrowing, they resort to caves in the rocks and amongst large stones.

The temperature of a wolf was ascertained by Captain Lyon immediately after it was killed to be 105° Fahrenheit.

	Length of body.	Tall.	Height at fore shoulder.
* Largest sized wolf of the United States, (Warden) - - -	$3\frac{1}{2}$ feet	18 inch.	18 inch.
Wolf killed at Cumberland House, (lat. 54°) - - - -	4 ,,	14 ,,	24 ,,
White wolf at Fort Enterprise, (lat. 64° 30') - - - -	$4\frac{1}{3}$,,	19 ,,	34 ,,
Wolves seen by Captain Parry, average height (p. 516) -	— ,,	— ,,	27 ,,
Wolf European, (Desmarest, Encyclop.) - - - - -	$3\frac{1}{4}$,,	18 ,,	31 ,,

5. Canis Lagopus. (L.) *Arctic Fox.*

Canis lagopus. *Supplement to Parry's First Voyage*, p. clxxxvii. *Appendix to Franklin's Journal*, p. 658. *Foster, Philosophical Transactions*, lxii. p. 370.
Tĕrree-ânee-ârioŏ. *Esquimaux of Melville Peninsula.*
Terregannœuck. *Esquimaux of the Welcome and of Coppermine River.*
Terienniak. *Greenlanders.* Wawpeeskeeshew-makkeeshew. *Cree Indians.*
White fox, and fox. *Parry's Narrative, Second Voyage*, pp. 128, 150, 151, 157, 230, 387, 446, 513.
Isatis *of the Siberian fur hunters*, (but the Isatis figured in Buffon, supplement, tom. 3. pl. 17. is the Canis Corsac, *Pall.*)

A Specimen of this animal procured at the entrance of Lyon Sound, in September, corresponds very nearly to one in the summer dress, described by Mr. Sabine in the appendix above-quoted, except that the tips of the hairs at the extremity of the tail are black. Another killed in December, is quite white, with the exception of a similar black tip. This mark though slight is sufficiently apparent to call in question the specific character "cauda apice concolore" (Lin.); indeed Mr. Graham is quoted in Arctic Zoology for the observation, that the black tip of the taii forms a characteristic distinction between the Arctic and common foxes of Hudson's Bay, which have their tails always tipped with white. It is proper to remark, however, that the colour of the tail is not considered as a specific mark in other foxes, for the *canis alopex, cauda apice nigro* (Lin. Syst. 59), is by the best authors considered as a variety only of the common fox *. A better mark of distinction is to be derived from the different physiognomy of the two species, and their very dissimilar fur, which both in their summer and winter clothing is very obvious †.

In the summer time the fur on the soles of the Arctic fox is short, and allows small callous eminences at the roots of the toes to appear. In the winter the

* The *c. alopex* is known in Wales by the name of *Corgi or Cur fox*, and is of smaller size than the ordinary fox. (*Brit. Zool.* i. p. 87.) A similar variety occurs in America, where it is termed the Brant fox. Warden's *United States.* Penn. *Arct. Zool.* i. p. 47. *Hist. of Quadr.* i. p. 252,) and also in Russia, (Tilesius, *Nov. Act. Phys. Med. Acad. Nat. Cur.* 1823, tom. xi. Second Part, p. 375.) It would appear that this was once the common variety of fox in England, as Chaucer in his tale of Chanticleer, enumerates the black-tipped tail as one of the characteristics of Dan Reynard.

† Desmarest, rejecting the Linnæan specific character, has formed a new one on the principle just spoken of. *Ency. Art. Mammalogie, No.* 305.

soles and toes are entirely covered by a very thick bushy coat of hair. The same thing occurs in the other foxes that inhabit those northern regions, and furnishes one of the means by which the hunters distinguish their foot-marks in the snow from those of the small wolves. The fox leaves a round hollow print that exhibits no distinct impressions of the toes. The foot-mark of the wolf is like that of the dog. Authors however, probably from not being acquainted with the summer states of the Arctic fox, have considered the hairy soles as a specific distinction betwixt the Arctic and other foxes. Thus in the *Dictionnaire des Sciences Naturelles* it is said "mais un caractêre qui lui est particulier, c'est d' avoir la plante des pieds garnie de poils, contre ce qui se voit communement; la plupart ayant des tubercules nus aux parties de la plante qui s'appuient sur le sol." (Tom. viii. p. 565.)

It would appear that on the approach of winter, the fur of the Arctic fox does not fall off, but actually alters its colour, increasing at the same time in length and fineness. Similar changes take place in the coverings of most quadrupeds of those regions, "Incanescunt hyeme lupi, cervi, alces, maximeque tarandi" (Pall. glires, p. 7). It is a considerable time after the commencement of the cold weather before the fur becomes, in the technical language of the traders, *prime*. In the spring, however, the change is much more sudden, and after the first shower of rain, most of the furs are of little value. In a register kept in the year 1810 at Churchill, in lat. 59°, the *white foxes* are noted as being partially brown on the 10th of October, and as not yet prime on the 22d.

It is probable that in high northern latitudes the old foxes may retain their white colour even in summer. Some naturalists have gone the length of considering the white foxes occasionally seen in summer to be a constant variety of the Isatis, blue, or Arctic fox. The Siberian hunters informed Gmelin that "they often found gray and white individuals in the same litter, and that the first have at birth a very deep gray colour, the latter a yellowish tint, the hair being in both very short. Towards the end of the summer, when the hair begins to increase in length, foxes are often met with having a brown streak along the back, crossed by a similar one at the shoulders. These individuals, sometimes termed *cross foxes* *, become at length entirely white." Hearne states, from personal observation, that the Arctic foxes "when young, are almost

* These cross foxes are very distinct from the cross foxes of the Hudson's Bay traders, which belong to the species *canis decussatus* of Desmarest, and which F. Cuvier, with great propriety, considers as a mere variety of the *canis argentatus*, or black fox.

all over of a sooty black, but as the fall advances, the belly, sides, and tail, turn to a light ash-colour; the back, legs, some part of the face, and the tip of the tail, change to a lead colour, and when the winter sets in, they become perfectly white. There are few of them which have not a few dark hairs at the tip of the tail all the winter." P. 365.

Mr. Mogg caught two foxes in January, 1822, at Igloolik, one a male of a bluish cast, with the tips of the ears and tail black, and the other a female, longer than the former, and beautifully white. They weighed respectively 8 and 8½ lbs. (*Narrative*, p. 387.)

The fox mentioned below, under the epithet *sooty*, is most probably a dark-coloured variety of the Arctic fox, of occasional occurrence, even in the winter time.

The dimensions of summer and winter specimens received, are as follow:—

	Summer.	Winter.
Length from nose to the origin of the tail - -	22	24 inches.
„ of head - - - - - - - - - - -	5½	6
„ of tail to extremity of vertebræ - -	11	12
„ „ including the fur - - - - -	13	14½

The native country of the Arctic foxes, is, as their name imports, within the Arctic circle, but they migrate at uncertain intervals, and generally in very severe seasons, as far south as lat. 56°, following for the most part the line of the sea-coast in their journeys. They do not return to the north the following summer, but remain and breed in their new quarters, from which, however, they are in general extirpated in a few years by their numerous enemies. They bring forth their young in deep burrows, lined with moss. In the winter they generally retire to caverns, formed in the ice by the flux and reflux of the tide.

The islands in the Arctic Sea, visited by Captain Franklin's party, were studded with stone traps, erected by the Esquimaux for the capture of these animals. The traps are described in Captain Parry's Narrative, (p. 387) which also informs us that the foxes were numerous in their neighbourhood, until the end of November, when they began to decrease; that few were taken in December, and that in January, the traps, from want of success, were finally dismantled.

The simplicity of the Arctic fox is noticed by most authors, who have given an account of their manners, but an anecdote told by Captain Lyon in his Private Journal, (p. 89) shews that they are not naturally stupid. The flesh of the Arctic fox is white, and when young, resembles that of the rabbit in flavour, and is equally delicate. The mean temperature of fourteen of these foxes examined immediately after their death by Captain Lyon and Mr. Mogg in the winter time, was 102° Fahrenheit.

Further particulars respecting the Arctic fox, its varieties, and the characters by which it is distinguished from the karagan of Pallas, may be learnt from a paper by Dr. Tilesius in the *Nova Acta, Phys. Med. Acad. Nat. Cur.* 1823, tom. xi. second part, p. 375. (Quoted from *Bulletin des Sciences*, January, 1824, p. 81.)

Canis Lagopus. β. *Fuliginosus.* *Sooty Fox.*

Canis fuliginosus. *Shaw's Zoology*, i. p. 331.
Canis fuliginosus and blue fox. *Mackenzie's Travels in Iceland*, p. 337.
Canis lagopi, varietas. *Pallas, glires*, p. 12.
Le chien brun. *Desmarest, Mammalog.* p. 205, *in notis.*
Kernektak. *Fabr. Faun. Greenland.* p. 20 ?
Sooty fox. *Penn. Hist. of Quadr.* i. p. 257.

A solitary fox, having the usual form, and the quality of the fur of the Arctic species, but differing from the ordinary summer or winter states of that animal, in being almost entirely of an uniform blackish-brown colour, was obtained in Winter Island on the 16th of December, 1821. The colour is purest and deepest on the belly, approaching to brownish-black, and the fur there is longest. The face, from an admixture of short white hairs, is hoary, and there are a very few white hairs on the back, not sufficient, however, to vary the colour, unless on close inspection. The fur is long, has a considerable lustre, and when blown aside presents a bright ash-gray colour towards its roots. The size of the specimen is greater than that of the Arctic foxes killed at the same place.

Length from nose to insertion of tail	- - - -	28 inches.
,, of head	- - - - - - - - - - - -	6
,, of tail to end of vertebræ	- - - - - -	13
,, ,, including fur	- - - - - - - -	15

These admeasurements being of a dried skin, are like the preceding ones of the Arctic fox, liable to much uncertainty.

The fur on the soles of the feet is of a grayish-white colour, and as bushy as in the winter state of the Arctic fox.

Fabricius appears to refer to this variety, when he says "Dantur canis lagopi duæ varietates: altera cœrules centi-nigricans pedibus subtus lana alba et vibrissis interdum albidis (Grœnl. Kernektak); altera tota alba naso nudo nigro

(Grœnl. Kakkortak): minimè tamen species diversæ; invicem coëunt, et utraque utriusque colores pullos habet; quin imo cærulescentem in albam, itidem albam in cærulescentem, cum ætate transmutari posse videns sum testis." Pallas likewise in speaking of the varying hare, incidentally mentions a similar variety as occurring in Siberia. "Præter constantem illam metamorphosin et climatis rigidissimi patientiam cum Cane Lagopode etiam in eo convenit Lepori variabili quod (minori licet frequentia) nascatur in hac specie, varietas, *tota fusca vel etiam aterrima hyeme colorem haud mutans*." (Pall. glires, p. 12.)

Pennant says, that the sooty fox is a distinct species, inhabiting Iceland in great numbers, and Sir George Mackenzie gives the following account of it. "The blue fox (*c. fuliginosus*) varies considerably in the shades of its fur, from a light brownish or bluish-gray, to a colour nearly approaching to black. It is more gracefully formed than the white fox, has longer legs, and more pointed nose. Horrebow says, that the black foxes are sometimes brought over to Iceland on the ice." (*Travels in Iceland*, p. 337.)

The specimen received, bears no resemblance to the American silver fox, (*c. argentatus*) which is sometimes quite black. The silver fox is much larger, and is clothed with a very different and highly valued fur. Hearne states, that the common foxes of Hudson's Bay (*canis fulvus, decussatus, argentatus*, DESMAREST), are never found on the barren grounds to the northward of the woods. "So long," says he, "as the trade has been established with the Esquimaux, to the northward of Churchill, I do not recollect that foxes of any other colour than white were ever received from them," (p. 382). This fact would lead us also to infer, that the sooty variety is very uncommon in the winter time, the only season in which the fur forms an article of commerce.

The black fox noticed by Dr. Tilesius, as an inhabitant of Russia*, if found in northern and barren tracks, may be this sooty variety of the Arctic fox; but if it frequents woody districts, it is more probably the representative of the American, *c. argentatus*.

ARVICOLA, (*Cuv.*) (LEMMUS, *Dict. des Sciences nat.*)

THE genus ARVICOLA of Cuvier, comprises the *mures cunicularii*, and some of the *mures subterranei* of Pallas, and the *mus zibethicus* of Gmelin, which agree in having their molar teeth composed of plates of enamel, forming a series of triangular prisms, arranged alternately in two lines. The sides of these grinders

* *Nov. Act. Acad. Nat. Curios.* 1823, tom. xi. Second Part, p. 375.

are very deeply impressed with perpendicular furrows, and their upper surfaces are flat, and exhibit sections of the prisms in form of spherical triangles, more or less oblique, and generally with slightly excavated areas. Cuvier has indicated three sub-divisions, which some other authors consider as distinct genera. The animals we are about to describe, belong to the third sub-genus, (Georychus, *Illiger*, Lemmus, *Desmarest*,) to which Cuvier has referred, not only the *mures cunicularii brachyuri*, but also those *mures subterranei*, that have not been placed in the genera *spalax* and *bathyergus*.

The Lemmings, characterized by very short ears and tail, and feet formed for digging, are very low on their legs, and have fat fleshy bodies. The upper fore teeth terminate in an even outline, or are more or less excavated or lunated at the apex; and the under ones are more or less circular at their summits, but are sometimes so narrow, as to appear pointed.

The lemmings may be arranged in two divisions, according to the number of claws on the fore-feet.

The species with five claws on the fore-feet, that is with a large thumb nail, are *Mus lemmus, aspalax, talpinus* of Pallas, and *arvicola trimucronata* (mihi.)

Those with no thumb nail at all, or with only a minute one at the base of a callous projection are,

Mus Hudsonius, lagurus and *torquatus* of Pallas, and *mus Grœnlandicus*. (Scoresby's voyage.)

The *mus aspalax* has a naked tail*, but the other lemmings have a pencil of stiff hairs, which is the only part of the tail that projects beyond the fur of the body. The *mus aspalax, talpinus*, and *lagurus*, agree also with each other in having naked palms, which in the two former approach in strength and form to those of the mole-rat or spalax; all the other species of the sub-genus georychus have both the palms and soles thickly clothed with coarse hairs.

6. Arvicola Grœnlandica. *Greenland Lemming.*

Mus Grœnlandicus. Traill, *Scoresby's Voyage to Greenland in* 1822. p. 416—419.
Mus Hudsonius. *Parry's Narrative, Second Voyage*, p. 52.
Ow-in-yuk. *Esquimaux?*
Mures campestres breves crassi. *Anderson Nachrichten von Greenland*, p. 173?
A. *(Grœnlandica) brachyura, exauriculata, rostro acuto, palmis tetradactylis hirsutis, unguibus apice cylindrico producto (callo nullo subjacenti.)*

Descr. *Size*, rather less than the water-rat, (*m. amphibius*, L.) the length to the

* Pallas, *glires*.

root of the tail, being (in the stuffed specimen) about 6¼ inches. In the form of the body it resembles the other lemmings.

Head narrower than the body, rounded. It tapers slightly from the auditory canals to the eyes, but from thence the accumination is sudden on every side, and it terminates in an acute snout. The general colour of the superior and the lateral parts of the head, is the same with that of the back. There are no external *ears*, but the site of the auditory opening is denoted by an obscure transverse brownish streak in the fur. The *eyes* are near each other, being only half an inch apart. The fur on the *cheeks* is a little puffed up, has a rufous tinge, and is bounded posteriorly by an obscure blackish semicircular line, which commences at the anterior angle of the eye. The nose covered with short erect black hairs, intermixed posteriorly with some hoary ones, is rendered prominent by a depression on each side of it, anterior to the cheeks. Its apex is acute, covered with black hairs disposed round it in a circular manner, and projects slightly beyond the mouth. The *nares* appear to be under the projection. They are covered with fur, and there is no naked space around them, not even the septum*. The upper lip is deeply divided.

Teeth. Incisores exserted, chisel-shaped, having a slight yellowish tinge; *superior* ones directed downwards with a slight curvature, of nearly equal breadth throughout, truncated and irregularly excavated interiorly; *inferior* ones narrower, nearly twice as long, not tapering, four sided, with a slight rounding exteriorly, rounded at the points and sloping forwards and upwards.

Whiskers. The vibrissæ that arise from the upper lip are numerous and long, some of them black, some white, the longest, which are the exterior ones, measuring about sixteen lines. There are also one or two long hairs on the eyebrows.

Body thick, having a smooth dense covering of long and soft fur. The colour of all the upper surface of the body is composed of black intimately intermixed with yellowish-gray so as to produce a nearly uniform tint in which the black predominates. These colours belong only to the tips of the hairs, and the black tips are longer than the others. When the fur is blown aside, it appears of a uniform deep blackish gray to the roots. A distinct black stripe runs from the nose along the back to the tail. The whole under surface of the throat, neck, and body, exclusive of some rusty marking anterior to the fore extremities, is an unmixed yellowish-gray. The fur of the belly when blown aside shews the same blackish-gray colour which that on the back does. The colours of the back and

* From the specimen being dried and perhaps distorted in mounting, the form of the animal, and particularly of the parts about the mouth, could not be ascertained with absolute certainty.

belly do not intermix at their line of junction on the sides. This line is nearly straight, and runs on a level with the inferior part of the cheek and the tail.

The *tail* is very short, and is of the same colour with the back at the root, but the part which projects beyond the fur of the body, is only a pencil of stiff white hairs or bristles, about four or five lines long.

The extremities are short. The length of the *fore extremity* from the sole to the axilla is little more than an inch, and the greater part of it is hid in the fur of the belly. Measured anteriorly and including the curvature of the foot and claws, its length is about an inch. The palms incline slightly inwards, are small, and the toes very short; both are covered above and below thickly with strong hairs curving downwards, and extending even beyond the nails. The only naked parts on the foot, are a minute flat callus far back on the inside, in place of a thumb, and a rounded smooth callus at the extremity of each of the toes underneath. These callosities do not project forwards under the nail, and bear no resemblance to the large compressed horny projections of the *arvicola Hudsonia*. The *claws* are long, strong, curved moderately downwards, and also inclining inwards to the mæsial line with a more slight curvature. The second claw from the inside, which is considerably the longest, is nearly four lines in length. At the root it has a thick compressed subulate form much deeper than broad, being rounded however above, and flattened or slightly groved underneath; but its curved extremity is lengthened out in a slender cylindrical manner, its groove being obsolete*. The other claws, though smaller, are similar to this one. The third from the inside is the next in size, and the two extremes are considerably shorter than either. The length of the whole palm and the middle claw is only six lines. The claws are fitted for digging, but not for cutting roots.

Hind feet. The soles are very hairy, and the hairs project further beyond the claws than on the fore feet. *Toes* five, of which the three middle ones differ little in length: the two extremes arise farther back, and are shorter. The *claws* are shorter than the fore ones, slightly arched, narrow, but not sharp at the points, hollowed out underneath, and calculated to throw back the earth.

The individual above described was a male, killed August 22d in Repulse Bay.

The *mus Grœnlandicus* of Scoresby differs, from the specimen here described, solely in colour, which above is a mixture of mottled ash-gray, and blackish and reddish-brown, and on the belly and inferior parts is rufescent. The slight dif-

* Compare this form with that of the nails of the Arv. torquata, which Pallas thus describes, " ungues robustiores catheto-plateo-lati, mucrone tenui falcato."

ference in size may be accounted for, from the greater or less distention of the skins in preparing, both being described from dried specimens. The form and structure of the different members is precisely the same in the two specimens, which are both preserved in the Museum of the University at Edinburgh.

Of the habits of the Greenland lemming we know little. In page 53 of Captain Parry's Narrative, where they are mentioned under the name of *mus Hudsonius*, it is stated, that a considerable number being caught in Repulse Bay, and put into a cage together, they fought and destroyed each other. The same fact has been recorded of other species of lemming. Pallas speaking of the *m. lagurus* says, "Quando mares plures cum feminis inclusi, pugnabant continuo, donec robustior exagitatem diu comparem interimeret atque Caribæo more stratum hostem devoraret. Fœminam tunc illam, quæ alterius socia fuerat, pessimè habet victor et sæpissime subigit, quasi pugnæ præmium etiam gravidam." "Sunt quoque alioquin salacissimi."

In the very mild spring of 1816, large bands of mice were seen travelling across Great Slave Lake, appearing at a distance like black spots on the ice. It is probable that these mice were either of this species, or of one of the other two about to be mentioned as natives of that part of America.

With regard to the claim of the *arvicola Grœnlandica* to be ranked as a distinct species, it may be remarked, that the want of a thumb-nail separates it from one half of the genus, but it may be proper to notice a few of the characters by which it is distinguished from the species which it most resembles. In the first place, it is a larger animal than the *m. Hudsonius*, *lagurus*, or *torquatus*, and it differs from them in having an acute snout. The *m. lagurus* has a very obtuse snout, naked soles, a large callus in place of a thumb, and a remarkable moveable one on the palm; and the *m. Hudsonius* is at once distinguished by its remarkable nails on the fore-feet, to be hereafter mentioned.

The affinity betwixt the *a. Grœnlandica* and *mus torquatus*, is much more decided. They agree in form, colour, dorsal stripe, in and in so many particulars, that were it not for the acute snout, the greater size of the former*, and its total want of even the minute rounded thumb-nail which the latter has, they might be considered as the same species. The two rings or collars which surround the posterior part of the neck, the one pale, the other brown, which have given rise to the specific appellation of *torquatus*, do not exist in the *a. Grœnlandica*. The structure of these two species being so much alike, and the district

* The *m. torquatus* is three inches long.

they inhabit not dissimilar, it is probable that their food is nearly the same. Pallas thus mentions the habitations and food of the *m. torquatus*. "Hinc in calvis Montium Uralensium per Arcticam Regionem crebri apparent horum murium cuniculi, a nido sub cœspitoso tubere latente pluribus canalibus pervii, a quibus quasi semicanales cœspiti muscoso insculpti, et hinc inde infra superficiem delitescentes continuantur. Lichene rangiferino et nivali etiam hi nidi repleti, attamen polygoni vivipari etiam tubera inibi reperta sunt." (PALL. *glir.*)

7. ARVICOLA HUDSONIA. *Hudson's Bay Lemming.*

Mus Hudsonius. FORSTER, *Phil. Trans.* lxii. p. 379. PALL. *glir.* 208. LIN. *Gmel.* 137. PENN. *Quadr. Third Edition*, ii. p. 201. SHAW'S *Zoology*, i. p. 94.

Lemmus Hudsonius. *Supplement to* PARRY'S *First Voyage*, p. clxxxviii. *Appendix to* FRANKLIN'S *Journey*, p. 661. *Dictionaire des Sciences Naturelles*, tom. viii. p. 566.

Hair-tailed mouse. HEARNE'S *Journey to the Northern Ocean*, p. 387.

A. *(Hudsonia,)* brachyura, exauriculata, palmis tetradactylis, unguibus duobus intermediis maximis compressis obtusissimis bi-mucronatis (mucrone uno super alterum.)

THIS animal was first described by Forster, from an imperfect specimen, and afterwards more fully by Pallas, who received a number of skins from Labrador, one of which he sent to Pennant. The latter author, and Shaw, have merely made extracts from Pallas' description. From its general form, it was placed by these writers in the genus in which it now stands, but it was from a skeleton preserved in the *Museum d'Histoire Naturelle* at Paris that the place so assigned to it was first ascertained to be correct. Hearne gives some information respecting its manners, and Captain Sabine, in the appendix above quoted, describes those seen on the former voyage.

The Hudson's Bay lemming has four toes on the fore-feet. The two middle ones are of equal size, and are each armed with a nail disproportionately large, compressed, deep, and very blunt at the extremity, which presents two obtuse points, one lying over the other, separated by a transverse notch. The under part of the nail has been described variously, as a callus, or as a second nail lying under the true one. It is, in fact, in the adult male, of equal length with the upper nail, externally continuous with it and of similar texture, but a shallow longitudinal groove on each side produces the appearance of one nail lying over the other. The nails of the two extreme toes are placed higher up, and are much smaller than the two middle ones, but are somewhat similar in form. There is merely a minute naked callus on the usual site of the thumb. The *hind claws* resemble those of the allied species; the two middle ones, however, in the full grown individuals, shew some approach to the peculiar form of those on the fore-feet. In the females and young, the callus, or subjacent production of the nail, is less conspicuous.

The singular structure of the fore-nails distinguishes this lemming from the rest of the species, but the purpose it serves in the economy of the animal has not been explained.

Like its congeners, it has hairy palms and soles.

The *fur* is long and fine, like that of the *a. Grœnlandica* and *tri-mucronata;* in the summer time, clouded above with dark-gray and brown, and reddish on the sides; hoary throughout, in the winter. The anterior part of the back is the last to change its colour to the winter hue.

The *whiskers* are longer than the head, and the tail, like that of the other American lemmings, is composed of a short pencil of stiff white hairs.

The form of the snout, head, *&c.*, have not hitherto been described from living or recent specimens. A specimen preserved in the *Museum d'Histoire Naturelle* at Paris, is said to have had a short rounded head, extremely small eyes, no exterior ears, and to have been very low on its legs. The one commented upon at present, was obtained from the Esquimaux, and is too imperfect to supply the deficiencies in this part of the description. Its nails seem to have attained the full size exhibited by the male, but the length of its body is only $4\frac{3}{4}$ inches. The largest skin measured by Pallas was $5\frac{1}{4}$ inches long. The one kept at Paris, and those seen by Captain Sabine at Melville Island, were under six inches. It is therefore a smaller species than the *a. Grœnlandica.*

Hearne says that the Hudson's Bay lemmings are easily tamed, and become very familiar, and fond of being handled. They burrow in stony ridges near Churchill, but never enter the houses, differing totally in that respect from a *campagnol* described in the appendix to Captain Franklin's Narrative, under the name of *arvicola xanthognatha,* which shews a great propensity to domesticate itself. It is probable that the lemming feeds on roots, lichens, and other vegetable matters.

8. Arvicola trimucronata, *(mihi.)* *Five-fingered American Lemming.*

A. *(trimucronata)* brachyura, auriculis brevissimis, rostro obtusiusculo, palmis hirsutis pentadactylis, unguibus (4) excavatis; pollicari utrinque convexo truncato tricuspidato, corpore super fusco badioque latere ferrugineo subter cinereo.

Descr. *Size* a little inferior to the Hudson's Bay lemming. Length from $4\frac{3}{4}$ to 5 inches.

Head rather flat, an inch long, covered with pretty long fur, above of the same colour, with the anterior part of the back. *Ears* very short, and concealed by the fur. *Eyes* small. *Upper lip* deeply cleft. A small naked space around the nares, not pointed nor projecting. The end of the nose is obtuse, and hairy above. The margin of the mouth is hoary.

Whiskers numerous, about an inch long, black at the roots, brownish or white towards the extremities: some entirely white.

Mouth. Inside of the cheeks hairy: the hairs seated on projecting glandular folds.

Fore-teeth exserted. Upper ones slightly yellowish, shorter, broader, much worn away or excavated inside, and deeply lunated at their extremities. The lower ones white, narrower, chisel-shaped, and almost pointed at the extremities. A prominent conical papilla rises from the narrow palate behind the two upper incisors, and is succeeded by two transverse folds, having their edges turned backwards. The posterior of these folds is immediately anterior to the grinders, between which and the fore teeth there is a considerable space of naked gum. The *grinders* are equal to each other in height, have a prismatic shape, and are deeply cut with perpendicular grooves. Their grinding surfaces present the edges of plates of enamel on a level with each other, arranged so as to form a series of acute-angled spherical triangles, placed alternately in two rows. The areas of the triangles being composed of softer bone, are hollowed out. There are three grinders on a side in each jaw. Those in the upper jaw contain four triangles each, but the posterior grinder has the plates more crowded, and the triangles indistinct. The two anterior grinders in the lower jaw have five triangles, the posterior one four.

The *body* is broad and rather flat, and everywhere covered with a beautifully fine and soft fur, upwards of half an inch long on the back, but rather shorter on the belly. This fur at its base, and for the greater part of its length, is of a deep shining blackish-gray colour, but its tips are variously coloured on different parts of the body. There is no distinct neck.

The *colour* of the head and anterior part of the back, is grayish from an admixture of clove-brown, yellowish-brown, and blackish-gray tips of the hairs. The posterior part of the back approaches to chestnut-brown, the sides are yellowish-brown, and the belly bluish-gray, intermixed with many yellowish-brown hairs.

The *tail* projects three or four lines beyond the fur, and is clothed with stiff gray hairs.

The *fore-legs* are almost buried in the fleshy body, but there are four toes, tolerably long, and armed with moderate-sized strong curved nails, which are much excavated underneath, and have sharp edges fitted for digging. There is also a thumb placed higher up, and almost entirely composed of a strong nail which is not excavated like the others, but is compressed, having two convex surfaces nearly alike, a strap-shaped outline and three small points, or teeth, projecting from its truncated extremity. The second toe from the thumb is the longest, the first and outer one are nearly equal to one another, and shorter than the others, and the third one is of intermediate length. The palms are narrow and hairy. The ends of the toes under the roots of the nails are naked.

The *posterior extremities* are considerably longer than the fore ones, the thighs and legs being tolerably distinct from the body. The sole is narrow, long, and somewhat oblique, having its inner edge turned a little forwards. The hairs on the upper surface of the tarsus and toes are adpressed, beneath they curve inwards to the mæsial line, and form a thick rough coating to the sole. Some of the hairs project beyond the nails. The length of the sole, from the heel to the root of the nails, is half an inch. The toes are longer, and the claws as long, but more slender than those of the fore-feet, and they are merely channelled underneath, not broadly excavated. The three middle ones are nearly of equal length, the outer toe is next to these in size, and is situated further back; the innermost arises still higher up, and is smallest of all. There are small rounded callous eminences beneath the roots of the nails, forming the extremities of the toes.

The individual here described, was killed by Mr. Back, on Point Lake, in lat. 65°, on the 26th June, 1821, It showed some courage and attempted to bite its pursuers. It was a female and had six young in the womb, fully formed but destitute of hair. The snow had disappeared from the ground about twelve days before this time.

Mr. Edwards procured one of these animals at Igloolik, but it was accidentally too much injured to be fit for setting up, although what remained was sufficient to identify it with this species. The sex of this individual was not ascertained. It is probable that this lemming becomes hoary in the winter, but no specimens were procured in that season.

The specific name adopted refers to the shape of the thumb-nail which approaches to that of the *mus lemmus*, PALL. in form. In the latter, however, even when most complete, there are only two points, and the nails of the other toes are very much compressed and scarcely furrowed underneath, not broadly excavated as in the species just described. In other respects they are much allied, and the *a. trimucronata* may be said to bear the same relation to the *m. lemmus* that the *a. Grœnlandica* does to the *m. torquatus*.

The *m. aspalax* has a sub-bidentate thumb-nail, but its broad naked palms and very large nails, with its naked tail, at once distinguish it from the *a. trimucronata.*

The *m. talpinus* is also distinguished by its broad naked palms, furnished with a large callus at the thumb, and another at the wrist, and also by the form of its thumb and claws.

From the near resemblance in form betwixt the *a. trimucronata* and the *m. lemmus* it is probable that their modes of life are similar. The latter feed on grass, lichens, catkins of the dwarf birch *&c.* They make shallow burrows under the turf in the summer, and in the winter form galleries under the snow, along which they travel in search of food, receiving air by small spiracles which open on the surface. As the margin of a lake is a favourable place for such retreats, because the grass is abundant there, and the snow always drifted more deeply and compactly, it is possible that the long ridges of mouse-dung mentioned by Captain Lyon in the Narrative p. 462 may have been deposited by the *arvicola trimucronata.*

Arctomys.

Since the time when the marmots were first separated from the Linnæan genus *mus*, by Schreber, many allied animals have been discovered and ranked either in the same genus, or in new genera, or sub-genera, according to the different views of authors ; and M. F. Cuvier (*Mém. du Mus. d'Hist. Nat. 5e année* 4e *cah.*) has founded his new genus *spermophile* upon one of the marmots which has been longest known.

The animal which is more particularly the subject of this article, is a spermophile, but as it is probable that this genus is not really distinct from some of those previously indicated by the American Naturalists, and that various animals hitherto referred to the genus *sciurus* may also be spermophiles, it has been judged proper to preserve the name arctomys in its original extended signification, until the limits of the new genera are more correctly fixed, by a comparison of their different species with one another, prefacing however, the description of the Arctomys Parryii, by a brief enumeration of the species described by authors, for the purpose of more ready reference.

When Schreber wrote, three species were well known as inhabitants of the old continent.

*A. marmotta**. *A. bobac*†, and *A. citillus*‡.

The two former, similar to each other in habits and general appearance, were the types of the genus, and still continue to be ranked as true marmots. The third has furnished to M. Cuvier, as has been just mentioned, the characters of his new genus *spermophile*, which, as we shall notice in enumerating the American marmots, is intimately allied to the division *tamias*, of the genus *sciurus*.

The following is a tabular view of the characters, by which he distinguishes the two genera:—

Arctomys.	Spermophila.
Grinders, presenting on a transverse section, a nearly circular outline.	*Grinders*, when cut transversely appearing somewhat wedge-shaped, the inner margin being narrower than the outer one.
External ear, a flat flap with the vestige of a helix merely at the anterior and posterior parts of the auditory opening.	*External ear*. The auditory opening entirely surrounded by a helix (bearing some resemblance to the cicatrix of a human ear that has been cut off. Pallas.)
Pupil of the eye, round.	*Pupil of the eye*, oval.
Feet, broad and clumsy.	*Feet*, slender.

* The *arctomys marmotta*, (Gmel.) is found on the Alps and Pyrenees, and was known to Pliny under the name of *mus alpinus*, (*Hist. Nat.* l. viii. c. 37.) It is the *mus marmotta* of Linnæus, and has given rise to the English appellation of the genus. We are indebted to Gesner, (*Quadr.* p. 743,) for the most complete account of its manners, and there is a good description and figure of it in *l'Histoire Naturelle des Mammifères*. It is well known to travellers on the continent, as one of the animals which the Savoyard boys exhibit, in order to procure a small pittance.

† The *a. bobac* (Gmel.) which is fully described by Pallas, under the name of *mus arctomys*, (*Glires*, p, 97,) is an inhabitant of Poland and Siberia, choosing its residence in sunny exposures on hills of small elevation.

‡ To Pallas we also owe very detailed accounts of the *a. citillus*, which is the *mus noricus* of Agricola, and is found from Bohemia to the distant parts of Siberia. He has described several varieties, differing from each other in size, in the capacity of the cheek-pouches, the proportional length of their tails, and in the spotted, or waved, or clouded disposition of their colours, and which on further research may prove to be so many distinct species.

Arctomys.	Spermophila.
Toes, short and robust, united up to the commencement of the second phalanges by a strong membrane.	*Toes*, long, slender, separated.
Sole, including the broad heel, entirely naked.	*Sole*. The four tubercles and under surfaces of the toes naked, the rest of the sole, including the narrow heel, hairy.
The *cranium* flattened above, and presenting a nearly straight line from the occiput to the nose, with a deep bending, however, at the root of the nose. The temporal depressions large, and nearly equal to the orbits in size.	The *cranium* presenting an uniform curvature from the occiput to the extremity of the nose, large orbits and small temporal depressions.
The *fur* spotted.	The *fur* nearly uniform in colour, (not spotted.)
Manners, &c., social, hibernate, feed upon grass in summer.	*Manners*, &c. Live solitary, and lay up a store of berries for winter food.

In addition to the three marmots of the old world above mentioned, Dr. Eversman has collected some new ones in the deserts of Bukhara, but not having been able to procure the narrative of his journey, we know nothing more of them than the names of two, (*a. fulvus* and *a. mugosaricus*,) imposed by M. Lichtenstein*, nor do we know whether they are true marmots or spermophiles. Neither is the Circassian marmot of Pennant (*Hist of Quad.* i. p. 137,) (*glis tschcrkessicus*, Erxlebein,) sufficiently described to enable us to arrange it. An African animal the *gundi* which inhabits Mount Atlas, and is ranked by Gmelin and Pennant as a marmot, has only four toes on the hind feet, is otherwise little known, and belongs most probably to another genus.

The American species are more numerous, and much information respecting them, may be derived from a paper by Joseph Sabine, Esq., published in the *Linnean Transactions*, vol. xiii.) wherein he has cleared up many difficulties respecting the synonymy of the then known species, and figured and described three new ones.

* *Bulletin des Sciences, No. 3, Mars*, 1824, p. 265.

The American marmots enumerated by him are, *a. monax**, *a. empetra*†, and *a. pruinosa*‡ of GMELIN, *a. Franklinii*, *a. Richardsonii*, and *a: Hoodii* of SABINE§, to which may now be added *a. Parryii*, MIHI, and as nearly allied to these, and perhaps in a few instances, synonymous with some of them, or with each other, *Cynomys socialis*‖, RAFINESQUE-SMALTZ. *C. griseus*¶, IDEM. *Anisonyx brachyura*¶, IDEM. *A? rufa*¶, IDEM, and the division *tamias* of the genus *sciurus*, as *s. striatus***, KLEIN. *s. tridecemlineatus*††, MITCHILL. *s. Hudsonius*, FORSTER. *s. quadrivittatus*, SAY. *s. lateralis*‡‡, IDEM.

* *A. monax* has been often described, and is well known in the southern districts of the United States under the appellations of *wood-chuck* and *ground hog*. DESMAREST, *Mammalogie, No.* 525. WARDEN's *United States*, i. p. 225.

† The *a. empetra*, or *Quebec marmot*, requires correction as to references. Four specimens have been described under this name by authors, but as Mr. Sabine (FRANKLIN's *Journey*, *Appendix*, p. 662) has justly remarked, there is so much discrepancy in the descriptions, that they cannot be all referred to the same species with any certainty. A specimen in the Museum of the University of Edinburgh, sent from Canada by the Earl of Dalhousie, although of smaller size, agrees in other respects with the one described in the *Linnean Transactions* by Mr. Sabine. Desmarest (*Mamm. No.* 526,) mentions that three individuals of this species, had been recently sent to Paris from New York.

‡ The *a. pruinosa* is known only by Pennant's short description of a specimen in the Leverian Museum, and the characters he has given, with the exception of the fur of the abdomen being hoary, are all referrible to the *a. empetra*. Its long coarse hair sufficiently distinguishes it from *a. Franklinii* and *Parryii*, to which it bears some resemblance in colours.

§ *Trans. Linn. Society*, vol. xiii. p. 19, *et seq*. *Appendix to Franklin's Journey*, p. 662.

‖ *Cynomys socialis*. *Arctomys Ludoviciana*, ORD., known also by the names of *monax missouriensis*, *wistonwish*, *prairie dog*, burrowing or barking squirrel, has been scientifically described only from a prepared specimen, kept in Peale's Museum, Philadelphia, and excepting its larger size, there is no character ascribed to it by James, who has given the fullest description, but what applies equally well to the *a. Richardsonii* as described by Mr. Sabine. There is a good account of its manners in PIKE's *Travels through Louisiana*, p. 207; and a description of it in JAMES' *Account of Long's Expedition to the Rocky Mountains*, vol. ii. p. 140, 141 and 334. See also WARDEN's *United States*. i. p. 226, and for an account of M. RAFINESQUE SMALTZ's characters of the genus *cynomys*, DESMAREST's *Mamm.* p. 314, which is taken from the *Amer. Month. Mag.* 1817, p. 45. The genera *geomys* and *diplostoma* of the same author, also mentioned in p. 314 and 315 of *Mammalogie*, seem to approach nearer in general character to the hamsters than to the marmots.

¶ DESMAREST, *Mamm. l. cit.*

** *Mamm. No.* 547.

†† *Sciurus tridecemlineatus*, *Mammalogie, No.* 548, seems from the description to be synonymous with the *a. Hoodii* of Sabine. SCHOOLCRAFT, in his *Narrative of Governor Cass' Expedition*, mentions two kinds of striped ground squirrels, one of which seems to bear considerable resemblance to this species.

‡‡ *S. quadrivittatus* and *s. lateralis* are described in JAMES's *Account of Major Long's Expedition* vol. ii. p. 234, 235, 349. (Lond. Edit.)

References to the descriptions or notices of these animals, are given at the bottom of the preceding page.

The *a. monax*, *empetra*, and *pruinosa*, as far as known, appear to be true marmots. The rest agree with each other in having fine fur, distichous bushy tails, much agility, and lively manners, and may be probably all referred to the genus *spermophila* of F. Cuvier, or to *Tamias* of Illiger, (*Tenotus*, Rafinesque Smaltz.) That these genera are very closely allied, has been noticed by F. Cuvier, and the connexion seems to be rendered more apparent by a consideration of the intermediate habits, structure, and manners of some of the American animals just enumerated.

9. Arctomys Parryii. *Gray Arctic-marmot.*

Ground squirrel. *Hearne's Journey*, p. 141 and 386.
Quebec marmot. *Forst. Phil. Trans.* lxii. p. 378 *or abridgem.* p. 329.
Arctomys alpina. *Parry's Narrative, Second Voyage*, p. 61.
A. palmis pentadactylis, rostro obtusissimo, baccis sacculiferis, auriculis brevissimis, cauda elongata apice nigra, corpore supra maculis albis nigrisque confluentibus marmorato subtus ferrugineo.

Descr. *Size* greater than the *a. Franklinii* and less than the *a. empetra*. Length, exclusive of the tail, from twelve to fourteen inches. Broad flattish body with thick short legs. *Head* depressed.

Face moderately broad, covered with short, dark, reddish-brown hairs, intermixed with a few coarser black ones. The *nose* is very blunt, and covered with a dense coat of short brown hairs, a little paler than those of the face, but mixing insensibly with them. A small portion of the upper margin of the nostrils, and their furrowed septum, are the only naked parts. The margin of the mouth is hoary. The *eyes* are large, prominent, and dark-coloured. Orifice of the auditory passage large. *Ears* very short, consisting merely of a flat semi-ovate flap projecting about 2½ lines on the superior and posterior margin of the auditory openings, and covered with short hairs. *Cheeks* of a brighter colour than the face.

Pouches ample, opening into the mouth anteriorly to the grinders.

Whiskers. There are some black *setæ* on the cheeks, above and below the eyes, and beneath the ears on the posterior part of the pouches; none of them exceeding half the length of the head. The last mentioned are the longest, and at the same time the most slender.

Teeth. *Fore-teeth* white, with chisel-shaped cutting-edges, wearing away and frequently channelled inside; *upper ones* short and somewhat truncated: *lower ones* one-third longer, rather narrower, and terminating at the points by nealry a semi-circular outline: five *grinders* above and four below on each side, the posterior ones the largest; (some adult individuals were observed with only four grinders on a side in the upper jaw.) The crowns of the grinders are bounded by an irregular bending plate of enamel, intersected by two transverse ridges of unequal height, and present a few obtuse points.

Body thick. *Back* covered with a dense coat of short soft fur, consisting of a fine down, which has a dark smoke-gray colour at the roots, pale French-gray in the middle, and yellowish-gray at the summits; and of longer but not coarse black and white hairs. The arrangement of these hairs produces a crowded assemblage of ill defined, irregular, and confluent whitish spots, margined and separated by black, and yellowish-gray. The spots are more distinct, and assume an obscure transverse arrangement on the posterior part of the back. The throat, sides of the neck, extremities, and whole under surface of the body have a colour intermediate between brownish-red and brownish-orange, which is most intense on the sides of the neck, posterior to the cheeks. The colours of the back and belly run gradually into each other on the sides; and according to Mr. Edwards' observations, the gray colours of the back extended farthest when the animal was fat, and the fur in *prime* order. In old and lean individuals, the rusty brown of the belly spreads up over the flanks and sides. The hair of the belly and thighs is longer and coarser than that of the back.

Tail to the end of the vertebræ about four inches, the hair projects nearly 1½ inches, and its whole length may be stated at 5¼ inches, or in proportion to the length of the head and body as 1 to 2½. It is flattish, and the hairs sub-distichous, very much resembling the tail of the *Sciurus Hudsonius; (Sabine, Franklin's Journey)*. The upper surface of the half next the body is yellowish-brown intermixed with black hairs, and the under surface uniform brownish-orange. The outer half above and below is black with a slight admixture of reddish-gray hairs. The hairs of the tail are long (1½ inch), and the animal possesses the power of expanding them like a feather. In this state, owing to the exterior hairs being black towards the tips, and brown towards their bases, the tail is brown down the centre, and tipt and margined for about two-thirds of its length with black.

Legs robust, the hind and fore ones nearly of equal length. The *feet* are covered superiorly with short adpressed brown hairs, which at the roots of the claws bend downwards. The *claws* are large, blackish, compressed, arched above, nearly straight and grooved underneath, and tapering, but not very sharp. On the inside of the *fore-feet* and high up, there is a small toe or thumb, armed with a conical nail of sufficient size to be of a little use in grasping substances. Of the remaining four toes of the fore-feet, the first and third are of equal length, the middle one a little longer than these, and the outer one the shortest of all. The claws are about half an inch long. The *palms* are naked and furnished with some remarkable roundish callous protuberances. Three of these are placed at the roots of the toes, the thumb is inserted into the largest one; there is a small one opposite to this at the root of the outer toe, and there is a large one at the extremity of each toe beneath the roots of the claws.

On the *hind feet* there are five toes, longer and more slender than those of the fore extremities, but having rather smaller claws. The inner and outer hind toes arise high up and opposite to each other. The three middle ones arise nearly together, but the centre one is rather the longest. The callosities at the roots of the nails are as large as those on the fore-feet, but there are only four on the soles, two at the roots of the extreme toes, and two lower down at the roots of the three middle toes.

These animals are truly plantigrade, the soles being naked to the heel. The heel is narrow and partially covered with hairs which curve over it.

Few *anatomical details* were preserved. Mr. Edwards has noted the cæcum as being very large. The liver exactly resembles that of the *Mus Citillus* as described by Pallas. A female killed on the 13th of June, 1821, at Point Lake in lat. 65°, had seven young in the dilatations of a tubiform uterus. The testes of the male lie over the symphysis pubis, and are small, without any projecting or pendulous scrotum.

This beautiful marmot was first noticed by *Hearne*, under the name of the ground-squirrel, and indeed it has a most striking resemblance to the Hudson's Bay squirrels in form and voice. In page 141 of his narrative he mentions them as the favourite food of the *grizzly bear*, a hoary variety of *U. americanus*, and in page 386 there is some account of its habits. Forster in the *Philosophical Transactions* describes a specimen of the *A. Parryii* procured from Churchill, under the name of the Quebec marmot, at the same time expressing his doubts of its identity with that animal. The Quebec marmot is found only in the woody parts of the country, but the *A. Parryii* is common in the sandy, barren tracks, near Churchill. It is possible that the *earless marmot* mentioned in Arctic Zoology as observed at Nootka Sound by Captain Cook, may be this species. It was observed by Captain Franklin's Expedition, in the summer of 1821, to abound on the *barren grounds* from lat. 64° to the Arctic Sea, but it was not noticed in Mr. Sabine's paper because the specimens did not reach England. The descriptions then taken, however, correspond in every respect with the specimens brought home by Captain Parry, and which were obtained in Five Hawser Bay in September, 1821.

The gray Arctic marmot is common in stony barren tracks, but delights chiefly in sandy hillocks amongst rocks, where it burrows, living in society. The same entrance is common to a number of individuals. It is not found in woods. A sentinel is generally observed sitting erect upon the summit of the hillock, whilst the others are feeding or sporting in the neighbourhood. Upon the approach of danger, he gives the alarm by a kind of whistle, and they instantly betake themselves to their holes, remaining chattering, however, at the entrances, until the near advance of the enemy obliges them to retire to the bottom. When their retreat is cut off, they become much terrified, and seeking shelter in the first crevice that offers, they not unfrequently succeed only in hiding the head and fore part of the body, whilst the projecting tail is, as is usual with them when under the influence of terror, spread out flat on the rock. Their cry, in this season of distress, strongly resembles the loud alarm of the Hudson's Bay squirrel, and is not very unlike the sound of a watchman's rattle. The Esquimaux name of the animal seek-seek, or cheek-cheek, is an attempt to express this sound. They run with considerable rapidity, have the gait of the Hudson's Bay squirrel, and can squeeze themselves into a very narrow cleft of a rock: we never observed them attempt to leap. According to Hearne, they are easily tamed, and are very cleanly and playful in a domestic state. From the deepness of their burrows, and the want of proper instruments to dig them out, it was not ascertained in what manner, or with what materials, their nests are constructed.

Their food appears to be entirely vegetable. In upwards of fifty individuals examined at various periods, no animal substance was detected in the pouches or stomachs. At Point Lake in lat. 65°, their pouches were observed about the middle of June to be filled with the berries of the *Arbutus alpina*, and *Vaccinium vitis idæa*, which were just then laid bare by the melting of the snowy covering, under which they had lain all the winter. In the end of July, on the shores of the Arctic Sea, their pouches contained the seeds of a *polygonum*, and in Five Hawser Bay in September, they were filled with the seeds of *astragali*.

We possess no precise information as to their hybernation, but it is probably commensurate with the time the snow lies on the ground, which may be generally stated to be from the middle or end of September, to the beginning of June, between the 65th and 68th parallels of latitude.

The number of young they produce at a time has, in one instance, been mentioned already.

Towards the end of summer, these animals, like the bear, acquire a layer of soft fat under the skin, and then they are considered by the Indians to be delicate food, and are much sought after by the bears and wolverenes.

The fur of the Arctic marmot though short, is, when in season, very beautiful and fine, and their skins might be easily procured in sufficient quantity to form an article of commerce. The skins of a spotted variety of the *A. citillus*, which is smaller than the Arctic marmot, are sold at a high price by the Tartars, to the Chinese.

The Canadian voyagers apply the term of *siffleur*, not only to this animal, but also to all the other marmots, and even to the badger, (*meles labradoria.*)

The *A. Parrii* may be distinguished from the *A. Franklinii* by its greater size, its flatter and scarcely gibbous forehead, shorter ears, tail shorter in proportion, tipt with black, but not banded, by the colours of the fur, and lastly, by the presence of a very distinct thumb nail on the fore feet.

It differs from the *A. Richardsonii* also in its greater size, in having an obtuse snout, shorter ears, a tail rather more than one-third the length of the body, in the greater thickness of the body, and in the dissimilarity of the colours of the body and tail.

With the *A. Hoodii* it can never be confounded.

The *A Parrii* has a greater affinity with the *A. citillus*, than any of the American marmots. Indeed Pallas has, as we have already noticed, referred so many varieties to this latter species, that it is not easy to find characters which may separate them all from the *A. Parrii.* One of his varieties approaches the *A. alpinus* in size, and is clothed with coarse fur; another, not larger than a water rat, and inhabiting the same districts with the last, has a short and very soft fur. There are besides intermediate varieties, differing in colour, which in some is nearly uniform, in others clouded or spotted. They vary, too, in the proportional length of their tails, and remarkably in the size of their cheek pouches. The characters which seem to distinguish the *A. Parrii* from all these are, its greater size, its forehead not rounded nor gibbous, but rather depressed, ears clothed with very short, yet distinctly visible, hairs, and a tail longer than the posterior extremities.

10. Lepus glacialis. *Polar Hare.*

Lepus glacialis. *Leach, Ross's Voyage. Supplement to Parry's First Voyage,* clxxxviii. *Appendix to Franklin's Journey,* p. 664.

Lepus timidus. *Fabricius Fauna Grœnl.* p. 25.

Varying hare of Hudson's Bay. *Hearne's Journey to the Northern Ocean,* p. 382. *Penn. Arctic Zoology,* i. p. 94. *Hist. of Quadr.* p. 100.

Kaw-choh. *Copper Indians.* Ookălik, *Esquimaux.*

Hare. *Parry's Narrative, Second Voyage,* p. 18, 94, 103, 104, 107, 137, 150, 157, 230, 309, 313, 512.

The Polar hare inhabits both sides of Baffin's Bay, and is common in the barren rocky tracts, from lat. 64° on the continent of America, to its extreme northern capes, and on the North Georgian Islands in lat. 75°. It is not found in woods; its favourite resort is to the dry acclivities of gently elevated hills, where it shelters itself under large stones and in the natural cavities of rocks, but does not dig burrows for itself. In the winter time, it scrapes a hole in a wreath of snow, generally at the foot of a precipice, and seldom wanders far from its retreat. It feeds on the bark of the *betula glandulosa* and of the various species of willow, and also on dry grass or hay, which it easily obtains even in winter, as the snow is speedily drifted from the acclivities to which it resorts. It is likewise fond of the berries of the *arbutus alpina,* and scratches them from under the snow with its fore-feet, which are armed with nails well adapted for the purpose. On the desolate shores of Melville Peninsula, the hares in the month of January, as stated in the narrative, were driven to the necessity of feeding upon the offal thrown from the ships.—p. 149.

Although considerable numbers of the Polar hares are found in favourable districts, it is not a gregarious animal, nor do the situations it lives in require that it should be so; but the American hares living in society, chiefly in willow thickets where the snow is deep and loose, find their association necessary to form beaten roads in the winter time, on which they may travel in search of food. This habit renders them an easy prey to the natives, who capture them by placing a noose formed of the sinews of the rein-deer in their path. The Polar hare, on the contrary, makes a devious and solitary track in the snow, and is destroyed by the bow and arrow or by fire-arms. The hunter, by a gradual circular approach, gets sufficiently near without alarming the animal, but its fur being of as pure a white colour as the snow itself, its presence is detected only by the dark colour of its eye.

The winter fur of the Polar hare is very dense and fine, of a snow-white colour to the very base, and longer than that of the American hare, which, even in winter, is dark-coloured towards its roots. Its length is about one inch on the back, and two and a half on the belly. During this season the animal is entirely white, with the exception of the black tips to the ears, the honey-yellow coloured irides, and part of the whiskers, which are black. In Greenland the hares continue white all the year, and the same thing would appear to occur with some individuals (probably old ones) in other quarters of the Arctic regions. A white hare was seen by Captain Parry on the 17th of August, although dark-coloured ones (young?) were frequent at the same period (p. 313). A partial change of the points of the hair on the face, front of the ears, and back, to grey and greyish-brown was observed by Captain Sabine in some of the hares killed in the height of summer on Melville Island. A *young one*, killed on the present voyage at Repulse Bay on the 22d of August, and hence nearly three months old, had the head and back hoary, from an intimate intermixture of hairs entirely black with others black at the base and white at the tips. These hairs are longer and coarser than the dull yellowish-grey down, which becomes visible when they are blown aside. On the breast, flanks, and thighs, the long hairs have fewer white tips, and are more thinly scattered, permitting much of the down to be seen; the down on these parts is of a bluish-grey colour. The belly, feet, and tail, both above and below, are white. The hairs on the belly are very long. The ears are coloured like the back, but have a greater proportion of black hairs; the margins are white, and there is a small brownish-black spot at their summits: they are about the same length with the head, that is 3½ inches long. The length of the back and head is 17½ inches.

About the end of April (in lat. 65°), the winter fur falls off with the slightest touch, a circumstance which does not occur in October when they begin to assume their winter dress. April is also their rutting season, and, according to Indian information, they bring forth only once a year, and from two to four young at a time. Otho Fabricius, however, from personal observation, ascertained that the Greenland hares produce as many as eight young at a time in the month of June.

The flesh of the Polar hare is whitish, and has a good flavour, contrary to that of the varying hare, which is said to be insipid. The flesh of the American hare is more brown, like that of the common hare. The Polar hare is also distinguished from the others by the extreme thinness and tenderness of its skin in the winter time. The full-grown hares killed on Melville Peninsula, weighed about 7lbs.; and Captain Sabine states, that the largest killed on Melville Island did not reach 9lbs.; none of those obtained by Captain Franklin's party in the neighbourhood of Fort Enterprise exceeded this latter weight. Hearne, however, informs us, that in his time they were frequently killed near Churchill river, weighing 14 or 15lbs. Pennant, in British Zoology, notices nearly as great a variation of the weight of the common hare.

The polar hare was considered by Fabricius to be the common hare, with the colour of its fur altered by climate, and by Barrington and Pennant, as the same with the varying hare of Scotland. Dr. Leach, on examining one brought from Baffin's Bay by Capt. Ross, named it as a new species, and Capt. Sabine, who had opportunities of seeing many recent specimens at Melville Island, describes their characteristic marks in the appendix above quoted. The different species of hare, although differing in manners, resemble each other so much in form, that it is difficult to find artificial characters by which they may be readily distinguished. The colour of the fur is, in many instances, an uncertain mark, especially as the effects of climate upon it are not yet perfectly known; authors have therefore generally had recourse to the relative proportions of the members, for the purpose of obtaining specific differences, and we are indebted to Pallas, Barrington, and Pennant, for measurements of this kind of the *lepus cuniculus*, *americanus*, *ogotona*, *variabilis*, and also incidentally of the *lepus glacialis* under the name of *variabilis*. It is to be remarked, however, that the differences of length are often minute quantities, and some uncertainty occurs as to the exact part of a joint, from which former authors have measured; hence this method is not so useful in practice, as might at first be supposed, and it is very convenient when any other character of practical application exists. Captain Sabine has therefore done a service to naturalists, by pointing out a very distinct specific difference betwixt the polar hare and the other two species, which it most resembles, the *L. timidus* and *variabilis*, in the direction of the fore teeth: those of the former being much less curved, and standing out more nearly in the planes of the jaws, into which they are implanted. We may add that the upper fore teeth of the two latter species have each a deep longitudinal furrow, which is continued so as to form a notch on their cutting edges; this groove is nearly obsolete in the adult polar hare, and the cutting edges of the teeth are even; the teeth too, in consequence of their dissimilar inclination, wear away on the inside differently in the different species.

The following table contains the dimensions of the common hare from the lowlands of Scotland, and of the varying hare from the highlands, taken carefully from recent specimens of full-sized individuals, procured in the month of January for the purpose. They are contrasted with some of the dimensions of the polar hare, in the last columns, but it is to be regretted that the latter being taken from the specimen which was brought home for the purpose of setting up, is necessarily defective, and in some degree inaccurate, because the cartilages of the few bones that remained attached to it were shrivelled by drying. The measurements are in inches and lines.

	L. timidus Common Hare. Old Male.		L. timidus Common Hare. Female.		L. variabilis, Varying Hare. Old Male.		L. glacialis Polar Hare.	
	IN.	LI.	IN.	LI.	IN.	LI.	IN.	LI.
Length from *nose to root of tail* (measured along the back)	24	0	23	0	22	0	22	6
——— from nose to point of middle claw, hind leg stretched out	31	0	30	8	29	8	(*)	
——— of *head*, from occipital spine to nose, measured over the forehead, and pressing down the fur	5	6	5	4	5	0	4	6
——— of *head*, measured with a pair of calliper compasses	4	6	4	5	4	3	4	0
——— of *ears*, including fur	5	6	5	0	4	0	4	0
——— of *ears*, from rictus to apex, or from the commencement of the cartilaginous part of the auditory canal	4	0	3	9	3	1	3	6
——— of *tail* to end of vertebræ	3	8	3	6	2	0	1	8
——— of *tail*, including fur	5	0	5	6	3	6	3	6
——— of *whiskers*	4	6	3	6	3	0	2	6
Fore Extremities.								
Length of *humerus* (measured anteriorly)	4	0	3	9	3	6	...	
——— of *ulna* (from olecranon to wrist)	5	1	5	0	4	11	...	
——— from wrist joint to end of middle claw	3	0	3	0	2	9	2	9
——— of *middle toe and claw*	1	7	1	6½	1	6½	1	2
——— of *fore leg* (from anterior part of elbow joint to point of middle claw)	7	5	7	3	7	0	...	
Hind Extremities.								
Length from knee joint to point of middle claw	10	8	10	7	10	6	...	
——— of *femur* (from trochanter to knee)	5	3	5	2	5	2½	...	
——— of *tibia* (measured exteriorly)	5	8	5	8	5	8	...	
——— from *heel* to root of middle toes	3	11	3	0	3	8	3	8
——— of *middle toe and claw*	2	2	2	1	2	2	2	1
——— from heel to point of middle claw	6	1	5	10	5	10	5	9

* A Polar hare, (termed by Pennant varying hare) measured at Hudson's Bay, was 24 inches long from nose to tail; 31½ inches from nose to the point of the middle claw, stretched out, and weighed 7 lbs. 6 oz. See *Arctic Zoology*, i. p. 95; Article, American hare.

The following Table is extracted from Barrington's paper in the *Philosophical Transactions*, Vol. LXII.

	Fore Leg measured from uppermost joint to end of toe.	*Hind Leg* from uppermost joint to end of toe.	Length including tail.
	IN.	IN.	IN.
Rabbit	$4\frac{1}{2}$	$6\frac{3}{4}$	$\frac{1}{2}$
Hare	$7\frac{3}{4}$	11	22
L. Americanus	$6\frac{3}{8}$	$10\frac{3}{8}$	18
Alpine Hare from highlands of Scotland (Varying Hare)	$6\frac{5}{8}$	$10\frac{5}{8}$	$22\frac{3}{8}$

It will be observed from the above table, that one of the most striking differences betwixt the polar and the common, or varying, hare is in the length of the fore toes, those of the former being nearly half an inch shorter. The claws of the polar hare are similar in form to those of the common hare, but are in general a little blunter, perhaps from more frequent use in scratching. The claws of the varying hare are more accuminated and sharper than either, but at the same time more depressed. The head of the polar hare seems to be proportionally smaller.

When the ears of the common hare are bent forwards over the crown of the head they reach to the tip of the nose, and if bent along the cheek they reach an inch beyond the nose. The ears of the varying hare treated in the same way reach, in the latter case, just to the tip of the nose, and in the former, they fall an inch short. The ears of the polar hare seem in general to be of a length intermediate between these two, although some differences seem occasionally to exist in this respect; Mr. Edwards, who examined several of these hares on the present voyage, found their ears, exclusive of the fur at their tips, of the same length with the head, and this agrees with the specimen in the Edinburgh Museum, from Melville Island. Those killed at Fort Enterprise had the ears, including the fur, about one-eighth part longer than the head, and Captain Sabine states the ears of those measured by him to exceed the head, by from one-fifth to one-seventh part. Barrington remarks that similar variations occur in rabbits, the ears of those fed in the house being usually longer than the head, whilst those living in warrens have the ears shorter than the head.

The *American Hare (L. americanus*)* which in northern districts also changes to a pure white in the winter, may be distinguished from the polar hare by its being of a much smaller size, by the fur at the tips of the ears being grey not black, and by the hind leg and foot, measured from the knee-joint, considerably exceeding one-half the length of the animal. The tail of the polar hare is like that of the varying hare, totally white even in summer, whilst the American hare has the upper surface of its tail black, like that of the common hare. The average weight of the American hare is about four pounds, scarcely half that of the polar hare. In the southern parts of the United States, the American hare does not change its dress in the winter time. It lives only in wooded districts, resorting chiefly to willow thickets, and was seen by Capt. Franklin's party as far north as 64° 30′ at Fort Enterprise, at which place, at Churchill, and along the whole borders of the barren grounds between these places, it lives in the neighbourhood of the polar hare. We never observed them associating or visiting the same haunts, and did not learn whether there is the same antipathy betwixt them that exists between the common hare and the rabbit, or whether like the common and varying hares they occasionally breed with each other†. Mr. Sabine in the appendix to Captain Franklin's Narrative has stated, we suspect from some error in the information communicated to him, that the American hare retires from the northern districts of Hudson's Bay to the southward in winter. We believe that they never migrate; but in some seasons, generally after a very wet summer, a great mortality prevails amongst them, and they become very scarce in certain districts.

II. Cervus tarandus. (*L.*) *Rein-deer.*

Cervus tarandus. *Supplement to Parry's Voyage*, exc. *Appendix to Franklin's Journey.*
Tukta (male,) Pangnek (female,) Kollowak. (young) Norak. *Greenlanders.* Fabr.
Deer. *Parry's Narrative, Second Voyage*, p. 52, 84, 101, 107, 108, 214, 324, 332, 434, 439, 505, 512.

This is the only species of deer found in America, to the eastward of the chain of the Rocky Mountains, and in a greater northern latitude than 64°. It is the *Attekh* of the Cree Indians, the *etthin* of the Copper Indians, and *tooktoo* of the

* This animal was first described by Kalm.—*Travels in America*, i. p. 105, ii. p. 45.

† This fact is stated by Pallas, and has also been lately observed in the highlands of Scotland. Professor Jameson, who received his information from a highland gentleman of veracity and observation.

Esquimaux. These people have, besides, names appropriated to the different ages and varieties. Thus the Copper Indians denominate a rein-deer of the smaller kind, such as frequent the barren-grounds, and migrate in the summer to the sea-coasts, and which were the only kind seen by Captain Parry, by the generic term *etthin*, or more exclusively *bedsee-awzeh*. The male is named *bedsee-ehoh*, the female *tsootai*, and if she is suckling a fawn, *tampeh*. A larger and woodland variety of rein-deer is named *tantsee-ah* *.

The rein-deer has been often described by naturalists, and there is a very full history of it in the Amænitates Academicæ, tom. 4, No. 57, from which succeeding authors have borrowed freely. It may be remarked that its horns vary exceedingly in shape and size, so that no two individuals in a herd are alike in their antlers, and in extreme cases it is difficult to trace any resemblance. Some have the extremities and branches of the antlers broadly palmated, others have them cylindrical, and even tapering. Many have a broad plate which runs down betwixt the eyes, and projects above the nose; in some this plate arises from the right antler, in others from the left, in a large proportion there is one from each antler, whilst in a great number it is altogether wanting. After paying considerable attention to the subject, we did not find ourselves warranted in ascribing these variations solely to sex or age. The rein-deer hunters, although, as might be expected, intimately acquainted with the economy of the animal, are unable to distinguish like the stag-hunters of Europe the age of the animal by the *tines* of its antlers. They remark indeed that the old males have generally (but not always) larger horns than the young males and females, and that they come to perfection sooner, and are shed earlier in the season.

It has been supposed that nature has provided the female rein-deer with horns, because inhabiting more northerly regions than the rest of the deer species, it requires them to clear away the snow. This affords no explanation of the fact that the old males lose their horns in December, before the snow has attained its greatest depth, whilst the young males and females retain theirs until March, April, or May. We know from frequent observation that the rein-deer removes the snow with its feet, but want confirmation of its ever using its horns for that purpose.

The horns attain their full size, and lose most of their hairy covering before the commencement of the rutting season, at which time the males have much

* For the numerous Lapland names applied to the rein-deer, see *Lach. Lappon.* 11, p. 48.

fat deposited upon their backs. The old males come first in season, generally about the beginning of October; their fat soon becomes red, and strong tasted, and in a fortnight they are lean and exhausted. They are succeeded in their office by the younger males, and the whole season is over before the middle of November. Although the males, as we have stated above, in general shed their horns some months earlier than the young ones, Captain Cartwright, who resided sixteen years in Labrador, and was much occupied in the pursuit of the rein-deer as an article of food, remarks that he often met with stout male deer which retained their horns in February, whilst many of the younger ones had shed theirs; that he frequently killed old stags which had not cast their horns in March, and that in May he saw a male three or four years old still carrying his antlers. He goes on to say that although they are thus irregular in shedding their horns, they all burnish in August *. The connexion that exists between the state of the genital organs of the male deer, and the increment of their horns, has been illustrated by Blumenbach and other physiologists. The immediate process by which nature produces the fall of the horns is pointed out by Mr. Brookes, of London, in his anatomical lectures. The rough coronary circle of bone at the base of the horn becomes gradually larger until it strangles the blood-vessels of the soft hairy covering of the antlers. This soon dries, shrivels and peels off, and the horns no longer deriving any nourishment also dry, and drop off like an extraneous substance.

The migration of the rein-deer has been considered as a flight from the incessant attacks of the *œstrus tarandi* †, but it is not until the herds have reached the sea-coast, or the still more remote islands which form the limits of their summer journey, that the larvæ deposited in their skins and fauces ‡ on the preceding season, become perfect insects and take wing; and in a short period thereafter, the ova of a future brood are deposited. Hence, as the barren-ground deer do not return to the woods until November, when much snow has fallen, and the insects are put to rest for the season, it is clear that they never hear the sound of the gad-fly in the woody country. Their migrations seem to be prompted by that

* *Journal of sixteen years' residence in Labrador, by G. Cartwright, Fifth Voyage*, p. 91, 112, 133.

† "Hæc musca notissima est rangiferis et quorum dorso prodit circa initium Julii tumque deponunt rangiferi crines, qui omnes in dorso ferè erecti conspiciuntur." *Flor. Lapp.* Ed. Smith, p. 378.

Vide etiam Travels through Sweeden, Norway, *&c.*, by A. De Capell Brooke, p. 41.

‡ The *larvæ* deposited in the fauces are said to belong to the *œstrus nasalis*.

instinct which leads them to resort, at certain seasons, to districts where alone food of the proper quality is to be obtained. In the winter time they feed on the *usneæ*, *alectoriæ*, and other lichens which cover the lower branches of the trees in the dark forests of larch and spruce fir. About the end of April, when the partial melting of the snow has softened the *cetrariæ*, *cornicularíæ*, and *cenomyces*, which clothe the barren-grounds* like a carpet, they are found ultimately resorting to these their most nutritious food, and returning to the woods according to the state of the weather. In June, when the increasing power of the sun has dried up the lichens, and rendered them quite hard and friable, the deer resort to the moist pastures which lie between the rocky ridges on the coasts and islands of the Arctic Sea, where they graze not only on the sprouting *carices*, but also on the hay and withered culms of the preceding year. Their spring journey is performed partly in the snow, partly after the snow has disappeared, on the ice of the rivers and lakes which have in general a northerly direction; and their return takes place after the snow has begun to fall, but whilst the heat remaining in the earth is still sufficient to keep the lichens in a comparatively soft state under their snowy covering. The food thus preserved for them brings them into a good condition for the rutting season, which takes place in October, when they arrive on the verge of the woods.

The pregnant does precede the males a month or six weeks in the spring migrations, and bring forth their young on the sea-coast, in May and June. It is probable that they go farther northwards than the bulk of the males, and as they travel before the ground is laid bare, they are very lean on their arrival in their northern summer quarters, although on quitting the woods they are in better condition than the males. The deer seen on the coast by Captain Franklin's party were almost uniformly does and fawns, and Captain Parry remarks that they were wretchedly poor on their arrival in his neighbourhood. Captain Parry saw deer as late as the 23d of September, and the females with their fawns made their first appearance on the 22d of April.

This account of the migrations of the rein-deer is to be considered as merely a general view, for stragglers are found in every part of the country at all

* The BARREN GROUNDS, ("Hi lichene obsiti campi quos TERRAM DAMNATAM diceret peregrinus," (*Flor. Lapp.*, p. 374,) are an extensive tract of country, more or less rocky and hilly, but no where mountainous, lying between the 60th and 68th degree of north latitude, and to the eastward of the 110th degree of west longitude. They are, except in a few alluvial spots on the banks of the larger rivers, where a few white spruces grow, entirely destitute of any shrub larger than the *betula glandulosa* or dwarf-birch.

seasons; and the remarks we have made apply exclusively to the barren-ground deer. A larger kind is said to remain the whole year in the woody parts of the country, migrating southwards in the summer season to the thickly-wooded swamps and marshes which skirt the coast of Hudson's Bay, betwixt Nelson and Severn Rivers. Hearne states that this variety has smaller horns than the barren-ground kind, although the weight of their carcasses is much greater*. They are like the others, infested by the gad-fly. In the beginning of September, vast numbers of this kind of deer pass near York Factory, in latitude 57°, on their journey towards the north-west.

When the rein-deer is in good condition, it is equal, if not superior, in flavour to the finest English venison. Almost every part of it is eaten by the Indians in one shape or another. The hunter breaks the leg bones of the recently-slaughtered animal, and whilst the marrow is still warm, greedily devours it. The legs and feet thus deprived of their marrow, fall to the lot of the females, who eat the sinews and membranous parts also raw. Portions of the intestines, too, are occasionally eaten raw, particularly the thin folds of the third stomach, or many-plies. The summits of the antlers likewise, as long as they continue soft, are delicacies in the raw state. The remainder of the animal is eaten when cooked, nor do the contents of the paunch escape. They are eaten sometimes raw, sometimes boiled along with the blood of the animal; and it would appear that the *lichens* and other vegetable matters are rendered more digestible by the human stomach, after having undergone mastication, and become mixed with the salivary and gastric juices of a ruminating animal. Many of the Indians and Canadian voyagers prefer this savoury mixture after it has undergone a degree of fermentation, or lain to season, as they term it, for a few days. The paunch and its contents are likewise esteemed to be delicate food by the Esquimaux and Greenlanders, the former of whom term it *nerrooks*, the latter *nerrokak*, or *nerriookak*. In the spring, when the *larvæ* of the *æstrus* which are lodged in the fauces, and about the posterior parts of the nostrils, have attained a large size, those parts of the animal are considered as choice morsels by Indian epicures. When the whole of the soft parts have been consumed, the women pound the bones betwixt two stones, and by boiling, extract the marrow for the purpose of forming the better kinds of the mixture of dried meat and

* Hearne, *op. cit.* p. 195-200, which may be consulted with advantage by those who are desirous of knowing more respecting the manners of this interesting animal.

See also Captain Franklin's Narrative, p. 240-245.

fat, termed pemmican; and most of the young females preserve some of the marrow in a bladder, to anoint their hair with on dress occasions.

12. Bos moschatus. (*L.*) *Musk Ox.*

Bos moschatus. *Supplement to Parry's First Voyage*, p. clxxxix. *Appendix to Franklin's Journey*, p. 668.
Musk Ox. *Hearne's Journey to the Northern Ocean*, p. 135.
Musk Ox and Oomingmuk. *Parry's Narrative, Second Voyage*, p. 497, 503, 504, 505, 512.

The coincidence between the Esquimaux name of this animal *oomingmak*, and the oomimak or umimak of the natives of Wolstenholm Sound and of the Greenlanders, has been pointed out by Captain Sabine, together with the singularity of the latter people having been able to preserve the name, and a general idea of the form of an animal through tradition only. Neither the Crees nor Copper Indians possess an original name for the Musk-ox, the former calling it *matheh-moostoosh*, or ugly bison, and the latter *adgiddah-yawzeh*, or little bison.

No Musk-oxen were seen by our navigators on the present voyage, but dishes or spoons formed out of their horns were observed in the hands of the Esquimaux. They do not visit Melville Peninsula, but keep more to the westward, near the banks of some of the larger rivers, on which alone willows or spruce trees sufficient to shelter them are to be found. Their appearance on Melville Island in the month of May, as ascertained on the former voyage, is an interesting feature in their history. Supposing them to have travelled directly northwards, they must have migrated at least seven degrees of latitude from their winter quarters on the continent. Their journey in the spring was performed on the ice, but as that must have been at least partially broken up when they returned in September, it is more than probable that there is a chain of islands by which they were conducted to the main land.

The food of the Musk-ox is the same with that of the rein-deer, and the footmarks of these two animals are so similar, that we have known hunters of some experience mistake the one for the other. The mark of the Musk-ox's hoof, however, is a little narrower. The winter coat of this animal yields a fine wool that would be a valuable acquisition to our manufacturers. It is hunted in its winter retreats by the Esquimaux only, none of the Indian tribes ever visiting the barren grounds at that season. At present, the Musk-ox is not found in a lower latitude than 66°, but formerly they came much farther to the southward.

and their flesh used to be brought by the natives to Fort Churchill in latitude 58°. It would appear that they are retiring to the northward, probably owing to the alarm created by the attacks made upon them by fire-arms. It is worthy of remark, that the *Bos Americanus*, or *bison*, has also retreated to the northward. Until very lately, they were never seen beyond Slave Point, in latitude 61° 30′; but, in 1821, they are said to have visited, for the first time, the neighbourhood of Great Marten Lake, in latitude 64°. When a herd of Musk-oxen are fired upon, if the hunters keep themselves secluded from their view, they mistake the noise for thunder, and form themselves into a circular group, crowding nearer together as their companions fall around them. When they discover by the sense of smell the presence of man, the whole herd seek safety by instant flight; but a wounded individual often turns upon its pursuer, and thus falls a more easy prey, for the hunter by frequent wheeling easily avoids the pushes of the infuriated animal, and finds an opportunity of stabbing it in some vital part.

They were observed by Captain Franklin's party to rut in the end of August and beginning of September, and Hearne says that they bring forth one calf at a time in the latter end of May or beginning of June. He remarks also, that very few bulls are seen in a herd, and supposes that they kill each other in their contests for the cows. When the Musk-ox is fat, its flesh is well tasted, and it is then preferred by the Copper Indians to the rein-deer. The flesh of bulls is high flavoured; and both bulls and cows, when lean, smell more strongly of musk, their flesh at the same time being very dark and tough. The contents of the paunch and other intestinal parts are relished as much by the Indians as the similar parts of the rein-deer.

13. Phoca fœtida. *Rough Seal.*

Phoca fœtida. *Zoolog. Dan. Mull. prodr.* p. viii. *Faun. Grænl.* 13.
Phoca hispida. *Gmel. Lin.* i. p. 64. *Shaw's Zoology*, i. p. 259.
Rough Seal. *Penn. Quadr.* ii. p. 278 (where it is confounded with a larger species), and *Arctic Zoology*, i. p. 160.
Neith heek, or Neitiek, (*middle-sized* kairolik, *young* ibbeen). *Esquimaux* Neitsek. *Greenlanders.*
Small seal, and Phoca hispida, and Neitiek. *Parry's Narrative, Second Voyage*, p. 172, 178, 386, 423, 424, 505, 506.

This species approaches very near to the phoca vitulina, or common seal. The teeth, vibrissæ, tongue, ears, tail, flippers, and claws of both are alike, and the principal differences which have been pointed out by Fabricius, are as follow: in the *common seal*, the head is a little depressed, the nose is of a moderate size, being one-third of the length of the head; the pupil of the eye is black, with a greyish-brown iris; the neck is lower, or has a less vertical diameter, than the head; the body is almost cylindrical, the space betwixt the hind feet being nearly as great as that betwixt the fore-feet; the fat is not oily, and the flesh is more edible than that of any other seal found in the northern seas. The *rough seal*, on the other hand, has a short roundish head, of which the nose forms less than one-third part; the pupil of the eye of a dull white colour, with a pure brown iris; a thick neck, elliptical body, oily fat, and the flesh very fœtid and disagreeable, particularly that of the old males, which is nauseated by the Greenlanders themselves. They differ also in their habits, the common seal being remarkable for its caution, acuteness in perceiving danger, and its more active habits; whilst the rough seal is easily surprised either on land or water, and is moreover a solitary and a lazy animal, being wont to lie basking in the sun in place of hunting after its prey, and thus being often found lean from want of nourishment. The latter is also a smaller species, seldom exceeding 4½ feet in length, according to Fabricius.

The only character that can be perceived in the dried skins for distinguishing the species, consists in the greater quantity of entangled woolly hairs at the roots of the fur of the rough seal, which have the effect of preventing the longer hairs from lying so close as in the common species, and of giving them the sub-erect position, from whence the specific appellation of hispida. In the young of the rough seal the whole fur is woolly, and forms a thick fine coating, on which account the Esquimaux prefer their skins for clothing before those of any of the other seals they are acquainted with. The woolliness of the fur of the common seal is much less remarkable than in the rough seal of a corresponding age.

The rough seal, like the common one, varies much in colour. The very young individuals, seen by Captain Parry, were totally white, and the fœtal ones had a yellowish white colour like raw silk. A specimen brought home of a young one about six weeks old, killed in the end of April at Igloolik, is entirely of a pure shining yellowish white colour without any dorsal line: another, three feet long, perhaps a year old, corresponds with the general description Fabricius gives of the young. It is without spots, and all the long hairs are white but on the head, back, and tail; the short woolly coat at their roots has a shining greyish-black colour, and as it is partially visible, it gives a dark appearance to these parts. One variety, known in Greenland by the name of *ukalleriak*, grows up of a white colour, marked merely with an obscure dark dorsal line. In general, however, the rough seals, as they grow older, exhibit more and more colour in their fur, and the arrangement of these colours is somewhat different from what takes place in the common seal. In the latter, they are generally greyish-black in distinct spots of very various and often considerable magnitude, upon a yellowish-white ground; in the former, the ground colour is the same, but the spots are very deep reddish, or blackish, brown of smaller size, but inosculating freely with each other, so as to produce a marbled appearance. In both species the abdomens are whiter than the back, and occasionally interspersed with distant small spots.

The specimens of the *P. fœtida* brought home have seven rows of whiskers. The setæ are all compressed and undulated with an appearance of articulation between each undulation; the upper rows are darker coloured and shorter, the lower ones longer and colourless; the exterior setæ of the lowest row are the longest.

The rough seals were seen in great abundance, both in the summer and winter, in the course of the voyage, and many interesting particulars respecting them are interspersed through the narrative*. They form the principal subsistence of the Esquimaux of Melville Peninsula in the winter time, and are also the chief dependance of the Esquimaux that frequent the mouth of the Coppermine river in the months of March, April, May, and June.

The rough seal, according to Fabricius and other observers, lives under the fixed ice, in which it has a small foramen for breathing, and a larger one to ascend by when it is satiated with food. The Esquimaux informed us, that the seal makes these holes with its teeth, indeed its claws would be inefficient weapons for wearing away the hard ice of the northern winters†. As two of these seals seldom use the same hole, the degree of labour to the solitary animal must be

* See particularly p. 171, 177, and 424.

† The *phoca vitulina* also lives under the fixed ice, in which it has a foramen, but the same foramen is common to a number. Linnæus thus mentions the fact: "Grey seals *(phoca vitulina)* are hunted in winter. They lie upon the ice often in great numbers close to a hole they have made in it. If it should freeze over, they travel to the south-west till they can get at water, always proceeding straight-forward, even though they meet with mountains in their way; and they return in the same direct line back again. The seals are able to pénetrate through the ice from beneath, lying on their backs under water be it ever so thick, but cannot make their way into it from above."—*Lachesis Lapponica*, ii. p. 237.

very great when the ice is thick, for the perforation is necessarily shaped like an inverted funnel. Our navigators often saw these perforations completed in a single night. According to the Labrador Missionaries, the rough seal makes for itself several large caverns, to which it retires in the months of February and March to bring forth its young; when disturbed in one cavern it takes shelter in a second.

A slight blow on the nose with the edge of the hand is sufficient to kill this seal, but wounded elsewhere it is tenacious enough of life; and when it receives a shot in a vital part, it generally sinks to the bottom and dies there.

14. Phoca barbata. *Great Seal.*

Phoca barbata. *Faun. Grœnl.*, p. 15. *Gmel. Lin.*, i. p. 65.
Great seal. *Penn. quadr.*, ii. p. 277. *Arctic Zoology*, i. p. 159.
Ogg œook. *Esquimaux of the Welcome.* Ogüke. *Esquimaux of Melville peninsula.* Urksuk. *Greenlanders.*
Great seal and Oguke. *Parry's Narrative, 2d voyage*, p. 171 (and figure.) 178, 457, 469, 505.

This seal does not live under the fixed ice, like the preceding species, but keeps amongst the floating fragments near the open water. In such situations it was often seen by our navigators, and sometimes killed by them, but more frequently by their Esquimaux visiters, whose mode of proceeding is detailed in p. 457 of the narrative.

It is distinguished from the other seals by its great size*. It is often ten feet long and the young of the second year are stated by Fabricius to measure nearly seven feet. It is further distinguished from the other seals common in the northern seas, by its whiskers, which are curled at the ends, being entire not undulated, the black pupil of its eye being rounded not linear, the iris brown, and still more decidedly by the form of its fore feet or flippers.—"Singulares habet pedes anticos longos, digito medio longissimo, quem sequitur sinister ejus, tunc dexter, extimus, intimus longitudine, qua nota optime a reliquis dignoscitur." (*Fabricius.*)

The flesh of the great seal and its fat, which is abundant, but not rich in oil, is much prized as an article of food, by the Greenlanders and Esquimaux.—The skin being very thick and in old individuals almost destitute of fur, is seldom

* Capt. Lyon, in his private Journal, p. 72, gives the dimensions of one, eight feet long, and weighing nearly 9 cwt.

used for clothing by the natives, but it is cut into sledge traces, fishing lines, and applied to a variety of domestic purposes.

15. Phoca Grœnlandica. *Harp seal.*

Phoca grœnlandica. *Fauna Grœnl.*, p. 11. *Gmel. Lin.*, i. p. 64.
Harp seal. *Penn. quadr.*, ii. p. 279. *Arctic Zoology*, i. p. 163.

None of this species were killed by our navigators, but a skin observed to be in the possession of the Esquimaux of Melville peninsula, by Mr. Edwards, enables us to rank them as inhabitants of those seas.

16. Balæna mysticetus. (*Lacepede.*) *Black whale.*

Aggă wĕk (Yookai *whale bone.*) *Esquimaux.*
Black whale. *Parry's Narrative, second voyage, August* 17-28*th*, *September* 13-19*th*, 1821, p. 301, 505, 515.

Black whales were frequently seen in Hudson's Straits, in the Frozen Strait near the shores of Melville peninsula, and in page 510 of the Narrative they are said to be most abundant about Eiwillik. The Hudson's Bay Company once carried on the whale fishery in the Welcome, but not finding it profitable they have abandoned it for many years.

For ample details respecting this animal, so important from the vast capital and the number of seamen annually engaged in its capture, the reader is referred to Martens' Voyage to Spitzbergen, and to the more recent, and excellent, publications of Captain Scoresby on the subject. It may be proper to mention, however, in this place, that the latter writer, whose authority in this matter is of the greatest weight, states the figure of the *nord-caper* in Lacepede's work to be an exact representation of the *mysticetus* or black whale, but that there is no existing whale which agrees with the figure of the same author, erroneously said to be that of the *baleine franche* or *mysticetus*.

17. Monodon monoceros. (*L.*) *Narwhal Sea-unicorn.*

Monodon monoceros. *Supplement to Parry's first voyage*, cxii.
Keina-lov-a. *Esquimaux.*
Narwhal. *Parry's Narrative, Second voyage, August* 12-15*th*, 1821.

The Narwhal was frequently seen in Hudson's and Frozen Straits.

The germs of two horns, or as they ought to be more properly termed fore-teeth, are to be found in this animal, but in general the left one only comes to perfection*. Some rare instances are noticed by authors in which there were two complete ones. In the thirteenth volume of the *Linnæan Transactions*, p. 620, there is an account of a female, which had a perfect tooth in the upper jaw, similar to, though not so large, as that in the male.

An account of a second species of this genus, (*narwalus microcephalus*, Lacepede,) is given by Dr. Fleming in the memoirs of the Wernerian Society, i. p. 146.

13. Delphinapterus beluga. (*Lacepede.*) *White whale.*

Delphinus leucas. *Gmel. Lin.* 232.
Delphinus albicans. *Fauna grœnlandica*, p. 50.
White whale. *Parry's Narrative, second voyage, August* 15-16*th*, *September* 13-15*th*, 1821, p. 302.

The Hudson's Bay Company formerly carried on a fishery for the capture of these animals at the mouth of Churchill river. They were seen abundantly by Captain Parry in the Frozen Strait, Lyon's Inlet, the Strait of the Fury and Hecla, and in various other quarters. Martens remarks — "when we see plenty of white fish it is the sign of a good year for catching whales, for if they find good food, the whales find the same also †."

For a figure, and good account, of this animal, with many important anatomical details, the reader may turn to the *Wernerian Transactions*, iii. p. 371.

Capt. Lyon remarks that the cubs of the Beluga are uniformly of a slaty hue. (*Private Journal*, p. 69.)

19. Trichecus rosmarus. (*L.*) *Walrus.*

Trichecus rosmarus. *Supp. to Parry's first voyage*, cxci. *Favn. grænl.* p. 4.
Arctic walrus. *Penn. quadr.*, p. 266. *Arctic Zoology*, i. p. 144.
Sea-horse, Morse or Morss. *Martens' voyage to Spitzbergen*, p. 107. *Supplement*, p. 183.
Ei-ŭ-ĕk. *Esquimaux of Melville peninsula.* Ej-ee-werk. *Esquimaux of the Welcome.*
Walrus or Sea-horse. *Parry's Narrative, second voyage*, p. 22, 178, 268, 355, 386, 415, 418, 469, 505, 510.

The manners of these animals have been often described by voyagers, and their various details as collected by Pennant form an amusing and instructive article.

* Cuvier *règne animal*, I. p. 281. *Fauna Grœnl.* p. 30.
† *Voyage to Greenland and Spitzbergen*, p. 126.

It is but just to Martens, however, to state that his account, although one of the oldest, is still one of the best, modern writers having added few facts of importance. Fabricius as usual gives a concise and accurate description; and we may refer to the figure in Captain Cook's third voyage, as giving the best idea of the form of the animal.

They feed, Cuvier remarks, partly on animal substances, and partly on marine algæ. Martens says,—" What their food is I cannot certainly tell, they may perhaps eat both *herbs* and *fish*; that they eat *herbs*, I conclude from hence, that their dung looks like horse-dung; that they eat *fish*, I judge, because when we cut the fat off a whale, one of them did often take the skin with him under the water, he did also fling it up and catch it again. The *Burgermeister* doth eat his dung." Fabricius acquaints us that they eat muscles, which they hook up with their tusks. Mr. Edwards sometimes observed a small intermixture of *fuci* with the *mollusca*, which their stomachs generally contained, and Captain Lyon found three pounds weight of pebbles, together with a handful of sea weed, in the stomach of a female. (*Private Journal*, p. 225.)

Besides the hooking up of their food just mentioned, their tusks serve another important purpose. " When they awake they rise up and stand upon their fore-foot, look terribly and roar, and strike with their long teeth into the ice for madness, and so draw themselves along by the help thereof," (Martens, p. 111.) In making these movements and in their contests with the polar bear, their teeth are often broken. " You shall see," says Martens, " almost a hundred of them before you find one that hath good teeth, for some are but small, others have but one, and others none at all."

The bellowing or barking of the walrus may be heard, Captain Parry states in his Narrative, (p. 268) in calm weather at the distance of two miles.

The walruses were very numerous at Igloolik, and on the other parts of the coast to the eastward of the Fury and Hecla's strait. They are not found, however, at the mouth of the Copper Mine river, although the black whale has been sometimes drifted thither. They were observed by Captain Parry to huddle themselves into separate droves of from twelve to twenty, many such droves being observed on the same beach. The weight of a moderate-sized female killed by our navigators was 15½ cwt. Their flesh is preferred by the Esquimaux before that of the small seal, (phoca hispida) their feet or fins are considered as delicacies, and the heart and liver were pronounced by our navigators to be excellent. The tongue is said to be good when fresh, but becomes oily by keeping.

We subjoin the following description by Mr. Edwards, containing many particulars not to be found in books.

Length from the end of the snout eight feet ten inches.

Shape of the body oblong, its circumference below the fore arms being six feet ten inches, and continuing the same for about four feet, before it slopes off towards the extremity, where it is only one foot. The neck tapers gradually from the shoulders, and unites insensibly with the head. From the eyes forward, the head is more cylindrical, swelling out however at the extremity, and then rounding off into a broad obtuse fleshy snout, whose lower edge overhangs the mouth in form of an arch. This snout is partially bilobed by the nasal depression, and is as Fabricius well remarks, " natibus hominis non dissimilis." The mustachios are formed of hard hollow pellucid bristles, placed in transverse rows. The bristles increase in length as their origin is more remote from the sulcus of the lip, and the exterior ones of the lowest row are the longest of all. These mustachios hang downwards, and curve inwards, so that they would meet if prolonged beneath the chin.

The under jaw being necessarily narrow to admit of its reception betwixt the tusks, the mouth is small, compared with the breadth of the snout. The tusks in this individual were as yet small, not projecting more than four inches above the gum. They were four inches apart at their base. The shape and curvature of the tusks of the morse render them important instruments of locomotion on rocky shores and on ice. The seals are enabled by the perfection of their claws to move and climb about with facility, but in the morse the claws are too imperfectly developed and disadvantageously situated, to be of much use in this way. There were on one side two incisores similar in form to the grinders, and on the other side three. The grinders were two on each side, posterior to the tusks, obliquely truncated, and scarcely rising above the gums.

The lower jaw is rather pointed, moving betwixt the tusks, and projecting about two inches past them. The nares are semilunar, about one inch long, have their crescentic edges turned outwards, and are separated by a septum three-quarters of an inch wide above, and one and half wide below.

Eye-lids prominent, pupils circular, irides dark brown, ciliary circle white *. Auricular apertures very small, merely admitting a goose quill, and a little higher than the eyes.

* Pennant, quoting from Crantz, says the eyes are small, and retractile from external injury, and Captain Sabine states that they were prominent in an individual examined by him.

The body is covered above with short coarse dusky grey hairs, and below it is scantily supplied with softer bay-coloured hair.

Upper limb. The flipper composed of five fingers, connected at their very extremities by a strong web. Length from shoulder joint to the finger ends, two feet. Expansion of the flipper, one foot. The inner finger is the longest, the outer ones become gradually shorter. *Claws* weak, and situated one and half to two and half inches from the ends of the toes. *Hinder flippers* twenty-one inches long, and when stretched out, extending eighteen inches behind the body. Toes five, of which the two extremes are long and strong, the inner ones short and weak. They are connected by a web, naked below, but furnished above with a few scattered hairs. Expansion two feet. The *claws* are weak, and are placed high up, at a distance from the ends of the toes. Os coccygis, covered with the rudiments of a tail. The aperture of the sheath of the penis lies seven inches behind the umbilicus, and twenty-eight inches anterior to the os coccygis. Four abdominal teats fifteen inches apart, placed in the corners of a quadrangle, and having the umbilicus in the centre.

Anatomical notices. *Heart* weighing eight pounds. Parietes of the left ventricle very thick. Foramen ovale closed. Fossa ovalis well defined. The *Aorta* gives off a solitary coronary artery, immediately above the semilunar valves. It is capable of admitting a swan quill. The aorta itself, at that part, has two inches internal diameter, and at the arch 2.6 inches. The first vessel which arises from the arch is the right subclavian, the second the innominata, which is an inch long, and divides into the two carotids, the third is the left subclavian. The *gall bladder* contained a pint of *bile* of the specific gravity of 1.0404.

The *kidney* nearly elliptic, weighing five pounds, is composed of very numerous lobes nearly incorporated. There are upwards of 400 papillæ, having as many distinct infundibula. The urinary bladder, capable of holding a gallon, is completely covered by the peritonæum, and is remarkable for the thickness and strength of its muscular coat. The ureters open close to the cervix, and within an inch of each other. No prostate gland nor vesiculæ seminales.

Besides the nineteen species of mammalia above noticed, a skin of a small animal of the weasel tribe was obtained from the Esquimaux of Hudson's Straits. It probably belonged to the *mink* of the fur traders, the *atjackash* of the Cree Indians, or *lesser otter* of Canada, which has been identified by Forster with the *mustela lutreola* of Europe. Mr. Graham, in Arctic Zoology having ascribed the manners of this animal to the fisher or *mustela Pennanti*, much confusion has been produced. Pennant has described the mink under the name of *Pekan* *.

It is probable also that the American bear (*u. Americanus*,) the otter (*lutra Canadensis*, SABINE, *Frank. App.* p. 653,) and the musk rat (*arvicola zibethica*, CUV.,) inhabit the neighbourhood of Repulse Bay, as they are found in equally high latitudes a little farther to the westward. The former of these animals is termed *neekeek* by the Cree Indians, and the latter *watsass* or *musquash*. The list of mammalia, therefore, in the quarters visited by Captain Parry, ought most probably to extend to twenty-three or more. The beaver (*castor fiber*,) the squirrel (*sciurus hudsonius*,) the Canada porcupine (*hystrix dorsata*,) several varieties of the fox (*canis vulpes*,) and the American hare (*lepus Americanus*,) are also found far north on the continent of America, but they frequent the wooded districts alone.

* Vide FORSTER. *Phil. Trans.*, lxii. p. 371. *Arctic Zool.* i. p. 79 and 82. FRANKLIN'S *Journal*, p. 90 and 652.

BIRDS.

1. Falco peregrinus. (L.) *Peregrine.*

Falco peregrinus. *Temm.* p. 22. *Greenl. Birds*, p. 529.
Peregrine falcon. *British Zoology*, i. p. 218, t. 20, and Lanner. *British Zoology*, i. p. 223, t. 23. *Arctic Zoology*, ii. p. 202, No. 97.
Peregrine and falco peregrinus. *Parry's Narrative Second Voyage, June* 18.

The specimen received was killed in Five-Hawser bay on September 8th, 1821, and is a young male, apparently of the second year.

Peregrine falcons were seen at various periods during the voyage, following the flocks of the snow-bunting, particularly on June 18th, 1821, near Cape Farewell on the coast of Greenland, and on August 12th, in the Frozen Strait on the coast of America. They seem to be summer visitors of these northern countries; but the *falco palumbarius*, named by the Esquimaux *oodno-ah-hœoot*, remains in high latitudes all the winter preying principally on the ptarmigan.

2. Strix nyctea. (L.) *Snowy owl.*

Strix nyctea. *Temm.* 82. *Supplement to Parry's First Voyage*, p. cxciii. *Fabr. Fauna Grœnl.* p. 60. *Forst. Philos. Trans.* lxii. p. 385.
Snowy owl, white owl. *Arctic Zoology*, ii. p. 233, No. 121. *Hearne's Journey*, p. 401.
White owl. *Parry's Narrative, Second Voyage, August* 22, 1821.
Wappakeethoo, or Wap-poo-hoo. *Cree Indians.* Ook-pēē-guak. *Esquimaux.*

A bird two or three years old was killed in the middle of September on Liddon Island, corresponding exactly with Fabricius's excellent description above quoted. It measures twenty-eight inches.

The Snowy owl remains in high northern latitudes the whole year. It preys in the day time, and we once saw one in lat. 64° in the middle of winter, repeatedly striking at an American hare, which was at the same time pursued by a wolverene. Hearne states, that this bird lays four eggs, of which two only are in general hatched.

3. Corvus corax. (L.) *Raven.*

Corvus corax. *Temm.* p. 107. *Supplement to Parry's First Voyage*, cxciv. *Appendix to Franklin's Journey*, 671. *Fabr. Fauna, Grœnl.* p. 62.
Raven. *Arctic Zoology*, ii. p. 245, No. 134. *Hearne's Journey*, p. 403.
Cuck-oo. *Cree Indians.* Toolloock. *Esquimaux.* Toollogak. *Greenlanders.*
Raven. *Parry's Narrative, Second Voyage, August* 22, 1821. p. 183, 234, 236, 372.

These birds are frequent in the northern tracks of America, and are of the few that do not leave them in the winter. They follow the rein-deer in their migrations, and when the wolves, which also hang upon the skirts of the herd, are successful in the chase, come in for a share of the spoil. Their scent is astonishingly acute, for when a deer has been killed by a hunter, or driven over a precipice by the wolves, they discover it even in the intense colds of winter, and flock from all quarters to feast on the offal. They often prove troublesome to the fur hunters by robbing their traps, and are not unfrequently caught themselves; shewing much less dexterity in avoiding the snare than the Canada jay, which is equally annoying and still more familiar. They pair in March, earlier than any other birds in those quarters, except the Canada jay just mentioned.

4. Alauda alpestris. (L.) *Shore-lark.*

Alauda alpestris. *Temm.* p. 279. *Forster, Phil. Trans.* lxii. p. 398.
Shore-lark. *Arctic Zoology*, ii. p. 392, No. 278.
Chee-chup-pee-shew. *Cree Indians.*

A specimen of this bird killed on the 10th July, 1822, near Cape Wilson, corresponds sufficiently with the descriptions of authors.

5. Emberiza nivalis. (L.) *Snow-bunting.*

Emberiza nivalis. *Temm.* p. 319. *Greenl. Birds*, p. 531, No. 5. *Supplement to Parry's First Voyage*, p. cxciv. *Appendix to Franklin's Journey*, p. 675. *Faun. Grœnl.* p. 117, No. 81. *Forster, Philos. Trans.* lxii. p. 403.
Snow-bunting. *Arctic Zoology*, ii. p. 355, No. 222. *Hearne's Journey*, p. 419.
Sheegun-peetheesees. *Cree Indians.* Kŏpĕnnŏ-ăccă-ŭ. *Esquimaux.*
Snow-bunting. *Parry's Narrative, Second Voyage, June* 18*th*, *July* 24*th*, *August* 22*nd*, 1821. *April* 27*th*, 1822, p. 214, 236, 265, 330, 332, 462.

Amongst the specimens of this bird received are two males, each measuring seven inches. One killed on May 10th presents precisely the colours of *le vieux* *male en plumage d'hiver*, Temm. and the other killed on the 27th of the same month, is in complete summer plumage, with only the pure black and white colours. These two specimens shew, in the most satisfactory manner, how the change to the summer plumage takes place, by the tips of the feathers on the parts tinged red dropping off, as mentioned by Temminck. A very few of the red points remain on the second specimen, but they drop off on the slightest touch, and the unequal and somewhat wiry appearance of the other feathers, mark the recent loss they have sustained of their coloured margins.

A female killed on the 10th of June, is noted by Mr. Edwards as having the crown and nape black with white tips. Fabricius remarks correctly, that the white feathers of the back and belly when blown aside, appear black at their bases. This occurs both in the summer and winter plumage of the male bird.

The snow-buntings frequent the shores of the Arctic Sea during the summer season, retiring inland in the winter to shelter themselves in wooded tracks. At Cumberland House, in the interior of the country, and in lat. 54°, they remain the greater part of the winter, absenting themselves only occasionally, during the severe storms of December and January. At Fort Enterprise, in lat. 64°, they were also seen in the winter but more rarely, and in a register kept for a series of years at Fort Churchill, in lat. 59°, on the sea-coast, they are noted as arriving from the 26th of March to the 7th of April; disappearing in the summer, returning again in the end of September, and remaining for about a month. It is mentioned as a rare occurrence that one was killed in December. They made their first appearance at Captain Parry's winter quarters in lat. 66°, on the 27th of April. In their winter migrations, they reach, according to Wilson (*Amer. birds*), as far south as the borders of Maryland.

They breed on Melville peninsula, and Captain Lyon describes their nest as being placed in the crevices of rocks or amongst loose stones, and constructed of dried grass neatly lined with white deers' hair. They lay seven eggs. (*Parry's Narrative*, p. 462.)

Pennant remarks, that it is singular that a graminivorous bird should resort to the barren regions of the Arctic circle; but Mr. Brown has pointed out, that the grasses which grow on the islands of the Arctic Sea, form nearly one fifth of the phænogamous vegetation, a proportion nearly double to what occurs in any other part of the world. These grasses retain their seeds all the winter, and thus furnish nourishment for the birds which arrive upon the melting of the snow*. The snow-bunting, moreover, feeds, as Temminck remarks, also on insects, and Wilson found their stomachs filled with shell-fish.

Fabricius† and other writers mention that the male loudly serenades the female during incubation, but that his song ceases when the young are hatched. Sir George Mackenzie informs us that the song is pleasing, and resembles the first three or four notes of the robin‡, whilst Marten, who perhaps was not musical, says, " I can tell nothing of its singing, only that it whistleth a little as birds use to do when they are hungry." *Spitzb.* p. 73.

6. Emberiza calcarata. (Temm.) *Lapland finch.*

Emberiza calcarata. *Temm.* p. 322.
Fringilla lapponica. *Lin. Syst. Nat.* i. p. 317. *Faun. Grœnl.* p. 119. No. 82. *Forst. Phil. Trans.* lxii. p. 403.
Lapland finch. *Arctic Zoology*, ii. p. 377, No. 250. *Hearne's Journey*, p. 420.
Tecurmashish. *Cree Indians.* Kernee-ook-tarai-ah, or, kerniuk-tărioo. *Esquimaux.*
Lapland finch. *Parry's Narrative, Second Voyage*, p. 462.

A *male in breeding plumage* was killed in the middle of June at Igloolik. of which the description is as follows :—

Colour of the whole head, throat, fore-part of the neck, and upper-part of the breast, forming one mass of velvet black, except that there are a very few reddish specks on the occiput, and that a reddish-white band runs nearly from the bill, over each eye, and from thence backwards to unite with a whitish line, that bounds the black of the occiput posteriorly. Immediately behind this last-mentioned whitish line, there is a broad transverse unspotted mark of bright chestnut-brown, which occupies the nape. The back, scapularies, rump, primary covertures, and secondary quill-feathers, are blackish-brown, or brownish-black, with light reddish-brown or dirty brownish-white margins to the feathers. The markings which result, are longitudinal. On the back the black predominates; but on the wing-covertures and secondaries, the reddish-brown is the prevailing colour, and occupies

* " On their first arrival they generally feed on grass seeds; but as the summer advances, they live much on worms, and are then not so much esteemed." *Hearne, l. c.*

† *Fauna Grœnl.* p. 119.

‡ *Travels in Iceland*, p. 341.

the outer vanes of most of the feathers. The two sets of feathers last-mentioned have very slight white tips, scarcely sufficient to produce two transverse white lines on the wings. The flag-feathers have a deep hair-brown colour, and the very narrow margins of all their outer vanes are pale as if worn. Nearly the whole of the outer vane of the exterior wing-feather is white. The tail, which is forked, is of the same colour with the flag-feathers, but the exterior feather on each side is white, with a narrow oval hair-brown spot at its tip. There are no red borders to any of the tail feathers. The belly, vent, and under-tail covertures are white. The flanks are black and white, in patches. Bill, bright yellow, with a brownish-black tip. Feet, brownish-black. Length, 6½ inches. Tarse, 1 inch. Hind toe and claw, 10½ lines. Claw alone, 5½ lines.

The following is the description of a *female* killed at the *same period:*—

The whole dorsal aspect blackish-brown, in some parts verging upon clove-brown, longitudinally spotted or striped with light yellowish-brown, which occasionally approaches to rusty-white. The lighter colour occupies the margins of the feathers, and its proportions vary in different parts. On the head, the dark blackish-brown is relieved by some spots only of the lighter colour. On the nape, and fore-part of the shoulder, on the contrary, the yellowish-brown predominates, and the spots of blackish-brown are small, and confined to the centres of the feathers. On the back, the light-coloured margins of the feathers are nearly worn off, and the blackish-brown again prevails. The tail and the wings, both covertures, and quill feathers, approach to clove-brown in their ground colour, but the narrow exterior margins of all the feathers are rusty-white. These whitish margins are broadest on the covertures and secondaries. The exterior tail-feather on each side, has its whole outer vane and a considerable portion of its inner one near the tip, white. There is also much white on the adjoining feather. The light-coloured band which passes over the eye, and is so well defined in the male, is less distinct and more spotted in the female, at this period. The female has also a large dark-coloured, but somewhat varied spot, (moustache) behind and beneath the eye. The throat, abdomen, and under-tail covertures, are ash-gray. The breast is somewhat rusty, with black spots, and the flanks have longitudinal dark marks. The general appearance of the plumage shews, that at this period the light-coloured margins of the feathers are every where wearing off, and daily allowing more and more of the dark colours to appear. Tarse, 10 lines. Hind toe and claw, 10 lines.

Hearne states that these birds remain all the winter at Hudson's Bay, but migrate farther north in the spring to breed. It would appear that they rarely go so far south as the United States, for they are not mentioned by Wilson.

They breed in Melville peninsula, and form a nest of the same materials with the snow-bunting, but place it on a grassy or mossy eminence, and not amongst stones. They lay seven eggs.—*Captain Lyon. Parry's Narrative. Second Voyage*, p. 462.

7. Tetroa saliceti. (Temm.) *Willow-grouse.*

Tetrao saliceti. *Temm.* p. 471. *Appendix to Franklin's Journey*, p. 681.
Tetrao albus. *Gmel. Lin. Syst.* i. p. 750.
White grouse. *Arctic Zoology*, ii. p. 308, No. 183.
Willow-partridge. *Hearne's Journey*, p. 411.
Wawpeethœoo. (White bird). *Cree Indians.* Kasbah. *Copper Indians.*
Akkai-diggœuck. (Dual, akkai-degeek.) (Plur. akkai-degeet.) *Esquimaux of the Welcome.*
Tetrao albus. *Parry's Narrative, Second Voyage*, p. 323, 378, 384, 385.

This is the most common kind of grouse at Hudson's Bay. During the winter they assemble in immense flocks, and frequent low swampy places, near willow thickets. In summer they retire in pairs to open situations to breed. They are more rare in the Barren Grounds, and in the quarters visited by Captain Parry, than the ptarmigan.

The change of plumage of the willow-grouse and ptarmigan, from white in winter to coloured in summer, has given rise to a variety of speculations. Some authors attributing it to the moulting of the birds twice a year, and others considering the alteration of colour to be independent of the annual moulting common to them with other grouse, and to take place in the old feathers, and not by the growth of new plumage. Dr. Fleming, in his Philosophy of Zoology, (ii. p. 22) supports the latter opinion at considerable length, and with much success.

The additional downy feather, which springs from the inside of the quills of all the feathers which cover the body, has been often noticed by writers, but they have hitherto considered this doubling of the feathers to be peculiar to the white plumage, and to be a provision of nature against the severity of winter. The fact is, that the small interior feather exists equally distinct, although not quite so bushy, in the coloured plumage. In the latter case its colour is bluish-grey, and even in the former case, it has sometimes a slight tinge of the same colour.

The double feathers cover the head, neck, body, and thighs, the proportional size of the inner one, however, varying in different places. The outer and inner wing-coverts and scapulars are also double, the only single feathers being the primaries, secondaries, and tertiaries of the wings, and sixteen of the tail-feathers. Temminck reckons eighteen tail-feathers to the willow grouse. We had an opportunity of examining many specimens, which were killed at Fort Enterprise, in April, 1821, in perfect white plumage. In all these, there were on each side of the tail, seven black feathers, slightly tipped with white, and four intermediate white ones, of equal size and similar shape. Only two of these intermediate ones were single, the other two had, like the superior and inferior tail coverts, the small internal feather springing from their quills.

Mr. M'Gillivray, assistant in the Edinburgh Museum, informs us, that he has found the additional internal feather more or less developed in all the gallinaceæ he has examined, and in many other tribes of birds.

8. TETRAO RUPESTRIS. (Sabine.) *Small Northern Ptarmigan.*

Tetrao rupestris. *Sabine. Appendix to Parry's First Voyage*, cxcv.
Tetrao lagopus. *Temminck*, 468.

SEVERAL species of grouse appear to have been hitherto confounded, under the name of ptarmigan or *tetrao lagopus*. Captain Sabine met with two kinds in Baffin's Bay and the Arctic Sea, one precisely similar to the Scotch ptarmigan, and for which he has retained the name of *tetrao lagopus;* the other is the one now under consideration, and was that most frequently seen by Captain Parry on the present voyage. Captain Sabine, under the impression that the latter was the *rock-grouse* of Hearne, and consequently of Pennant, has applied that name to it; but the fact is, that it has not hitherto been brought from Hudson's Bay, and if it actually exists there, it is confounded by the natives with the ptarmigan, (*tetrao lagopus*, SABINE, not of TEMMINCK,) which the Crees term *asseenee-peetheyoo*, grouse of the barren or rocky districts, to distinguish it from the willow-grouse, which forms the subject of the preceding article. Hearne in his Northern Journey may have seen Captain Sabine's species, but is not likely to have transmitted any specimens to Mr. Pennant.

A specimen of the *tetrao rupestris* in summer plumage, brought home by Captain Parry, corresponds exactly with an European continental specimen, preserved in Dufresne's collection, now in the Edinburgh Museum, under the name of *tetrao lagopus*, and this is the kind almost always met with in the French and German collections, so that we consider the synonymes prefixed to this article to be correct.

My friend, Mr. James Wilson, whose opinions and observations on ornithological questions carry with them deservedly much weight, permits me to state, that in his journies through Scandinavia, and in his visits to different Northern Museums, he observed two species or varieties of ptarmigan, (with the black mark from the angle of the eye in the males of each, and consequently distinct from the *t. saliceti*,) both of which differed from the *tetrao lagopus*, or ptarmigan of Scotland, in having a more gay and brighter summer dress, with broader and deeper coloured blotches of orange, and less of the fine sprinkling of gray. The smaller kind, a third less in size than the other, but more common, known in Sweden by the name of *sno rissa*, is the kind usually observed in the Museums of France and Italy, and corresponds with the subject of this article. The larger kind observed only in Northern Collections, approaches in size more nearly to the Scottish specimens, but, as has been observed, has a brighter plumage. The Swedish sportsmen say, that the large kind frequents the craggy summits of mountains, and thus resembles in its habits the Scottish bird; while the smaller kind, the *sno rissa*, affects sub-alpine districts, where the birch and other native trees prevail. Further observations and comparisons are required, to enable us to decide, whether the kinds which are here indicated are only varieties or distinct species. It appears to be certain, however, that the subject of this article, by whatever name it shall be hereafter called, is common to the North Georgian Islands and most northern parts of America, and to the Continent of Europe: that the Scottish ptarmigan is by Mr. Sabine's observations, (*Franklin's Appendix*, p. 682,) the most common about Hudson's Bay, but goes as far north as Barrow's Strait; and that a kind resembling the last in size and manners, but of a brighter plumage, is found on the snowy summits of the mountains in the North of Europe.

9. Tetrao lagopus. (Sabine.) *Ptarmigan.*

Tetrao lagopus. *Captain Sabine. Supplement to Parry's First Voyage*, cxcvii. *J. Sabine. Appendix to Franklin's Journey*, p. 682.
Asseenee-peetheyoo. (Barren ground or Rock-grouse.) *Cree Indians.*
Kasbah-yazzeh. *Copper Indians.*
Small white partridge. *Hudson's Bay Traders.*

After what has been said in the preceding article, we have few remarks to make on this bird. Captain Sabine observed it on the southern shores of Barrow's Strait, and Mr. Edwards also saw it on Melville Peninsula, but as no specimens were brought home on the last voyage, it would appear to be much more rare in those quarters, than the *tetrao rupestris*, its principal *habitat* being more southerly.

10. Charadrius pluvialis. (L.) *Golden plover.*

Charadrius pluvialis. *Temm.* p. 535. *Supplement to Parry's First Voyage*, cxcix. *Appendix to Franklin's Journey*, p. 683.
Charadrius apricarius. *Fauna Grœnl.* p. 114. No. 79.
Golden plover, No. 399, and Alwargrim plover, No. 398. *Arctic Zoology*, p. 483. *Hearne's Journey*, p. 429.
Tōōdlēē-ărioo. *Esquimaux.*
Golden plover. *Parry's Narrative, Second Voyage, August* 7th, 1821, *June* 29, 1822, p. 265, 435, 446.

These birds are very common in America, varying their places of resort with the seasons, from Florida to the most distant Arctic lands; and in their various dresses, and in different places, they are known by a corresponding variety of names, such as black-bellied plover, golden plover, green plover, hawk's eyes, *&c.* They were seen in abundance, during the progress of the expedition. Individuals killed in June and July, and consequently in that state of full summer plumage which characterizes the nominal species of *c. apricarius*, corresponded, with slight variations, to the description given by Temminck; but it is worthy of remark that the black on the upper parts of the body had generally a green reflection, which is lost after the specimen has been kept for some time*. Many killed near the end of August,

* From Mr. Edwards' Notes.

agreed with the account given by Captain Sabine * of the young birds, but others, on the contrary, had the mixture of black and white on the abdomen, which is mentioned by Temminck, as being always the case in the young birds †.

After the breeding season in the north is over, the golden plovers frequent the sandy and gravelly banks of the lakes and rivers that flow into Hudson's Bay, and like other birds, before finally emigrating, employ the autumn in getting very fat. In this state they are certainly the most delicious bird in the country, although the residents sometimes prefer to it the little teal (*anas crecca*), which is at the same period in most excellent condition. In September and October they arrive on the shores of the United States, and soon afterwards disappear, retiring still farther to the southward. They are not met with in the interior of that country, nor, as far as Wilson could learn, were they known to breed on the coast. Their principal resort in the breeding season is to the barren grounds, upon the confines of the Arctic Circle, and to the islands that lie to the north of the American continent.

It may be proper to notice here that Temminck, through inadvertence, has quoted Wilson's description and figure, v. 7. p. 41, t. 57, fig. 4, as referring to this bird in its breeding plumage, although, under the article *vanellus melanogaster*, p. 549, he has pointed out Wilson's misapplication of the name, and quoted him aright.

11. Charadrius hiaticula. (L.) *Larger ringed plover.*

Charadrius hiaticula. *Temm.* p. 539. *Greenland Birds*, No. 10, p. 534. *Supplement to Parry's First Voyage*, p. cc. *Appendix to Franklin's Journey*, p. 684. *Faun. Grœnl.* p. 112, No. 78.

Ringed plover. *Arctic Zoology*, ii. p. 485, No. 401.

Ringed plover. *Parry's Narrative, Second Voyage, Aug.* 17th, p. 309.

The specimens brought home accord with Temminck's description, and are exactly represented by Wilson's figure, vii. t. 59, f. 3. The small figure in vol. v. p. 30, t. 37, f. 2, he has himself rejected. It may be thought scarcely worth mentioning, that the orbits of a great number of individuals, killed at Hudson's Bay, in August, were pure yellow, not orange, as stated in Temminck's account of the European birds.

* *Supplement to* Parry's *First Voyage*, p. cxcix. † From Mr. Edwards' Notes.

The ringed plovers assemble, after the breeding season is over, in vast numbers, on the sandy shores of Hudson's Bay between Churchill and Moose factory, and continue feeding there, until the formation of ice upon the beach drives them to a more genial climate.

12. Vanellus melanogaster. (Bechst.) *Gray plover.*

Vanellus melanogaster. *Temm.* p. 547. *Appendix to Franklin's Journey*, p. 684.
Tringa helvetica. *Forster, Phil. Trans.* lxii. p. 412.
Gray sand-piper. *Arctic Zoology*, ii. p. 477, No. 393, and Swiss sand-piper, *Arctic Zoology*, ii. p. 478, No. 396.
Wawpusk-abreüsheesh, (white bear bird.) *Cree Indians.*
Tōōlēē-ărioo, or Tooglee-ai-ah. *Esquimaux.*

A male specimen, killed on the 23rd of June, corresponds exactly with Temminck's description of the breeding plumage; but a female killed on the same day has a considerable intermixture of white, in the parts that are black in the male. The specimens are equal in size, and 11½ inches long. In addition to the characters which Temminck gives for distinguishing this species from the golden plover, with some states of which it has been occasionally confounded, the greater size and strength of the bill, mentioned by Wilson, are very conspicuous, when the birds are compared.

The eggs of the gray plover, collected on Melville Peninsula, are of an oil-green colour, with irregular spots of umber-brown, of different degrees of intensity, crowded and running into each other towards the obtuse end.

13. Strepsilas collaris. (Temm.) *Turnstone.*

Strepsilas collaris. *Temm.* p. 553. *Supplement to Parry's First Voyage*, cc. *Appendix to Franklin's Journey*, p. 684.
Tringa interpes. *Faun. Grœnl.* p. 109, No. 74.
Hebridal sand-piper. *Arctic Zoology*, ii. p. 472, No. 382. *British Zoology*, ii. p. 84. *Hearne's Journey*, p. 427.
Turnstone sand-piper. *British Zoology*, (Ed. 1812, 8vo.) ii. p. 83.
Tāllĭg-wēē-ărioo, or Tellee-goo-ai-en. *Esquimaux.* Tellee-goo-ak. *Greenlanders*, (Fab.)
Turnstone. *Parry's Narrative, Second Voyage*, p. 241. Whale Birds. *Hudson's Bay Traders.*

The specimen brought home, is a male killed on the 14th of June at Winter Island. It has the large black spot on the lateral tail-feathers, which is said to be proper to birds one year old, but its plumage is in other respects perfect, agreeing with Temminck's description of the old male. Fabricius did not meet with this bird in Greenland, but from the descriptions given by the natives, he conjectured it to be an inhabitant of that country. The similarity betwixt the Esquimaux and Greenland names, shews that his conjecture was right.

14. Grus Canadensis. (L.) *Brown crane.*

Grus Canadensis. *Temm. Ornith. Introd.*, p. c. *Appendix to Franklin's Journey*, 685.
Ardea Canadensis. *Latham, Index Ornith. Supp.* i. p. 299. *Synops.* ii. p. 675. *Forster, Philos. Trans.* lxii. p. 409.
Brown Crane. *Arctic Zoology*, ii. p. 443, No. 340. *Hearne's Journey*, p. 423.
Ardea Canadensis. *Parry's Narrative, Second Voyage*, p. 442, 448.
Ochee-chak. *Cree Indians.* Tattēē-lēē-ărŭok. *Esquimaux.*

The specimen received, was obtained by Captain Lyon, near Igloolik on the 25th of June, and corresponds in size and plumage with the description in Arctic Zoology. It is considerably smaller than the one described by Mr. Sabine in the appendix above-cited; the bill is an inch shorter, and the plumage of its body has a deep rusty tinge, whilst that of the latter was ash-coloured. Hearne says, that the Brown Crane never has more than two young, and that it goes farther north than the Hooping Crane, which latter remark, as far as regards the sea-coast, would appear to be confirmed by the circumstance of the Hooping Crane not having been seen by any of Captain Parry's people. Captain Franklin's party observed both species in lat. 62°, but neither of them were seen higher on their line of route, which lay in the middle of the continent.

Both species are edible, and when in good condition, resemble the flesh of the swan in taste.

15. Tringa variabilis. (Meyer,) *Dunlin.*

Tringa variabilis. *Temm.* p. 612 *Supplement to Parry's First Voyage*, p. cc. *Appendix to Franklin's Journey*, p. 686.
Tringa alpina. *Greenl. Birds*, p. 534, No. 9.
Dunlin (summer). *British Zoology*, ii. p. 92. *Arctic Zoology*, ii. p. 473, No. 391.
Purre (winter). *British Zoology*, ii. p. 94, t. [illegible]. *Arctic Zoology*, ii. p. 475, No. 390.
Seekee-arak-seē-oo. *Esquimaux.*

These birds breed on Melville Peninsula. Their eggs are 15½ lines long, and 11½ lines at their greatest transverse diameter. They have an oil-green colour, with very irregular spots of different sizes and shades of liver-brown. These spots are confluent at the obtuse end, where they form a large clouded blotch. One end of the egg is very much more obtuse than the other.

16. Tringa maritima. (Brunn.) *Purple sand-piper.*

Tringa maritima. *Temm.* p. 619. *Greenl. Birds*, p. 532, No. 7. *Supplement to Parry's First Voyage*, p. cci.
Tringa striata. *Faun. Grœnl.* p. 107, No. 73.
Purple sand-piper, (tringa nigricans.) *Montague, Dictionary and Supplement.*
Selninger sand-piper. *Arctic Zoology*, ii. p. 480. *British Zoology*, ii. p. 80, No. 8.
Siggee-âree-ârioo? *Esquimaux.*

Nine or ten of these birds were shot on the rocks at low-water mark, on Winter Island, on the 10th of June. The two specimens received are male and female. The bill of the latter measures 16 lines, whilst that of the male measures only 13 lines. Mr. Edwards remarked, in examining a number of individuals, that the females were the largest, and had longer bills in proportion. In the recent specimens, the bill was black, with a yellow tint at the base. The plumage of those received, corresponds with Temminck's description of the summer bird, except that the margins of the dorsal feathers exhibit more of the ferruginous colour than of the white, and that the black has more of a brown hue than of a violet.

The eggs of this bird have a pyriform shape, tapering very much towards the small end, and being extremely obtuse, almost flattened at the other. Their length is 16½ lines, and greatest transverse diameter 12 lines. Their colour is yellowish-gray, interspersed with small irregular spots of light hair-brown, most crowded towards the obtuse end, and rare at the other. Fabricius describes the eggs well, and says, they are from four to six in number, and deposited in a tuft of soft roots of grass, gathered together without any appearance of art.

17. Tringa minuta. (Leisler.) *Little sand-piper.*

Tringa minuta. *Temm.* p. 624. *Appendix to Franklin's Journey*, p. 686.
Little sand-piper, tringa pusilla, (non tamen, Lin.) *Montague, Suppl. Ornith. Dict.* cum tabula.

A single specimen of this bird, in the autumn moult, was brought home by Mr. Edwards.

18. Tringa cinerea. (L.) *Knot.*

Tringa cinerea. *Temm.* p. 627. *Greenl. Birds*, p. 533. *Supplement to Parry's First Voyage*, p. cci.

Tringa cinerea, grisea, canutus, islandica, nævia, australis. *Gmel. Syst.* p. 673, 682, 681, and 679. Sp. 25, 41, 15, 24, 40 and 39.

Red sand-piper, (No 392,) ash-coloured, S. (No. 386.) *Arctic Zoology*, ii. p. 476, 474.

Knot. *Montague*, *Dict.* and *Supp.*

Knots and sand-pipers. *Parry's Narrative Second Voyage*, *Aug.* 22nd, 1821. p. 241, 435, 446, 462.

The specimen received, is a male killed in the Duke of York's Bay, on the 17th of August, and corresponds with Temminck's description of the yearling before moulting, and with Wilson's figure in *Amer. birds*. v. 7, t. 57, f. 2.

The knots were observed breeding on Melville Peninsula, by Captain Lyon, who tells us, that they lay four eggs on a tuft of withered grass, without being at the pains of forming any nest. (*Narrative*, p. 462.)

19. Phalaropus platyrhinchus. (Temm.) *Flat-billed phalarope.*

Phalaropus platyrhinchus. *Temm.* p. 712. *Greenl. Birds*, No. 12, p. 536. *Supplement to Parry's First Voyage*, cci.

Gray phalarope, (No. 412,) Plain-phalarope, (No. 415.) *Arctic Zoology*, ii. p. 494, 495.

Phalarope. *Parry's Narrative*, *Second Voyage*, *June* 18, 1821. *June* 29, 1822. p. 462.

The specimen received is a male in full summer plumage, in which state the trivial name of *red* is as applicable to it as to the *P. hyperboreus*, and Latham, misled by the colour, has actually described it as the female of the latter.

The *phalaropes* swim well and gracefully, and were seen on the present voyage upon the sea out of sight of the land. We have often noticed them on the small lakes, in the interior of America, unwilling to take wing when disturbed, and preferring to swim out of the reach of danger. In this respect they differ totally from the *tringæ*, with which they were long classed.

They lay four eggs, upon a small tuft of grass. (*Captain Lyon's Narrative*, p. 462.) The eggs have an oil-green colour, and are very much covered with irregular spots of dark umber-brown. Towards the obtuse end of the egg, the spots run into each other, and almost hide the ground colour.

20. Sterna arctica. (Temm.) *Arctic tern.*

Sterna Arctica. *Temm.* p. 742. *Supplement to Parry's First Voyage*, p. ccii. *Appendix to Franklin's Journey*, p. 694

Sterna hirundo. *Greenl. Birds*, No. 17, p. 542.

Black heads. *Hearne's Journey*, p. 432 ?

Tern. *Parry's Narrative, Second Voyage, June* 29th, 1822, p. 254, 268, 283.

Descr. of a *male* in full *breeding plumage*, killed on Winter Island on the 24th of June, 1822.

Forehead, crown, and nape, brownish-black; posterior part of the neck, back and wings, pearl-gray, approaching to light bluish-gray. Tail and tail-coverts, white, but the exterior tail-feather on each side has its outer vane coloured blackish-gray; there is also a slight tinge of this colour on the adjoining feather. The flag feathers are of the same colour with the mantle, except that the first has its outer narrow vane of a blackish-gray colour. The inner vanes of all the primaries are longitudinally half gray, half white. Their tips are entirely gray, approaching to blackish-gray. Most of the secondaries are tipped with white. The throat, cheeks, and fore-part of the neck, are white. The breast, abdomen, and flanks, are coloured like the mantle. The inner wing covertures, vent, and under surface of the tail, are white. The under surfaces, however, of the flag and exterior tail feathers, have more or less of a grayish tint. The tail is very much forked, the exterior feathers being much longer than the others, and passing the tip of the folded wing, about a quarter of an inch. The bill and feet have a scarlet colour in the recent specimen, but acquire more or less of a lake hue in drying. Length fifteen inches. Length of the upper mandible measured on the mæsial line, 16½ lines. Measured to angle of mouth, two inches. Tarse, seven lines. Middle toe with the claw, one inch.

A *female*, killed on the same day, differed, in having the shade of gray on the breast and abdomen a little lighter and approaching to ash-gray, in the dark gray margins extending to three of the outer tail feathers of a side, and in the upper mandible being blackish towards the tip. The length of the bill in this specimen was fifteen lines, or when measured to the angle of the mouth, twenty-one lines. Its tarse was very nearly seven lines. Its total length was fully equal to that of the male specimen, or fifteen inches.

Captain Sabine describes the *young bird*, of the 8th July, in the appendix above-quoted.

One thirteen inches long, killed at York Factory on the 28th of August, had its forehead white. Crown of the head and upper eyelid black. Back and wings bluish-gray, clouded with yellowish-gray. Tips of the flag, and secondary feathers whitish. Ventral aspect entirely white. Bill and legs orange. Wings passing the tail a little. In all other respects like a mature bird. Tarse six lines.

It will appear, upon a review of the above descriptions, that some of the characters pointed out by Temminck as distinguishing this species from the *st. hirundo* do not hold good in all cases, namely those which relate to the colour of the point of the bill, of the fore part of the neck and throat, and of the proportion of white on the belly. The rather smaller bill, shorter tarsus, and longer tail, of the *st. arctica*, seem to be the only constant differences.

The *sterna arctica* having been hitherto confounded with the *st. hirundo*, it is uncertain whether both are inhabitants of Hudson's Bay*. That the latter is found in the United States, is evident from the short wings, and comparatively long tarse, exhibited in Wilson's figure (*Am. birds*, 7, p. 67, t. 60, f. 1,) and from the assurance of Temminck, that he has American specimens which do not differ from the European ones. A tern with a slight smoke-gray tinge on the breast, but the rest of the ventral aspect pure white, was killed by Captain Franklin's party, near the verge of the Arctic Circle; one the 5th of July, whilst hatching upon two eggs. This is the livery of the *st. hirundo*, but the length of the tarse was unfortunately omitted to be noted, so as to decide the matter.

The Arctic terns were seen in great abundance on the present voyage, and were found breeding on Seeowak or Tern Island. The nest, as noted in the Narrative (p. 283,) consisted merely of a depression in the sand, and contained generally two, very rarely three eggs. The colour of the eggs varied, even in the same nest. Those brought home are of a pyriform shape, are very obtuse at one end, and sharp at the other, and marked with many irregular umber-brown spots of different degrees of intensity. Some of the eggs had a light yellowish-brown ground colour, others a bluish, or greenish-gray.

These terns, like the common species, are very clamorous when any one approaches their nests, and strike furiously within an inch or two of the intruder's head.

* Forster, in *Phil. Trans.*, lxii., describes a tern with a tail still shorter than that of the *st. hirundo*, *British Zoology*. This cannot be the *st. arctica*.

21. Larus glaucus. (Brunn.) *Glaucous gull.*

Larus glaucus. *Temm.* p. 757. *Greenl. Birds*, No. 19, p. 543. *Supplement to Parry's First Voyage*, p. cciii. *Faun. Grœnl.* p. 100, No. 64.
Burgermeister. *Marten's Spitzb.* p. 84, t. L, f, e.
Glaucous gull. *Arctic Zoology*, ii. p. 532.
Iceland gull. *Edmonston in Wernerian Trans.* iv. part 1, p. 176, 182. *Bewick's British Birds, Supplement pl.*
Now-idioke. *Esquimaux.*
Larus glaucus. *Parry's Narrative, Second Voyage, Sept.* 13.

There is a young male of this species in the collection, killed on September 26th, at the entrance of Lyon's Inlet.

Length twenty-nine inches. Wings as long as the tail. Bill two inches long above, and three to the angle of the mouth. Length of tarse thirty-two lines. Weight 2¼lbs.

22. Larus argentatus. (Brunn.) *Black-winged Silvery gull.*

Larus argentatus. *Temm.* p. 764. *Supplement to Parry's First Voyage*, p. cciv. *Appendix to Franklin's Journey*, p. 695.
Silvery gull, (winter.) *Arctic Zoology*, ii. p. 533.
Herring gull, (summer.) *Arctic Zoology*, ii. p. 527, No. 452. *British Zoology*, ii. p. 181, No. 5, t. 23.
Now-ya. *Esquimaux.*
Silvery gull. *Parry's Narrative, Second Voyage*, p. 61, *Sept.* 13, 1821, p. 254.

A male and female, in mature breeding plumage, killed at Winter Island on June 29th, 1822, are in the collection. The former measures two feet, and has a tarse 2⅓ inches long; the latter is two inches shorter, and has a tarse 2¼ long. The wings, in both specimens, pass the tail about an inch; they have the usual black markings on the flag-feathers, and accord in all respects with Temminck's description of the breeding plumage, except that he does not notice the white colour of the smallest covertures, forming a white border to the upper part of the wing.

Of six individuals examined by Mr. Edwards, in June, July, and September, the length varied from twenty-three to twenty-five inches, and the length of the tarse from twenty-seven to thirty-one lines, averaging twenty-nine lines.

The silvery gull, (*Larus argentatus*) *Greenl. Birds, No.* 20, p. 546, brought home on the former voyage, and which wants the black markings on the wings, is considered by Temminck as a variety proper to the polar countries.

A specimen of it, in the Edinburgh Museum, was brought from Greenland by Captain Scoresby. It is probable that a further acquaintance with it will confirm Captain Sabine's opinion, of its being a distinct species. The wings are shorter than in the black-winged kind, being only equal with the tail; a close comparison detects a slight difference in the form of their bills, and the young are said to differ in the colours of their plumage.

23. Larus tridactylus. (Lath.) *Kittiwake.*

Larus tridactylus. *Temm.* p. 774. *Greenl. Birds*, p. 519. *Supplement to Parry's First Voyage*, p. ccv. *Appendix to Franklin's Journey*, p. 695.
Kittiwake, (No. 456) and Tarrock *Arctic Zoology*, ii. p. 529, 533.
Kutge-gehef. *Marten's Spitzb.* p. 82, t. N, a.
Kittiwake, (larus rissa.) *Parry's Narrative, Second Voyage, June* 7, 1821.

24. Larus Rossii. (Mihi.) *Cuneate-tailed gull.*

Undescribed gull. *Parry's Narrative, Second Voyage*, p. 449.

Descr. Head and tail pure white; the neck above and below, the breast, and the inferior parts of the body, are, in the recent bird, deeply tinged with peach-blossom red, which disappears some months after the specimen is mounted, leaving a pure white. There is a distinct collar of deep brownish-black round the middle of the neck, four or five lines broad above and narrower below. The back, scapularies, and wings both upper and under surface, have a clear pearl-gray colour (*cendré-bleuatre pur* of Temm.) The outer web of the first primary is deep blackish-brown, from its base to within 1½ inch of its tip, which is of the colour of the rest of the wing, and the tips of the scapularies, and of the inner webs of some of the secondaries, are whitish.

The bill is black, slightly margined with red at the angle of the mouth. It is more slender and smaller than in its congeners. The upper mandible is slightly curved and compressed towards the point, and the lower one has a corresponding droop at the end, but is otherwise nearly straight. The salient angle beneath is not very evident, and the bill altogether is less strong than in other gulls. The nostrils are longitudinal slits, occupying about one half of that part of the mandible which is uncovered with feathers. The length of the bill measured above is nine lines, and to the angle of the mouth fifteen lines. The tarse is thirteen lines long, and rather stout, and with the feet is of a vermilion colour. The middle toe, including the claw, is nearly fourteen lines long. The thumb is very distinct, and has a claw nearly as large as that of the outer fore-toe.

The tail is decidedly cuneate, the central feathers being about five inches long, and the others becoming gradually shorter, as their situation is more external. The outermost are above an inch shorter than the central ones. The wings surpass the longest tail-feather about one inch.

The length from the tip of the bill, to the end of the middle tail-feather, is about fourteen inches.

Of the manners of this species we know nothing. Two individuals only were seen during the voyage, both killed in the month of June, at Alágnak. The first killed by Mr. now Lieutenant Ross, is here described, and under a specific name adopted in compliment to his exertions for the advancement of ornithology, frequently referred to in the Narrative. The second one, killed by Mr. Sherer, "differed only in having the exterior wing covert of the same blackish colour, with the outer web of the first primary *."

Until further specimens are procured, it would be premature to attempt to frame a specific character, but the distinguishing marks of the one received may be thus summed up: Larus (*Rossii*) capite caudâque cuneatâ albis, dorso alisque caudam superantibus griseis, pectore abdomineque roseis, rostro debiliori nigro, tarso unciali pedibusque miniatis.

25. Larus Sabinii. (J. Sabine.) *Fork-tailed gull.*

Larus Sabinii. *Temm. Intr.* cviii. *Linn. Trans.* xii. p. 520, t. 29. *Greenl. Birds*, No. 23, p. 551. *Supplement to Parry's First Voyage*, p. ccv.
Xema Rossii. *Leach in Ross's Voyage to Baffin's Bay.*
Erkēēt-yuggēē-ărioo. *Esquimaux.*
Larus Sabinii. *Parry's Narrative, Second Voyage*, p. 254, 301.

Many specimens, male and female, of this bird, were procured in June and July, 1822, at Winter Island and Auliitiwick, which correspond minutely with the description given by Mr. Sabine in the *Linnean Transactions* above quoted. Mr. Edwards remarked that, when newly killed, they had all more or less of a delicate pink blush on the abdomen. The winter changes of plumage which this bird undergoes, are still unknown. A flock of them was seen in the end of June, accompanied by the *lestris parasiticus*, and on the

* Mr. Edwards' Notes.

5th of August, another flock was seen flying high, as if migrating. Captain Sabine, in honour of whom, as its first discoverer, this bird has been named, informs me, that he killed a pair at Spitzbergen, on his late voyage. This decides its claim to be enumerated amongst the European birds. The Spitzbergen specimen is in full summer plumage, and corresponds with the description in the *Linnean Transactions* quoted above.

26. Lestris pomarinus. (Temm.) *Pomarine lestris.*

Lestris pomarinus. *Temm.* p. 793. *Supplement to Parry's First Voyage*, p. cevi.

A male specimen, killed at Igloolik on the 27th of June, was received. It measures 18½ inches in length, or when the long tail-feathers are included 20½ inches, and corresponds with Temminck's description of the old bird, except that there are only some slight traces of the collar of brown spots on the breast, and that the vent feathers and under tail covertures are uniform blackish-brown without spots; cheeks black. Tarse two inches long. The long tail feathers are twisted towards their points, so as to have their vanes obliquely applied to each other.

The following particulars respecting a *young bird* of the *preceding year*, shot on the 10th of June, are extracted from Mr. Edwards' notes. Length 18½ inches, to which 1½ inch is to be added for the excess of the long tail-feathers. Extent 48½ inches. Weight twenty-two ounces. Tarse twenty-four lines long, of a bluish-gray colour. Toes and webs, black. Nape of the neck, white, with a yellowish-brown tinge; flanks and under tail covertures barred with dark brown. The webs of the two middle tail-feathers preserve their breadth to their extremities, which are rounded.

27. Lestris parasiticus. (Boie.) *Arctic lestris.*

Lestris parasiticus. *Temm.* p. 796. *Greenl. Birds*, p. 551, No. 24. *Supplement to Parry's First Voyage*, p. cevi.
Struntjager. *Marten Spitzb.* p. 87, t. L, d.
Catharacta parasitica. *Faun. Groenl.* 103, No. 68.
Arctic gull. Black-toed gull. *Arctic Zoology*, No. 459, p. 530, No. 460, p. 531.
Is-sū-uak. *Esquimaux.*
Boatswain. *Parry's Narrative, Second Voyage, June* 29, 1822, p. 279.

A male and female were obtained on the 17th of June, in the Duke of York's Bay, agreeing exactly with each other in the colour of their plumage, but differing from Temminck's description in the forehead, crown, and occiput having a dark brownish-black colour; in the neck having the yellowish hue of the same parts in the *l. pomarinus;* and in the purplish-gray of the under tail covertures extending forwards past the vent to the posterior part of the abdomen. The male measured fifteen and the female sixteen inches, the middle tail-feathers in both having a further length of 6⅓ inches. One shot by Mr. Griffiths on the 16th of June, had the long tail-feathers, projecting 8⅓ inches farther than the rest. Mr. Edwards has noted a number of individuals killed between the 19th and 30th of June, 1822, as having the abdomen purplish-gray, with various intermixtures of white. In one instance, the white was confined to a few streaks. Captain Franklin's party observed these birds hatching in considerable numbers on the banks of the Copper-Mine River, in the beginning of July, and the greater part of them had dark abdomens.

A young bird, taken before it had escaped from the nest, and still covered on the head and breast with blackish-gray down, has all the dorsal aspect blackish-brown, with narrow light yellowish-brown margins to the feathers. The wings and tail are brownish-black without spots, but slightly tipped with light brown. The feathers on the belly are blackish-brown, barred transversely with dull white. The legs and posterior part of the webs and toes are partly of a pale dull yellowish colour.

The mode by which the *lestris* obtains its food on the sea-coast through the labours of the other gulls, is well known; but in the interior of the country, it caters for itself, in other and less parasitical ways.

ANAS.

THE arrival of the birds of this genus in the fur countries, marking the return of spring, is an event of great importance to the natives, as it affords them a supply of food at a season when the moose and deer hunting is impeded by the floods of melting snow. The larger species, or geese, have been principally attended to, and are observed to follow determinate routes in their progress northward, and to halt regularly at certain stations. Their return in autumn is also by passes well known to the natives, but not always in the same line with their spring movements. Actuated in the beginning of the season by an impulse which hurries them to the breeding stations, they remain at their resting-places only long enough to admit of the country to the northward being properly thawed for their reception; but during these rests, which are seldom prolonged beyond eight or ten days, they become very fat, although on their first arrival they are always lean. Their movements to the northward are sometimes premature, and after having left a station, they occasionally return to it for a few days. Such an event is always followed by cold frosty weather, or severe snow-storms. When they return in autumn, their migrations being more exclusively regulated by the supplies of food they can obtain, their halt in the marshy districts through which the Saskatchawan, and its continuation, Nelson's River, flows, and on the low shores of the southern parts of Hudson's Bay, is more considerable, and is terminated by the freezing of the marshes. This period forms the principal *goose-hunt* of the Crees, who are the only natives that frequent those swampy districts. In the *barren-grounds*, on the other hand, frequented by the Northern Indians, or Chepewyans, the spring goose-hunt is the most productive.

The only geese seen in numbers in the *interior* of the country, are the Canada-goose, (*anas Canadensis*,) the laughing-goose, (*anas albifrons*,) and the snow-goose, (*anas hyperborea*.) The distinct notes of these three species are well imitated by the Indians, who thus are very successful, in the spring, in bringing them within gun-shot. In the autumn the geese do not so readily answer the call, and it is necessary that the sportsman should conceal himself, and use some dead birds as a decoy.

The Canada-goose, termed by the Canadian voyagers *l'outarde**, and by the Crees *neescah*, arrives first of the three species just mentioned. It breeds every where throughout the Hudson's Bay territory, and was observed, in the middle of July, on the Copper-Mine River, not far from its debouchure, accompanied by its newly-hatched young. The cry of this species is imitated by a nasal repetition of the syllable *wook*, or as Wilson writes it *honk*.

The following table of the arrival of this species in different parallels of latitude in the interior of the country, is derived chiefly from the journals kept by the traders.

Engineer Cantonment.	Lat.	41½°		22nd of February †.
Cumberland House.	,,	54°	from the 8th to the	12th of April.
Athabasca Lake.	,,	59°	about the	20th-25th of April.
Slave Lake.	,,	61°	,, ,,	1st-6th of May.
Fort Enterprise.	,,	64° 30′	,, ,,	12th-20th of May.

* This is the bustard of Messrs. Jerome and De la Poitries, who have been so much censured by Hearne, for asserting its existence. See *Journey to the Northern Ocean*, p. 417.

† In LONG's *Expedition to the Rocky Mountains*, the great migration of geese is stated to commence at Engineer Cantonment, in lat. 41½° on 22d February, and to terminate at the latter end of March.

The results of registers for various years kept at Fort Churchill, on Hudson's Bay, lat. 59°, give the 27th of April, and 14th of May, as the earliest and latest arrivals of different seasons. Their eggs have been found as early as the 15th of May. They collect in the marshes of that neighbourhood in some autumns as early as August 16th, and depart about September 10th, rarely continuing until October 10th, which is considered as a very late *fall.*

The other two species seen in the interior, arrrive in separate flocks, generally about six or eight days after the Canada geese. One of these, the *laughing-goose,* keeps the middle parts of the continent in its migrations, and is rarely seen on the coast of Hudson's Bay. Its breeding station is to the northward even of the resorts of the snow-goose, and is still unknown to Europeans. The note of this bird has some resemblance to the laugh of a man, and from this its name has been derived, and not as Wilson (*Am. orn.*) supposes, from the grinning appearance of its mandibles. The Indians imitate its cry by moving the hand quickly against the lips, whilst they repeat the syllable *wah.*

The *snow-goose,* in its migration northwards, is seen both in the interior, and on the sea-coast, and in numbers exceeding the other two. It forms more particularly the subject of the following article.

The brent goose, (*anas bernicla*) also particularized afterwards, is found only on the coast of Hudson's Bay; and the barnacle, (*anas leucopsis*) and the bean-goose, (*anas segetum*) the remaining two species of geese known to visit those countries, are rarely seen, being accidental visitors.

The *swans* arrive in the fur countries still earlier than the Canada-goose, and frequent the eddies under water-falls and other spots of open water, until the rivers and lakes break up. They are seen both in the interior and on the sea-coast, sometimes in small flocks, but more frequently in pairs.

Of the smaller birds, or ducks, that constitute the bulk of the genus *anas,* there are about twenty-four species known in the Hudson's Bay fur-countries, only three of which were seen by our navigators. Two of these three, the eider and king ducks, confine their visits to the sea-coast; but the third, the long tailed duck, (*anas glacialis*) is seen also abundantly in the interior, on its passage north.

28. ANAS HYPERBOREA. (Gmel.) *Snow-goose.*

Anas hyperborea. *Temm.* p. 816.
Anas nivalis. *Forster, Phil. Trans.* lxii. p. 413.
Snow-goose. *Arctic Zoology*, p. 549, No. 477. White goose. *Hearne's Journey*, p. 439.
Wè-wè-oo or wapow-wè-oo. *Cree Indians.* Kangokh (plur. kang-oot.) *Esquimaux.*
Wavey. *Hudson's Bay Traders.*
Anas hyperborea. *Parry's Narrative, Second Voyage, June 24th*, 1823, p. 437, 462.

WHITE, except the ten first quill feathers, which are brownish-black, fading at the tips into umber-brown. Their shafts all white. Crown of the head, slightly tinged with dirty reddish-brown. Irides dark hair-brown. Margin and inside of the mouth black. Bill, feet, and orbits, aurora-red.

The above is a description of this goose, as killed near Fort Enterprise, in lat. 65°, on its way to the breeding-places.

A female killed at Igloolik, on June 28th, and consequently in the height of the breeding season, differed, in wanting the brown tinge on the crown of the head, but in having it on the fore-head, cheeks, throat, part of the neck underneath, and very slightly on the middle parts of the abdomen. The primary wing covertures are bluish-gray, with blackish-brown shafts. The middle tail-feathers are much worn, and the long scapularies have almost entirely lost their vanes, the naked shafts alone remaining. Length thirty-one inches; of tarse three inches; of bill, measured on the mœsial line to the feathers of the forehead, two inches three lines; or when measured to either of the angles which recede towards the eye, two inches seven lines; to the angle of the mouth two inches five lines.

The *young*, until they attain their fourth year, are said to wear a plumage so different, that they have been described as a distinct species, under the names of

Anas cœrulescens. *Gmel. Syst.* i. p. 513. *Lath. Ind. Orn.* ii. p. 836.
Blue-winged goose. *Arctic Zoology*, ii. p. 547, No. 474. *Lath. Syn.* vi. p. 469.
Blue-goose. *Hearne's Journey*, p. 441. *Forst. Phil. Trans.* lxii.
Cath-catoo wè-wè-oo. *Cree Indians.*

IF these birds are really, as the most eminent ornithologists of the present day suppose them to be, the young of the snow-goose, they keep themselves very much apart from their parents, take a different route on their way southwards from the breeding-places, and do not return to the very high latitudes until the fourth year afterwards, when a complete change has been operated upon their plumage. According to Hearne, they are numerous at Albany Fort, in latitude 51°, not common at York Factory in latitude 57°, and seldom seen to the north of Churchill in latitude 59°. Captain Franklin's party, during their progress though the fur countries, had opportunities of seeing immense flocks of snow-geese, not only at Cumberland House, in latitude 54°, at Slave Lake, in latitude 60°, and at Fort Enterprise, nearly in latitude 65°, performing their migrations during three successive springs, but also saw them moulting, and unable to fly, upon the shores of the Arctic Sea, in the month of August, and again migrating to the southward, in the months of September of two successive years, yet they were always accompanied by coloured individuals. Hearne, whose opportunities of observation embraced many years, says, that the blue-goose is often seen leading a flock of white ones. He must be understood, however, as is evident from his previous remarks, to refer principally to the southern parts of the fur countries, where alone the blue geese are common.

The snow goose breeds on the coasts and islands of the Arctic Sea, and arrives in the Hudson's Bay countries, on its passage thither, a few days later in the spring than the *A. canadensis*. Its eggs are a little larger than those of the eider duck, of a most regular ovate shape, one end being a little more obtuse than the other, three inches one line long, and two inches one line across at the greatest transverse diameter, which is situated rather more than one-third of the whole length from the obtuse end, and of a yellowish-white colour.

The Cree Indian term, *we-we-oo*, is an attempt to express the peculiar note of this animal, and which the native hunters imitate so exactly, that in the spring they can often decoy the same flock many times within gun-shot. When fat, the snow-goose is much prized as an article of food in the fur countries, and is considered as more delicate than the Canada-goose.

By the end of August the moulting and breeding season being finished in their Arctic retreats, the snow-geese generally take their flight to the southward, with the first northerly or north-west gale of wind, which at that season is often accompanied with heavy snow. They fly chiefly in the night time, and the length of their flight would appear to be regulated, in some measure, by the distance to which the storm extends, because a fall of snow prevents them from obtaining the berries of the *Empetrum nigrum*, which form a chief article of their food at that season. They were observed by Captain Franklin's party in 1821, on the 4th of September, in latitude 66° 30′

on the *barren grounds*, feeding in the day-time on the margins of small lakes, and in such numbers as to whiten the ground for miles together. Their flight to the southward lasted for two or three nights, and was immediately succeeded by a severe storm, and the snow which then fell remained on the ground for the rest of the winter. On the preceding year they had passed Fort Enterprise in latitude 64° 30′ on the 13th, 14th, and 15th of September. In their spring migrations through the interior, they may be stated to reach latitude 54° on the 15th of April, latitude 59° on the 25th of April, latitude 64° on the 20th of May, and their breeding stations in latitude 69°, by the beginning of June.

29. Anas bernicla. (L.) *Brent-goose.*

Anas bernicla. *Temm.* p. 824. *Greenl. Birds*, p. 558, No. 45. *Supplement to Parry's First Voyage*, ccvii. *Appendix to Franklin's Journey*, p. 698. *Faun. Grœnl.*, p. 67, No. 41.
Brent-goose. *Arctic Zoology*, ii. p. 551, No. 478. *Hearne's Journey*, p. 440.
Weetha-may pawew. *Cree Indians.* Neer-gluk, or Neerlook. *Esquimaux.*
Brent. *Parry's Narrative, Second Voyage*, p. 304, 435, 448, 462. (Nerdlek. *Greenlanders.*)

Two varieties of this bird were observed by our voyageurs. The following description is taken from a *female* killed on the 21st June, and consequently in the height of the *breeding season.* It agrees sufficiently with the ordinary state of the summer plumage of the brent-goose of authors, and is introduced here principally to contrast with the variety which follows, and also to show the first appearance of moulting, &c.

Head, neck, greater part of the breast, and primary and secondary wing-feathers brownish-black. The black terminates in an even line, which surrounds the upper part of the shoulders and breast, on a level with the more anterior part of the folded wing. The black on the ventral aspect of the neck is a little tarnished, by the very narrow margins of most of the feathers being of a grayish-black colour, and an irregular spot is formed on each side of the neck, by a few feathers tipped with white. The back, scapularies, and wing covertures, are of a colour intermediate between light liver-brown and clove-brown, each feather being surrounded by a margin of yellowish-gray. Towards the root of the tail, however, the colour is nearly uniform, their being no gray-margins. The tail covertures, which usually form a white band across its root, have dropped out, and the tail feathers themselves have entirely lost their vanes. There is a large white patch, however, running up from the vent, on each side of the rump, which is visible from above. The feathers of the abdomen are yellowish-gray, fading at their margins into yellowish white*; on the flanks there are alternate transverse bars of bluish-gray, and tarnished white, the latter colour occupying the margins of the feathers. The vent feathers are white, and the linings of the wings clove-brown. The under tail covertures have fallen out. Bill and feet black. Length of bill, measured along the ridge, 14 lines. Tarse 28 lines. Middle toe and claw 26 lines. Total length from end of the bill to the tip of the tail, 23½ inches.

Captain Sabine, who observed the brent-geese breeding in great numbers on the islands of the Polar Sea, remarks, in the supplement cited above, that the colours of the male are more vivid, in the height of the season, than those of the female, but makes no mention of any other difference in the plumage, so that the bird referred to in the following description is to be considered as a variety, and not as the male in his ordinary breeding-dress, notwithstanding the opinion of the Esquimaux to the contrary.—(*Narrative*, p. 435.)

ANAS BERNICLA. *Varietas*, β.

Bernacle-geese. *Parry's Narrative*, p. 435. Neerlook, (male.) *Esquimaux*.

A KIDNEY-shaped white patch (like that of the *A. canadensis*) occupies the throat and cheeks, and extends upwards behind the eyes. The under eye-lid is whitish, but there is a narrow black line betwixt it and the white patch just mentioned. There are also a few small white feathers above, and rather before, the eye. The rest of the head and neck are velvet black. This black colour does not encroach upon the breast, and as in the female above described, but ceases about four inches from the nearest part of the folded wing, or just where the neck begins to swell out. There is no white patch on the sides of the neck. The general arrangement and tints of colour on the dorsal aspect are similar to what is mentioned in the description of the preceding specimen, but the yellowish gray colour occupies a broader portion of the margins of the scapularies and wing-coverts. The tips of the flag and secondary feathers are much faded, and the vanes of the latter are considerably worn. The tail feathers are not worn as in the female, and have a brownish-black colour with faded extremities. A single row of white covertures form a white band across its root; the shoulders are coloured like

* This agrees well with Fabricius's description in *Faun. Grœnl.*, but differs from Temminck's.

the back. The breast is yellowish-white. The abdomen and flanks have the same colours as the female above-mentioned, but they are a little lighter, and the white about the vent is more extended. Length 26 inches.

This bird differs from the usual state of the *A. bernicla*, in having the white patch on the throat and cheeks, in wanting the white mark on the neck, in the base of the neck being coloured superiorly like the back, and in the whole breast being whitish. The ridge of the upper mandible is a little flatter, broader, and about two lines longer, than in the female *A. bernicla*.

The plumage bears no resemblance to that of the *A. leucopsis;* there is none of the bright ash-gray, which is to be observed on the dorsal feathers of the latter, succeeded by black bands, and these again by light-coloured tips. The bill is also larger than that of the *A. leucopsis*.

The specimen here commented upon was killed, with several others precisely similar, out of a flock on the 19th of June. Another was killed on the 9th of July, differing only in the colours being in general darker, and the plumage more worn. These were all males. The Esquimaux consider them as the males of the *A. bernicla*, which during the breeding season keep in separate flocks. The specimens brought home have the appearance of full plumaged birds, and differ much from the young of the *A. bernicla*, as described by Temminck; that it is not the common plumage of the male in the breeding season, we have the anthority of Captain Sabine above referred to.

The brent-goose breeds, according to Fabricius, in the most remote islands of Greenland. Barentz found them in vast numbers on the coast of Spitzbergen, sitting on their nests. Hearne states them to visit Hudson's Bay in prodigious flocks, on their route to the southward, from their breeding quarters on the Arctic Sea, and he remarks that they always follow the line of coast. They are not seen in the interior, and their route in the spring he says is unknown. Their nests were not seen on the present voyage. On August the 11th, they were seen in large flocks, and it is probable that they were preparing thus early for their migration to the southward. Hearne says that they arrive at Churchill late in August.

30. Anas cygnus. (L.) *Wild Swan.*

Anas cygnus *Temm.* p. 828. *Supplement to Parry's First Voyage*, p. ccvii. *Appendix to Franklin's Journey*, p. 697.

Whistling swan. *Arctic Zoology*, p. 541, No. 469.

Wawpee-shew. *Cree Indians.* Kagoos, *Northern Indians.* Kō-guke, or Koob-yak, *Esquimaux.*

Swan. *Parry's Narrative, Second Voyage*, p. 236, 240, 342.

Swans were observed by Captain Parry to arrive in latitude 66° on the 31st of May, and were seen flying to the southward, as if migrating, on the 8th of September. A nest containing eggs was found on the 9th of June, 1822, and is described in the Narrative. The specimen brought home is a female, and was killed at Igloolik on the 19th of June, 1823. At this season, the reddish or yellowish tinge is, as Captain Sabine observes in the Appendix above cited, not confined to the head. In the specimen at present under notice, the crown of the head, nape, and superior parts of the neck, are deeply tinged with reddish-orange, and there is a very slight tint of the same colour spread over the whole abdomen. The colour is confined to the tips of the feathers, and even on the crown of the head, where it is deepest, allows much white to appear.

Hearne mentions, that there are two varieties of swan known at Hudson's Bay, distinguished from each other only by size, the one weighing upwards of thirty pounds, and the other from eighteen to twenty. Mr. Lawson is quoted in *Arctic Zoology*, for the Carolina appellation of Trumpeter to the former, and of Hooper to the latter.

The swan becomes fat soon after its arrival in the fur countries, and is then much prized as an article of food.

31. Anas Mollissima. (L.) *Eider Duck.*

Anas mollissima. *Temm.* p. 848. *Greenl. Birds*, p. 554. *Supplement to Parry's First Voyage*, p. ccviii. *Fauna Grœnl.* p. 68, No. 42.

Eider-duck. *Arctic Zoology*, ii. p. 553, No. 480. Dunter goose. *Hearne's Journey*, p. 445.

Eider-duck. *Parry's Narrative, Second Voyage*, Sept. 13, 1821, p. 254, 265, 283, 337.

In the specimen brought home, which was killed on June 14 at Winter Island, the siskin-green colour does not extend to the cheeks, nor crown of the head, as mentioned by Temminck, but is confined to the occiput and adjoining part of the neck, agreeing with the description given by Pennant, in *British Zoology*, p. 245.

The tertiary wing feathers are white, and curve outwards over the primaries. The primaries themselves are blackish-brown, fading at the extremities into clove-brown. Their immediate covertures are brownish-black. In a specimen killed on the 5th June, Mr. Edwards remarked the white of the scapularies to be tinged with greenish-yellow.

The female killed on June 2d agrees with Temminck's description, and also with Pennant's, in *British Zoology*, which is more minute in some parts. The white tips to the secondary wing-feathers, and larger covertures which have been described as forming two white bands across the wings, are small and not visible when the wings are closed.

Eider-ducks were observed breeding in Tern Island in July, when there were most generally two, rarely three eggs in one nest, (p. 283.) They are stated by authors to lay five or six eggs; the eggs vary in shape, some being exactly elliptical, others ovate, with a considerable disproportion in the obtuseness of the ends. Their length is three inches, and the greatest transverse diameter two.

The Eider-ducks are sea-birds, being never seen in the interior. They arrive in the quarters visited by our navigators in the end of May, and were observed to be very tame, seldom taking the alarm until warned by their more suspicious companions, the long-tailed ducks. It would appear from this, that they do not migrate in winter, to countries where they are liable to be disturbed by man, but merely retire to sea in search of open water. Fabricius says, that they remain in Greenland all the year, collecting in flocks in the winter time. They are not seen farther south in Hudson's Bay than Churchill River, in latitude 59°.

32. Anas spectabilis. (L.) *King-Duck.*

Anas spectabilis. *Temminck*, p. 851. *Greenl. Birds*, 553. *Supplement to Parry's First Voyage*, p. ccvii. *Faun. Grœnl.* p. 63, No. 39.
King-duck. *Arctic Zoology*, ii. p. 554, No. 481.
King-duck. *Parry's Narrative, Second Voyage*, p. 237, 254, 431, 435, 454, 461.

The male specimen received, was killed on the 2d of June, and corresponds pretty exactly with M. Temminck's description, but we are enabled to add, from the inspection of a beautiful drawing by Captain Lyon, conjoined with

Mr. Edwards' notes, some particulars respecting the colours of parts that are apt to fade in drying.

The fleshy sides of the compressed gibbosity at the base of the bill have a Dutch-orange colour. The bill itself is vermilion red, and its large nail is nearly flesh-coloured, with a horny translucency. The inferior mandible has a narrow orange-coloured margin next the feathers. The cheeks are pistachio-green, which is separated from the bright bluish-gray of the head and nape, by a white line that is continued over the eye, until it joins the black which surrounds the bill. Both eyelids are black, but this colour is broadest on the under one. The breast is cream-yellow, deepening in the old specimens into ochre-yellow. The posterior part of the back, the wings, tail, and belly, have a blackish-brown colour, which deepens on the curved tertiaries into brownish or pitch-black. The shafts of the tertiaries have a peculiar shining umber-brown colour. The patch of white on the wings is intermixed with a few brownish-black feathers, and one or two of the secondaries are tipped with white. The scapularies have a fine wiry appearance, and the legs an ochre-yellow colour. In other respects, the specimen and drawing correspond exactly with Temminck's description of the old male. The length of a number of individuals measured by Mr. Edwards, varied from 22 to 23½ inches.

The *female* king and eider-ducks resemble each other so exactly in plumage, that one description suffices for both; the only difference being, as Fabricius and Captain Sabine have pointed out, in the compressed base of the bill. The posterior soft plates, or prolongations of the upper mandible of the former, have nearly a vertical position, but in the latter they are more horizontal, like the depressed plates of the male of the same species. The specimen of the female king-duck received, is unusually large, being 24½ inches long, yet its bill is two lines shorter than that of an eider-duck only 22 inches long; other females, however, measured by Mr. Edwards were only 22 inches long.

A *young male*, shot on September 8th, had the head and neck dusky yellowish-gray, crowded with blackish-brown spots. Back, scapularies, and wing covertures, brownish-black, each feather bordered with dark yellowish-brown. Tail, grayish-black, with slight brown tips; one or two of the primary wing covertures have minute white tips. The primary wing feathers are uniform brownish-black, but the secondaries and tertiaries have some brownish margins. The breast has a general yellowish-brown colour, spotted, and inferiorly barred transversely with brownish-black. The black predominates on the abdomen, but it is so minutely and intimately intermixed with the yellowish-brown, that it assumes, when viewed at a little distance, an uniform dusky clove-brown colour; on the flanks and under tail covertures, the black and brown are in alternate and more distinct bars. The linings of the wings are shining pearl-gray. The posterior prolongations of the bill resemble those of the female. Length 22 inches.

King-ducks were numerous in the quarters visited by Captain Parry, and upwards of 600 were killed by a party sent to Alagnak for the purpose. Like the eider, these birds obtain their livelihood entirely in the sea, and therefore do not visit the lakes of the interior; nor are they seen farther south on the shores of Hudson's Bay, than lat. 59°. Perhaps they never migrate farther from their breeding quarters in the north, than to permanent open water. They arrived at the winter quarters of 1821 in lat. 66°, on the 31st of May, 1822, along with the other summer birds, but at Igloolik, where the open water was perhaps more favourable, they made their appearance on the 16th of April before the other birds.

The eggs vary in form, from oval to more or less ovate. They are 30 or 32 lines long, and 21 lines at the greatest transverse diameter. Their colour is asparagus-green, with a slight tinge of yellowish gray.

33. Anas glacialis. (L.) *Long-tailed Duck.*

Anas glacialis. *Temm.* p. 860. *Greenl. Birds*, 555. *Supplement to Parry's First Voyage*, p. ccviii.

Anas hyemalis. *Faun. Grœnl.* p. 71, No. 45.

Long-tailed duck. *Arctic Zoology*, ii. p. 566, No. 501. *Hearne's Journey*, p. 447.

Caccawee. *Franklin's Journey*, p. 383. Al-diggee-āriov. *Esquimaux.*

Anas glacialis and long-tailed duck. *Narrative, Parry's Second Voyage, Sept.* 7, *Oct.* 4, 1821, p. 237, 254, 313, 431, 437.

The long-tailed Duck is one of the most clamorous of the tribe, and is celebrated in the songs of the Canadian voyagers, by the name of *caccawee.* Its arrival in spring could not be overlooked by the American poets in descriptions of that season.

Considerable varieties of plumage are observed amongst the males of this species during the breeding season, probably depending on age.

One killed at Winter Island on the 1st of June, had the cheek and side of the head, from the bill to the middle of the orbit, dull ash-gray. A black band runs in the mæsial line from the bill to the crown, separating the gray patches on each side from one another. The eye is placed in a spot of pure white, which runs backwards in a tapering manner for an inch. The rest of the head, neck, back and central tail feathers, have a shining brownish-black colour. The wings are blackish-brown, the outer vanes of the secondaries fading into umber brown. The scapularies, and the broad band across the base of the neck above, have the feathers edged with orange-brown (rust colour,) the black central part of each feather having a rhomboidal shape. The exterior tail feathers are totally white, and the three succeeding ones on each side have their outer vanes white. On each side of the rump there is a large patch of pure white, continuous with the white of the abdomen. The under parts of the neck, breast, and anterior part of the abdomen have an unspotted blackish-brown colour. The rest of the abdomen, and the under tail coverts, are pure white. The flanks covered by the wings are pearl-grey, and the linings of the wings are clove-brown, fading on the flag feathers into hair-brown without spots.

Another bird was killed on the 25th of June, precisely similar to the above, except that the grey patches on the face were brighter, and met on the forehead. This state of the plumage, with the addition of a few white feathers on the nape, and a little whitish bordering to the scapularies, (observed in some instances by Mr. Edwards,) is that which is considered by Captain Sabine, in his memoir on the Greenland birds, to be the full breeding plumage.

Mr. Edwards, however, took full descriptions of a considerable number killed between the 1st and 25th of June, and the most of them approached more nearly to the description given by Temminck of the old male in his winter dress.

"They had all a dark silky chestnut-brown patch on each side of the neck; a greater or smaller intermixture of white in the black stripe from the bill to the crown; the crown and nape sometimes entirely white, sometimes with an admixture of black; the borders of the scapularies with more or less white; a broad white collar round the lower part of the neck; in some individuals the feathers composing this collar were tipped with black or brown; below the white collar there was in some instances a narrow band of white feathers on the breast; and some had the upper tail coverts partly white. The colour of the transverse middle band of the bill varied from rose-red to violet*."

The usual length of the full-grown birds killed on this voyage, was from

* Extracted from Mr. Edwards's notes.

21 to 23 inches, or excluding the long tail feathers about 17 inches. Bill measured on the mæsial line, 11 lines, or to the angle of the mouth 17 lines. Length of tarsus 15 or 16 lines. Middle toe and claw 26 lines.

The long-tailed Duck feeds principally on the sea; they pass over the interior of the continent, however, in their migrations, occasionally lighting upon the rivers and lakes to feed upon insects. In 1821, they passed Fort Enterprise in latitude 64° 30″ on their way to the shores of the Arctic sea, in small numbers, on the 24th and 25th of May. They made their first appearance at Captain Parry's spring quarters, in 1822, on June 1st, and in 1823 on May 21st. They were observed collected into large flocks and moulting in the middle of August, and they did not migrate from Winter Island before October 4th. It would appear that as long as they have sufficient open water and food they do not migrate. Fabricius says that they remain in Greenland the whole year, and the same thing is stated by Latham, with regard to Hudson's Bay.

Shape of the eggs ovate approaching to oval, with both ends rather obtuse. Colour betwixt greenish-white, and greenish-gray; 25 or 26 lines long, and 18 at the greatest transverse diameter.

34. Colymbus glacialis. (L.) *Great Northern Diver.*

Colymbus glacialis. *Temm.* p. 910. *Appendix to Franklin's Journey*, p. 703. *Faun. Grœnl.* p. 97, No. 62.

Northern Diver, (mature.) No. 439. Immer. (young.) No. 440. *Arctic Zoology*, p. 518. *Hearne's Journey*, p. 429. *British Zoology*, p. 165, No. 1 and 167, No. 2. t. 30. f. 2 and 1.

Galkyeh. *Copper Indians.* Kaglooleek. *Esquimaux.* Toodleek. *Greenlanders.*

These birds are numerous in the northern parts of the American continent. They arrive in the fur countries about the end of May, and retire to the south in October. They were frequently seen by Captain Franklin's party during their voyage on the Arctic sea, and Captain Parry received some of their skins from the Esquimaux who visited him. They breed on the shores of small lakes, laying two eggs at a time. Their cry is loud, has a peculiarly hollow and melancholy tone, and when often repeated is said to portend rain. The Canadian voyagers never fail to make a loud hooting noise when this bird passes, for the purpose of rendering it, as they say, foolish. It is certain that it is thus frequently induced to fly in circles round the canoe, and often attracted within gun-shot. In water, they are watchful, and dive so instantaneously, that it is difficult to shoot them. They take wing, however, with difficulty, although they fly well, and this circumstance enables the hunter to destroy great numbers of them in the spring. They arrive in that season when the ice of the lakes continues entire, except, perhaps, a small basin of open water where a rivulet happens to flow in, or where the discharge of the lake takes place. When the birds are observed to alight in these places, the hunter runs to the margin of the ice, they instantly dive, but are obliged after a time to come to the surface to breathe, when he has an opportunity of shooting them. In this way, upwards of twenty were killed at Fort Enterprise in the spring of 1821, in a piece of water only a few yards square. In the summer and autumn, they are often caught in nets set for fish. The flesh of the northern diver is tough, and is eaten only through necessity.

35. Colymbus arcticus. (L.) *Black-throated Diver.*

Colymbus articus. *Temm.* p. 913.
Black-throated diver. *Arctic Zoology*, ii. p. 520, No. 444. *British Zoology*, ii. p. 170, No. 5. t. 30, f. 2. *Hearne's Journey*, p. 430.
Black-throated diver. *Parry's Narrative, Second Voyage, Aug.* 17, 1821, p. 265, 435.

These birds were in considerable numbers in the quarters visited by Captain Parry. The length of those shot in the end of June, was noted to vary from 25 to 27 inches, and their weight from 4½ to 5¾ lbs. The specimen received was killed on the 28th of June, and is in mature plumage.

The skins of this bird, in common with those of the other species of the genus, are used by the Indians to form caps or bags for holding their smoking materials, and by the Esquimaux are formed into caps, jackets, and trowsers.

36. Colymbus septentrionalis. (L.) *Red-throated Diver.*

Colymbus septentrionalis. *Temm.* p. 916. *Greenl. Birds*, No. 16, p. 152. *Supplement to Parry's First Voyage*, p. ccix. *Appendix to Franklin's Journey*, p. 703. *Faun. Grœnl.* p. 94. No. 62.
Red-throated diver. *Arctic Zoology*. ii. p. 520, No. 443. *British Zoology*, ii. p. 169, t. 30, f. 1. *Hearne's Journey*, p. 430.
Striped driver and speckled diver, (young). *Arctic Zoology*, ii. p. 519, No. 442, and No. 441.
Red-throated diver, and Col. Septentrionalis. *Parry's Narrative, Second Voyage, Sept.* 13, 1821, p. 254, 435, 437.

These birds were found breeding by Captain Parry. The eggs, which are two in number, vary in size and form, being sometimes elliptical, sometimes a little ovate, and in length from 34 to 36 lines, and transverse diameter 20 or 21 lines.

37. Uria Brünnichii. (E. Sabine.) *Brünnich's Guillemot.*

Uria brunnichii. *Temm.* p. 924. *Greenl. Birds,* p. 538, No. 14. *Supplement to Parry's First Voyage,* p. ccix.
Colymbus triole. *Parry's Narrative, Second Voyage, Sept.* 13, 1821.

A male specimen, obtained in June, corresponds exactly with Temminck's description, and a female killed on the 4th of August differed merely in having the flag and tail-feathers faded into clove-brown, and appearing as if worn, and in some very minute white markings on the throat.

38. Uria grylle. (Lath.) *Black Guillemot.*

Uria grylle. *Temm.* p. 925. *Fauna Grœnl.* p. 92, No. 60. *Greenl. Birds,* p. 540, No. 15. *Supplement to Parry's First Voyage,* p. ccix.
Black guillemot. *Arctic Zoology,* ii. p. 516, No. 437. *British Zoology,* ii. p. 163, No. 2, t. 28, f. 2, (young.) *Hearne's Journey,* p. 428.
Spotted Greenland dove, *Edw. t.* 50. Pigeon-diver. *Marten's Spitzb.* 79, t. ab. *L.* f. 6.
Dovekie. *Parry's Narrative, Second Voyage, June* 7, 18, *Aug.* 22, 1821, p. 136, 138, 139. *March* 25, 1822, p. 241, 418.

These birds were numerous on the coast of Melville peninsula, and were the only species of water-fowl that remained there during the winter. They were seen during that season, swimming in a piece of open water near the ships, and their absences were merely for short periods. As the winter advanced, they were observed to assume much more white on the plumage than has been described by authors.

A male bird killed on the 22d of July off Tern Island, is in the velvet-black breeding plumage, the only indication of change being a single white feather on the abdomen, and the tips of the scapularies, tail, and the whole wing feathers except the white mirror, having faded into broccoli-brown and appearing worn. The secondary coverts were slightly tipped with white, and the bases of the inner vanes of the flag-feathers, and the whole linings of the wings, were pure white. The length of the specimen from the end of the bill to the claws, is 14½ inches.

A female, killed eight days later, had the wings and tail of the same colour with the last, and the black plumage both above and below every where thinly interspersed with white feathers; a state which is described by Temminck, as occurring at the commencement of the moulting season.

The most perfect *winter plumage* was as follows:

Head, neck, whole ventral aspect, rump, and mirror of the wings, unspotted white. A small crescentic black spot before the eye, having its horns turned backwards. The back is variegated with black and white, but the latter colour occupying the tips of the feathers, when the plumage is smooth, nearly conceals the black. The scapularies form an oblong patch of pure white, terminated at the lower end by deep black, which unites with the black of the wing. The smallest wing covertures, the flag-feathers, their immediate covertures, the secondaries, tertiaries, and tail feathers, are velvet black. The white mirror is formed by the middle wing covertures; the tips of the long wing covertures and of some of the secondaries are white, forming a narrow transverse band.

The linings of the wings are pure white, and the upper halves of the inner vanes of the flag-feathers are also white. In this perfect winter dress, then, the whole bird may be said to be white, except the tail, the flag-feathers, and a band surrounding the mirror of the wing, into the formation of which the black tips of the long scapularies enter. When the plumage of the back is ruffled, the black bases of the feathers also contribute to produce a further variety of appearance. Legs, bright scarlet.

A specimen killed on the 25th of March, had some black mottling on the mirror of the wing, many of the black bases of the feathers of the back visible, and some very slight margins to the feathers on the belly; but in other respects the plumage was the same as that of the winter bird above described, and the legs also exhibited the bright scarlet colour.

The individuals killed were about 14 inches long to the end of the tail, and 15 or 15½ from the point of the bill to the claws, when the leg was stretched out. The length of the tarse was 12 or 13 lines, and the weight, 12 or 13 ounces.

The speckled white and black birds of this species observed in the Shetland Islands, are supposed to be the young only, left behind; and that the whole migrate. (Montague, Supp.) We are unable to decide, whether the same explanation would be correct, if applied to the birds seen by Captain Parry, or whether the very great proportion of white in the plumage is the proper livery of the mature birds of the species, when they winter in high northern latitudes. The dimensions and appearance of the specimens brought home, and their bright scarlet legs, would seem to point them out as full grown.

The thirty-eight species of birds above noticed, were all that were procured by our navigators after entering Hudson's Straits. The *procellaria puffinus*, (Shearwater or Cape-hens,) *p. glacialis*, (fulmar petrels,) and *uria alle*, (little awks or rotges,) were observed before, and for some time after, passing Cape Farewell in Greenland, but not having been seen on the coast of America, it was judged advisable to omit them in this list.

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No. IV.

BOTANICAL APPENDIX,

BY

PROFESSOR HOOKER.

THE task of preparing a Catalogue of the Plants collected during Captain Parry's second Voyage for the discovery of a North-West Passage from the Atlantic into the Pacific Oceans, is rendered comparatively easy by the knowledge derived from the *Floras* of the neighbouring regions. These have been published by Mr. Brown, in Ross' Voyage, and in the first of Captain Parry's expeditions; by the same gentleman in an Enumeration of the Plants gathered in Spitzbergen by Mr. Scoresby; by Dr. Richardson in his Botanical Appendix to Captain Franklin's Journal; and by Mr. Greville in his list of the plants found by Mr. Jameson on the West Coast of Greenland: to which I may be permitted to add a small catalogue, which I drew up for Captain Scoresby, of the vegetable productions which he had collected on the East Coast of West Greenland, and which was published in his account of that voyage. The excellent Floras of Denmark, Norway, Lapland, and Siberia, likewise, contain many plants which are common to the arctic or subarctic parts of America.

When the extent of the present collection is considered, a greater accession of new species might perhaps have been anticipated than appears in its enumeration. Few of them can actually be termed novelties; although there are several which were discovered only for the first time during the former Voyage, or in Captain Franklin's researches in Arctic America. The situation of the countries which the expeditions embraced; Melville Island being to the North, and that portion of the continent of America bordering on the Arctic Sea to the South, of the regions last visited by Captain Parry, diminishes the probability of many new plants existing to reward the exertions of those who investigated the intermediate country.

In point of the number of its species, this collection very considerably exceeds that of either of the foregoing Voyages; a circumstance that may be attributed, partly to the more southern latitudes in which the plants were found, and partly to the length of time spent in those countries; so that, as a specimen of the Botanical productions of a region extending from between latitude 62° to 70° North, and longitude 65° to 88° West, I conceive that it may be considered tolerably complete. The variety of Cryptogamia is particularly great; and the whole are in that admirable state of preservation as to reflect the highest credit on the skill and patience of the gentlemen employed in the gathering and drying of them.

The principal herbarium, from which the following notes were made, was sent to me by Captain Parry, and a more beautiful set of specimens I never saw. While engaged in preparing my observations on them, Mr. Edwards allowed me the free use of his ample collection, in which I had the good fortune to find many species not in Captain Parry's herbarium; and that gentleman was further kind enough to permit me to inspect his Melville Island plants, which were of considerable advantage in enabling me to verify many of Mr. Brown's new species. Two other small collections, one made during the present, the other during the former of Captain Parry's Voyages, and which are deposited in the Hunterian Museum in the University of Glasgow, were also of some service.

To my excellent friend, Dr. Richardson, my warmest thanks are due; not only for the gift of a very full collection of plants made during his North American travels, which were of most essential use to me; but also for his kindness in affording me extracts from his notes on the vegetables found on the shores of the Arctic Sea, which were gathered at a distance not greater than three hundred miles from the most western point visited by Captain Parry. The plants, themselves, Dr. Richardson had the misfortune to lose.

The interesting botanical collections made by Captain Sabine on the East Coast of West Greenland, at Spitzbergen, and the North Cape, were put into my hands by his brother, Joseph Sabine, Esq., during the period that I was engaged in the present undertaking, with the view to my drawing up an account of them; and they have enabled me to make some observations on the geographical extent of certain plants, which, however, are more fully detailed in my catalogue of Captain Sabine's discoveries.

It may not be amiss to notice here the extreme difficulty which attends the determination of what ought, and what ought not, to be considered as good species among Arctic plants. Vegetables of our own more southern latitudes, often assume in those frigid regions an aspect quite different from what we are accustomed to see them wear; and which, without referring to a very extensive series of specimens, might well be supposed to afford decided marks of specific distinction. Mr. Brown seems to be fully aware of this, and he speaks with caution of the identity of several of his new species. In more than one instance, after having drawn out a description of a supposed new individual, I have found cause to alter my opinion concerning it, and finally to consider it only as a variety of a well known kind; nor shall I be surprised if future observations would shew that my *Saxifraga plantaginifolia* must be united to *S. nivalis*, and my *Chrysanthemum grandiflorum* to *C. inodorum*; though at first sight nothing can appear more distinct.

From Captain Parry's Herbarium, I have made, at that gentleman's request, an ample collection of specimens, which is deposited in the British Museum, and another which is placed in the Museum of the University of Edinburgh.

DICOTYLEDONES.

I. RANUNCULACEÆ.

1. Ranunculus.

1. Ranunculus *nivalis*. Br. in Parry's 1st Voyage. App. p. cclxiv. Linn. Fl. Lapp. ed. Sm. p. 195. t. 3. f. 2. Wahl. Lapp. p. 156. t. 8. f. 3. Hooker Icel. Tour. App. p. 327. Grev. Pl. W. C. of Greenl.* p. 430. Fl. Dan. t. 1699.

α. Foliis radicalibus reniformibus alte lobatis, lobo medio cuneato-obovato basi angustiore. *Br.*

R. *nivalis*. De Cand. Syst. Veg. v. 1. p. 273. (excl. cit. ad. Sw. in Act. Holm. p. 47. quæ R. pygmæus, et syn. Mertens Spitzb. ad var. β. pertinente; *fid. Br.*)

β. Foliis radicalibus basi cuneatis vix ad medium lobatis, lobo medio semiovato basi latiore, petalis obcordato-obovatis calyce hirsutissimo sesquilongioribus. Br. in Parry's 1st Voy. App. p. cclxiv. Wahl. Lapp. p. 157.

R. *sulphureus*. Soland. in Phipps's Voy. p. 202. (*fide Br.*) De Cand. Syst. Veg. v. 1.

* Catalogue of Plants collected by William Jameson, esq., surgeon, on the West Coast of Greenland, betwixt latitudes 70° and 71°, in 1818 and 1820, drawn up by R. K. Greville, esq.; published in the Memoirs of the Wernerian Society, v. iii. p. 426.

p. 274. "Br. Spitzb. pl. in Scoresby's Arctic Regions*. v. 1. App. p. 75." Richardson in Franklin's Journ. p. 742.

γ. Foliis radicalibus basi subcuneatis vel transversis alte lobatis, lobo medio cuneato-obovato basi angustiore. Br. in Parry's 1st Voy. App. cclxiv.

HAB. Igloolik. 1822 and 1823. Upper Savage Island. Duke of York's Bay. Five Hawser Bay. Repulse Bay. Barrow River.

The three above mentioned varieties, noticed by Mr. Brown, of this beautiful species of *Ranunculus*, are all to be found among the numerous specimens gathered during the present expedition; and so liable to variation are they in the form of their radical leaves, that on the same individual may be seen the two configurations which distinguish both β and γ. The variety α seems to be the rarest, and there is only one plant of it, which exactly accords with the Linnæan figure in the *Flora Lapponica*. Mr. Brown correctly defines the styles of the ovary as "*rectiusculi*." Willdenow describes the beaks or styles of the *pericarps* as straight, which they neither are in his figure nor in Captain Parry's specimens, but decidedly hooked.

The plant is a native of Siberia.

2. R. *hyperboreus*. "Rottb. Pl. Isl. in Act. Hafn. v. 10. p. 458. t. 4. f. 16. Fl. Dan. p. 331. Hook. Icel. Tour. v. 2. p. 327. Wahl. Fl. Lapp. p. 158. Br. in Parry's 1st Voy. p. cclxiv.

Found in small shallow lakes at the entrance of the strait of the Fury and Hecla, and in similar situations in the island of Igloolik. *Mr. Edwards*. No specimens, however, were gathered. It is found in Norway and Siberia.

3. R. *affinis*, foliis radicalibus pedatomultifidis petiolatis; caulinis subsessilibus digitatis; lobis omnium linearibus, caule erecto 1-2-floro cum calycibus ovariisque pubescentibus, fructibus oblongo-cylindraceis, acheniis rostro recurvo. *Br.*

R. *affinis*. B. in Parry's 1st Voy. App. p. cclxv.

There is only one specimen of this, and that exists in Mr. Edwards's collection. It comes, as Mr. Brown observes, very near to R. *auricomus*; and will, probably, prove to be only a slight variety of it.

Mr. Edwards informs me he found it growing on the margin of a small lake on an isle situated in about latitude 69°, at the entrance of the strait of the Fury and Hecla.

II. PAPAVERACEÆ.

2. PAPAVER.

4. Papaver *nudicaule*. Linn. Sp. Pl. p. 725. Fl. Dan. t. 41. (an excellent figure.) Hook. Iceland Tour. App. p. 326. Br. in Ross's Voyage. ed. 2. v. 2. p. 193. Br. Spitz. Pl. in Scoresby's Arctic Regions. (γ radicatum.) Grev. Pl. of W. C. of Greenl. p. 430. Richardson in Franklin's Journ. App. p. 740. Hook. in Scoresby's E. C. of West Greenl. p. 413. Br. in Parry's 1st Voyage, App. p. cclxv.

* This species did not exist in the collections of plants brought by Captain Scoresby, from the East Coast of Greenland. The individual, so named in the Appendix to the account of that voyage, p. 413, was, by mistake, written *nivalis*; it should have been *glacialis*: a species, I may observe, not found during Captain Ross' or either of Captain Parry's voyages, unless it be that noticed by Mr. Brown in the Botanical Appendix to the first of these, "*Ranunculus—sulphureus forte, vel glacialis; species e fragmentis non determinanda.*" Both R. *nivalis* and R. *glacialis* are plentiful in Captain Sabine's collections from the E. Coast of West Greenland.

HAB. Igloolik. 1822 and 1823. Ducket Cove. Repulse Bay.

The specimens of this plant are from seven to eight inches high, with their corolla, when fully expanded, nearly two inches in diameter, and of a bright sulphur colour: the calyx covered with brown rough hairs. My Greenland specimens, gathered by Wormskiold, differ in nothing from these, save in being smaller, with the leaves more compact and rather more hairy. They are, I presume, the P. *radicatum* of Rottb. the *nudicaule* γ. of De Candolle.

It is found in Siberia, in Dahuria, in Unalaschka, and on the coast of Labrador.

III. CRUCIFERÆ.

3. DRABA.

5. Draba *alpina*. Linn. Sp. Pl. p. 896. Fl. Dan. t. 56. Wahl. Lapp. p. 175. t. 11. f. 4. De Cand. Syst. Veget. v. 2. p. 338. "Br. Spitzb. Pl. in Scoresby's Arctic reg. v. 1. App. p. 75." Grev. Pl. of W. C. of Greenl. p. 431. Hook. in Scoresby's Pl. E. C. of W. Greenl. Richardson in Franklin's Journ. p. 744.

HAB. Igloolik. 1822 and 1823. Barrow River. Neerlo-Nakto.

The specimens of this plant scarcely agree with those in my herbarium, gathered in Lapland by Wahlenberg, the upper part of their scape and the pedicells being hairy *. The calyx also is more hairy than in the plants found by Wahlenberg. Individuals which were sent me from Norway by the late Professor Schmidt have the pedicells and calyx perfectly smooth, in this particular according with Dr. Richardson's plant, where the pedicells are scarcely at all hairy; and the calyx is entirely smooth. Here the germen is slightly pubescent.

In Europe this species has only been found in Norway and Lapland.

6. D. *pauciflora*. Br. in Parry's 1st Voyage. App. cclxvii.

HAB. Barrow River.

Differs from D. *alpina* in being smaller, in having a less number of flowers upon each scape, in the petals not being much more than half the size, and much narrower.

7. D. *micropetala*. (*nov. sp.*) scapis aphyllis pedicellisque pilosis, foliis lato-lanceolatis subvenosis integerrimis pilis furcatis simplicibusque, petalis (albis) anguste-spathulatis calycem pilosiusculum vix superantibus.

HAB. Igloolik.

I feel extremely unwilling to add unnecessarily to the number of species, in a genus which is already burthened with many whose characters depend upon very obscure marks. I cannot, however, refer the present individual to any described one, although in most respects, but its petals, it accords with either D. *alpina* or D. *pauciflora*.

In D. *micropetala*, however, the petals are narrower than in the latter named species, and are decidedly white. The heads of flowers are capitate or corymbose, and crowded, and the glabrous germen or ovary seems to advance to maturity, without the inflorescence being lengthened into a raceme. The leaves are, in some of the specimens, even larger than those of D. *alpina*, and are decidedly reticulated with veins.

8. D. *hirta*, scapis puberulis (vel glabris) nudis vel subdiphyllis, foliis radicalibus oblongis subintegris puberulis, silliculis oblongis pedicellisque glaberrimis vel pubescentibus.

Of this species the collection contains the undermentioned varieties (for I can consider them as nothing

* In Captain Sabine's collections from East Coast of W. Greenland, there are numerous specimens of D. *alpina*, some having the scape very pubescent, others nearly glabrous. The leaves also vary much in hairiness.

more), and, as far as I can judge, in plants, the investigation of which is attended with such extreme difficulty, the following synonyms may be attached to each.

Var. 1. 4-5-pollicaris, foliis lato-lanceolatis subdentatis, scapo plerumque mono-diphyllo superne, una cum pedicellos calycem siliculasque, glabro.

D. *hirta*. Linn. Sp. Pl. p. 897. Wahl. Lapp. var. α. inferalpina. p. 175. t. 11. f. 1. De Cand. Syst. Veget. v. 2. p. 343. Hook. in Scoresby's E. C. of West Greenl. p. 413. Richardson in Franklin's Journ. p. 744.

Hab. Igloolik. 1823.

This exactly corresponds with Dr. Richardson's plant, and tolerably so with Wahlenberg's figure. The D. *glabrella* of Richardson approaches very nearly to this plant.

Var. 2. 3-5-pollicaris, foliis lanceolatis subdentatis vel integris, scapo plerumque mono-diphyllo, una cum pedicellos calycem siliculamque, pubescente.

D. *stellata*. β. hebecarpa? De Cand. Sys. Veg. v. 2. p. 346.

D. *stellata*. α. De Cand. Syst. Veg. (nisi quod silic. glabr.)

D. *oblongata*. Br. in Ross' Voy. (absque descr.) De Cand*. Syst. Veg. v. 2. p. 342.

Hab. Igloolik and Barrow River.

In this state the leaves vary in the degrees of pubescence, and in being more or less entire at the margins.

Var. 3. 3-4-pollicaris, foliis lanceolatis subintegerrimis, scapo plerumque mono-diphyllo, una cum pedicellos calycem siliculamque, glaberrimo.

D. *lapponica*. De Cand. Syst. Veg. v. 2. p. 344. Br. in Parry's 1st Voy. p. cclxiii.

D. *androsacea*. Wahl. Lapp. p. 174. t. 11. f. 5. (excl. syn. omn.)

Hab. Igloolik. 1822.

My third variety agrees so well with the description, as well as the figure of Wahlenberg's D. *androsacea*, and with the D. *lapponica* of Mr. Brown, that I think I am correct in referring to those authors for it. To me it appears to hold an exactly intermediate rank between my first and my fourth varieties, approaching the former in the generally monophyllous scape, the latter in its smaller size, slenderer habit, and nearly entire leaves.

Var. 4. 1-3-pollicaris, foliis integerrimis, scapo gracili aphyllo.

D. *hirta*. Fl. Dan. t. 142. (excellent.) Jacq. Fl. Austr. t. 432†.

D. *nivalis*. De Cand. Syst. Veg. v. 2. p. 344.

D. *hirta*. Var. β. alpicola? Wahl. Lapp. Hook. Fl. Scot. P. 1. p. 197. Grev. Pl. of W. C. of Greenland. p. 431.

D. *rupestris*. Br. in Hort. Kew. ed. 2. v. 4. p. 91.

Hab. Igloolik. Barrow River. Duckett Cove. Repulse Bay. Winter Island. Neerlo-Nakto.

* D. *oblongata* is thus defined by the latter author; "scapis nudis pube floccosa subhirsutis, foliis cæspitosis oblongo-linearibus integris ciliatis velutinisque, siliculis elliptico-oblongis velutinis." Closely allied to this, according to Mr. Brown and De Candolle, is the D. *corymbosa*, *n. sp.?*" of Mr. Brown in Ross' voyage, "scapis nudis hispidulis, foliis dense cæspitosis oblongis basi attenuatis ciliatis subhispidisque, siliculis ellipticis corymbosis hispidulis." *De Cand.* This plant Mr. Brown speaks of, for it is not defined in Ross' voyage, as being extremely similar to D. *oblongata* and D. *rupestris*. Hort. Kew. ed. 2., and De Candolle says of it "*affinis D. oblongatæ et hirtæ.*"

† Tab. 432, of the *Flora Austriaca*, represents three varieties of this plant, the uppermost figure approaches nearest to my fourth variety. Indeed, so changeable in this species are the size, the pubescence and the form of its leaves, that it would be endless to notice all the slight differences to which it is subject.

Leaves very variable in hairiness, sometimes quite glabrous, sometimes slightly hairy, especially at the margins, with simple longish pubescence; at other times the hairs are intermixed with a dense stellated pubescence. The scape and pedicells are glabrous or hairy, the germens generally glabrous, occasionally slightly pubescent. I find the same states of this variety in Captain Sabine's E. Greenland plants.

Var. 5. pollicaris sesquipollicarisque, scapo vix foliis longiore, pedicellis siliculisque corymbosis glaberrimis.

Hab. Igloolik. Barrow River. Neerlo-Nakto. Aug. 1822.

Were this variety a little larger, and were its pedicells and fruit pubescent, I should have no hesitation in referring it to the D. *corymbosa* of Brown and De Candolle. Except in the shortness of its scapes and the dense and corymbose siliculæ, it does not differ from the preceding variety.

All the states of this plant have the stem divided at the setting on of the root (multiceps) into numerous short branches which are forked, the lower parts covered with the bases of former years' leaves. In these particulars the species differs from D. *incana*, which is either quite simple or sends out from the root, below the ground, several short runners, and has numerous leaves upon the stem.

9. D. *muricella*, scapo nudo velutino, foliis oblongis integris pube stellata cæsio-velutinis, siliculis oblongo-lanceolatis glabris. D. C.

D. *muricella*. Wahl. Fl. Lapp. p. 178. t. 11. f. 2. Decand. Syst. Veg. v. 2. p. 340. Br. in Ross' Voy. App. p. 193. Grev. Pl. of W. C. of Greenland. p. 431. Richardson in Franklin's Journ. p. 744.

Hab. South side of the Strait of the Fury and Hecla.

A species, as far as I can discover, differing in no respect from my 4th variety of *D. hirta*, but in being covered with short, dense, stellated pubescence; and in being destitute of simple hairs or marginal ciliæ, De Candolle has quoted the same figure in the Flora Danica, both for the *D. muricella* and his *D. nivalis* (my 4th variety of *D. hirta*.)

4. Cochlearia.

10. Cochlearia *fenestrata*. Br. in Ross' Voy. ed. 2. v. 2. p. 193. De Cand. Syst. Veg. v. 2. p. 367.

Hab. Igloolik. Fern Island. E. entrance of the Frozen strait. Neerlo-Nakto. Upper Savage island. Barrow River.

Most of the specimens are not sufficiently advanced to exhibit the fenestrate axis of the dissepiment of the pericarp: and it is thus scarcely possible to distinguish this plant from some of the states of *C. anglica*.

5. Braya.

11. Braya *arctica* (*nov. sp.*); foliis lineari-spathulatis carnosis integerrimis glabris, scapo aphyllo pubescente.

Hab. S. side of the Strait of the Fury and Hecla. Neerlo-Nakto.

Radix fusiformis inferne fibroso-ramosa, superne multicaulis. *Caules* perbreves, foliosi. *Folia* vix unciam longa, lineari-spathulata, obtusa, carnosa, integerrima, basi membranaceo-dilatata, alba, juniora viridia, adulta omnino glaberrima, vel pilis raris albis versus apicem instructa, subtus non raro purpurascentia. *Scapi* breves, vix foliis longiores, pilosi, pilis albis divaricatis simplicibus vel ramosis. *Pedicelli* bi-trilineares, succulenti, siccitate torulosi, pubescentia. *Calyx* erecto-patens, foliolis late ovatis, concavis, viridibus vel purpurascentibus, nunc glabris, nunc parce pilosis. *Petala* calyce duplo longiora, unguiculata, ungue purpurascente, lamina alba, vel purpurascente, dilatata. *Filamenta* edentula. *Germen* oblongo-cylindraceum, intense viride subpubescens. *Stylus* distinctus, brevis, cylindraceus, pallide viridis. Stigma capitatum bilobum.

Upon comparing the individuals, only two in number of this plant, which exist, though without fruit, in the present collection, with specimens of *B. alpina* which I had received from its discoverers, it appears that they evidently belong to the same genus. The form of the pistil is exactly similar, and the habit is the same. Indeed almost the only marks of specific difference which I can detect, are that the *B. alpina* is about thrice the size of the present individual, with leaves broader, less fleshy and distinctly toothed, and that the scape is leafy. The *B.? glabrella* of my friend Dr. Richardson, has its leaves linear, remotely toothed, is of a much longer and slenderer habit, with a scape frequently leafy and almost wholly glabrous.

This plant differs from the *Platypetalum purpurascens* of Mr. Brown, as far as I can judge from his elaborate description, principally in the different shape of its germen.

6. Eutrema.

12. Eutrema *Edwardsii*. Br. in Parry's 1st Voy. App. p. cclxvii. Tab. A.

Hab. Igloolik. Barrow River. Duke of York's Bay. Duckett Cove. Repulse Bay. Neerlo-Nakto.

These specimens are similar in every respect to those represented in Mr. Bauer's admirable figure, except in the particular of their being almost twice as large, and having some of their corymbs of flowers drooping, while others are erect. One of Mr. Edwards's specimens is a foot in height, but it is in fruit.

7. Parraya.

13. Parraya *arctica*. Br. in Parry's 1st Voy. App. p. cclxviii. Tab. B.

Hab. Duke of York's Bay. Repulse Bay.

This plant also, at least the flowering specimens, is twice the size of that represented by Mr. Bauer. The seed vessels, not fully ripe however, are all nearly erect, frequently torulose and attenuated at the base, so that the whole is club-shaped.

Dr. Richardson informs me that this is the same genus with Neuroloma of De Candolle (*Prodromus Syst. Nat. Regn. Veg.*) which he has adopted from *Andrz. MSS.* The character, however, given in the Prodromus, is considerably different from that of Mr. Brown. "*Calyx* erectus basi æqualis, sepalis margine membranaceis. *Petala* unguiculata; limbo obovato. *Stam.* libera edentula vix calyce longiora. *Siliquæ* lanceolatæ, sessiles, compressæ, valvis planis. *Funiculi umbilicales* superne septo adnati. *Semina* late marginata. *Cotyledones* accumbentes," *etc.*:—and he includes in it the *Hesperis arabidiflora* of his Systema (the *Arabis grandiflora*, Linn. Amæn. A. v. 2. t. L. f. 20), *Hesperis scapigera*, Syst. Veg. and *Arabis nudicaulis*, Syst. Veg.:—all natives of Siberia. Mr. Brown's character of *Parraya* is, "Siliqua lata linearis, valvis venosis. *Semina* biseriata, testæ *epidermide* laxo, corrugato. *Cotyledones* accumbentes. *Stigmata* approximata, basibus connatis in stylum (brevissimum) decurrentibus. *Filamenta* edentula."

8. Vesicaria.

14. Vesicaria *arctica*. Richardson in Franklin's Journ. p. 743.

Alyssum *arcticum*. Fl. Dan. t. 1520. De Cand. Syst. Veg. v. 2. p. 324.

Hab. Igloolik. Duke of York's Bay. Southampton Inlet.

9. Arabis.

15. Arabis *hispida*. Brown Hort. Kew. ed. 2. v. 4. p. 106. Hook. Icel. Tour. App. p. 329. Richardson in Franklin's Journ. App. p. 743.

Cardamine *hastulata*. Engl. Bot. t. 469.

C. *petrea*. Lightf. Scot. p. 347. t. 15. f. 2.

C. *petrea*. β. De Cand. Syst. Veg. v. 2. p. 229.

Hab. Igloolik.

10. Cardamine.

16. C. *pratensis*. Linn.

β. *angustifolia*, foliorum radicalium pinnis lanceolatis basi attenuatis subintegris.

Hab. Igloolik. Duke of York's Bay. Southampton Island.

Among the five specimens which exist of this plant, four out of that number have their radical leaves numerous, and all of them are distinguished by their lanceolate pinnæ, tapering at the base into a short footstalk: which last character is totally at variance with that of *C. pratensis*. In other respects the two plants are perfectly alike.—I may add, that Dr. Richardson's specimens of *C. pratensis*, from the northern parts of America, have their leaflets or pinnæ orbiculato-cordate, with a slender petiole inserted into the notch; whereas those I have from Iceland entirely resemble plants of my *var. angustifolia*.

17. C. *bellidifolia*. Linn. Sp. Pl. p. 913. Fl. Lapp. ed. Sm. p. 222. t. 9. f. 2. Sm. Fl. Brit. p. 697. E. Bot. t. 2355. Fl. Dan. t. 20. Wahl. Fl. Lapp. p. 179. Hook. Fl. Scot. P. 1. p. 199. Wahl. Helv. p. 126. Brown in Scoresby's Arctic Regions, v. i. App. p. 75. Hook. Iceland Tour. v. 2. App. p. 329. Brown in Parry's 1st Voy. App. p. cclxx.

Hab. Igloolik. *Mr. Edwards*.

A single specimen of this was gathered by Mr. Edwards at Igloolik. Three other individuals of the same plant are in that gentleman's collection from Melville Island.

IV. CARYOPHYLLEÆ.

11. Silene.

18. Silene *acaulis*. Linn. Sp. Pl. 709. Fl. Dan. t. 21. Smith Fl. Brit. p. 472. Hook. Icel. Tour. App. p. 324. Pursh Fl. N. Am. v. i. p. 316. Grev. Pl. of W. C. of Greenl. p. 429. Br. in Ross. Voy. ed. 2. v. 2. p. 192. Wahl. Lapp. p. 122. Hook. Fl. Scot. P. I. p. 135. Hook. in Scoresby's E. C. of W. Greenl. App. p. 411. Richardson in Franklin's Journ. App. p. 738.

Hab. Upper Savage Island. Duckett Cove. S. side of the Strait of the Fury and Hecla.

This plant is found on most of the European Alps, as well as on the mountains of North America.

12. Lychnis.

19. Lychnis *apetala*. Linn. Fl. Lapp. ed. Sm. p. 150. t. 12. f. 1. Fl. Dan. t. 305. Wahl Lapp. p. 135. t. 7. Gmel. Siber. v. 4. p. 157. Br. in Ross Voy. ed. 2. v. 2. p. 192. Richardson in Franklin's Journ. App. 738.

Hab. Igloolik. Duckett Cove. Neerlo-Nakto. Repulse Bay. Duke of York's Bay. Southampton Island.

A dwarf specimen of this is in Mr. Edwards's collection, having the whole flower of a white colour.

13. Spergula.

20. Spergula *saginoides*. Linn. Sp. Pl. p. 631. Sm. Fl. Brit. p. 504. Engl. Bot. t. 2105. Hook. Fl. Scot. P. 1. p. 145. Gmel. Sib. v. 4. t. 157. De Cand. Fl. Gall. p. 394. Wahl Fl. Lapp. p. 138. Fl. Dan. t. 1577. Hook. Icel. Tour. p. 325.

Two specimens of this plant are in Mr. Edwards's collection. I have received individuals from Professor Hornemann, which were gathered in Greenland. In the *Flora Danica*, too, it is stated to be an inhabitant of Norway.

14. Cerastium.

21. Cerastium *alpinum*. Linn. Sp. Pl. p. 628. Lightf. Scot. p. 242. t. 10. (Cerast. latif.) Smith Fl. Brit. p. 500. Engl. Bot. t. 472. Hook. Icel. Tour. App. p. 325. Wahl. Lapp. p. 136. Gmel. Siber. v. 4. p. 150. Hook Fl. Scot. P. 1. p. 144. Br. Spitzb. Pl. in Scoresby's Arct. Reg. v. 1. App. p. 75. Br. in Ross Voy. ed. 2. v. 2. p. 192. Hook. in Scoresby's E. C. of W. Greenl. p. 413 ?

β. C. *glabratum*, foliis sublanceolatis glabratis. Fl. Dan. t. 979.

C. *glabratum*. Hartmann.

Hab. Igloolik. Aug. 1822. Fern Island. Duckett Cove. Neerlo-Nakto. β. Duke of York's Bay.

15. Stellaria.

22. Stellaria *læta*. Richardson in Franklin's Journ. App. p. 738.

Hab. Duckett Cove. Igloolik.

The specimens of this plant coincide precisely with those which I have received through the kindness of Dr. Richardson.

It seems to hold a middle station between *S. glauca* and *S. nitida*.

23. Stellaria *Edwardsii*. Br. in Parry's 1st Voy. App. p. cclxxi. Richardson in Franklin's Journ. App. p. 738.

S. nitida. Hook. in Scoresby's E. C. of West Greenl. App. p. 411.

β caule foliisque glaberrimis. St. Edwardsii β. Br. in Parry's 1st Voy. loc. cit.

Hab. β. Igloolik. Barrow River. Neerlo-Nakto. Duke of York's Bay. Upper Savage Island. Winter Island 1822.

I find myself much at a loss to distinguish some individuals of this species from *S. læta* of Dr. Richardson. The relative length of the corolla and calyx appears to me to vary in different specimens; and the uppermost and younger leaves are often more attenuated and more thin and glaucous and less shining than the lower ones. All the specimens of this collection are glabrous, like the smaller of two under this name, which Dr. Richardson has given me, and thus according with the var. β. above quoted from Melville Island.

My learned and valued friend Mr. Brown has separated his *S. Edwardsii* from my *S. nitida*, upon the ground that I have described the "leaves" as "lanceolate, somewhat three-nerved when dry, the flowers subpaniculated, and anthers yellow;" whereas he has characterized the "leaves" as "ovato-lanceolate, nerveless, the peduncles one-flowered or trifid, and the anthers purple."

The form of a lanceolate leaf may be so easily understood to pass into the ovato-lanceolate, that no great stress should perhaps be laid on this character. Besides I find that in both Dr. Richardson's specimens and mine, there are some leaves linear-lanceolate, and, on the other hand, some ovato-lanceolate, and I have adopted the medium term. By the expression somewhat three-nerved, I meant to imply that, besides the central nerve, (which indeed is evident in Dr. Richardson's specimen as well as mine), there is, in the thickness of the leaf, a lateral linear impression, owing to its shrinking in drying, and which gives the appearance of three obscure nerves. If I have described the inflorescence as subpaniculated, I have also said that the flowers are sometimes "solitary;" and a "trifid peduncle," in this kind of inflorescence, will be found not to be far removed from a panicle. In Dr. Richardson's flowering specimens in my possession, the anthers are unquestionably of a deep purple colour; and upon looking again at the only specimen in flower which I received from Captain Scoresby, the anthers are of an orange yellow, at the back even approaching to purple. If however this character is of importance, then I fear some of the individuals in the present collection will have to be removed altogether from *S. nitida*, as the anthers are, in many instances, of a pale straw-colour.—Notwithstanding that the specific appellation, *nitida*, has the right of priority in it favour, I have great pleasure in adopting that of *Edwardsii*, in order that the name of a gentleman may be thereby commemorated, who has rendered most essential service to the Flora of the Arctic regions, and to myself, individually, in the preparation of the present Catalogue.

24. S. *humifusa*. "Rottb. in Act. Hafn. v. 10. p. 447. t. 4. f. 14. Retz. Prodr. Fl. Scand. n. 488." Fl. Dan. t. 978. Grev. Pl. of W. Greenl. p. 429.

S. crassifolia. β. Wahl. Lapp. p. 125.

HAB. Neerlo-Nakto.

It is singular that Wahlenberg should have confounded this species, which has very much indeed the habit of *Arenaria peploides*, with the *Stellaria crassifolia*, which is quite a different plant, as is likewise the *Arenaria humifusa* of the same author. I have, in my herbarium, specimens from Dr. Swartz, which were gathered at the river Varanska, near the North Cape, and others from Greenland, sent me by Professor Hornemann. Captain Sabine has brought it from the E. Coast of W. Greenland.

16. ARENARIA.

25. Arenaria *rubella*.

Alsine *rubella*. Wahl. Lapp. p. 128. t. 6*.

Arenaria *quadrivalvis*. Br. in Parry's 1st Voy. App. p. cclxxi.

HAB. Igloolik. Neerlo-Nakto. South side of the Strait of the Fury and Hecla.

As I can find no difference between the specimens of this plant in the collection, and individuals of *Alsine rubella* which I have received from Professor Hornemann, I have retained the specific name of Wahlenberg: indeed Mr. Brown seems to consider the two species may be the same. It is plentiful on the E. Coast of W. Greenland (Captain Sabine).

26. Arenaria *Rossii*. Br. in Parry's 1st Voy. App. p. cclxxii. Richardson in Franklin's Journ. App. p. 738.

HAB. Barrow River. Duckett Cove. Duke of York's Bay.

This species has the habit of A. *rubella*, but it is admirably distinguished by its blunt, nerveless, shorter leaves, which are like those of *Sagina maritima*.

The plant agrees better with Mr. Brown's description than with Dr. Richardson's specimens. Those differences are noticed by the first author, *loc. cit.*

26*. A. *Pumilio*, glaberrima cæspitosa, foliis lineari-subulatis obtusis carnosis enerviis flore longioribus margine ciliato, flore solitario subsessili, petalis oblongo-spathulatis calyces trinervios obtusissimos duplo longioribus.

A. *Pumilio*. Br. MSS.

A. *arctica*. "Stev. MSS.?" D. C. Prodr. v. 1. p. 404?

Habitus, speciminum nanorum *Silenis acaulis*. *Radix*, pro ratione plantulæ, longa, descendens, subfusiformis, vix fibrosa. *Caulis* plurimi ex eodem puncto, breves, unciales, cæspitosi, subdichotomi, foliosi. *Folia* opposita, basi dilatata, connata, densissime imbricata, caulem obtegentia, *inferiora* marcescentia, *superiora* viridia, nunc purpureo tincta, patentia, lineari-subulata, glabra, enervia, obtusissima, carnosa, supra planiuscula subtus semicylindrica, margine ciliato, ciliis brævibus albis subrecurvis. *Pedunculi* vix ulli. *Flores* solitarii terminalis, foliis subimmersi. *Calyx* 5-particus, viridi-flavescens, vel purpurascens, foliolis ovatis,

* Since this Appendix was written, the *Arenaria rubella* has been found upon the Breadalbane Mountains in Scotland, and a figure and description of it will appear in the next Number of the New Series of *Flora Londinensis*.

concavis, trinerviis, obtusissimis, carnosiusculis, marginibus submembranaceis, albis. *Petala* 5, subunguiculata, angusta, oblongo-spathulata, calyce duplo longiora, alba. *Stamina* 10. *Filamenta* subulata, alba, germine paulo longiora. *Antheræ* rotundatæ, flavæ. *Germen* ovatum, sessile, calyce brevius. *Stigmata* 3, filiformia, breviuscula, pubescentia, alba.

HAB. One of the Islands in the Strait of the Fury and Hecla, *Lieutenant James Ross.*

For the opportunity of adding this interesting plant to the list, I am indebted to the kindness of my friend, R. Brown, Esq., who sent me a specimen for inspection, marked *A. Pumilio* of his MSS. It will rank near *A. Rossii*, but is abundantly different in habit, as well as in essential characters, and approaches still nearer to the *A. artica* of De Candolle, according to his character in the *Prodromus.* "Parvula cæspitosa foliis linearibus obtusis caulibus unifloris, pedunculis piloso-glandulosis, sepalis oblongis obtusis vix nervosis, petalis obovatis calyce duplo longioribus:" an inhabitant of the shores of the Icy Sea in Siberia, and which, that Author further remarks, has the habit of *Silene acaulis.* Had the ciliæ upon its leaves been described, I should hardly have entertained a doubt of their being the same; and these, it must be confessed, are minute, and only visible under the microscope.

27. Arenaria *propinqua,* cæspitosa glanduloso-pilosa, foliis lineari-subulatis acutis trinerviis, calyce acuto trinervi petalis vix longiori capsula breviori. Rich.

A. *propinqua.* Richardson in Franklin's Journal. App. p. 738.

A few specimens, and only in Mr. Edwards's collection. It perfectly accords with Dr. Richardson's description and specimens, which were gathered on the Barren Grounds between Point Lake and the Arctic Sea.

V. SAXIFRAGEÆ.

17. SAXIFRAGA.

28. Saxifraga *oppositifolia.* Linn. Sp. Pl. p. 515. Smith Fl. Brit. p. 450. Engl. Bot. t. 19. Fl. Dant. t. 34. Hook. Icel. Tour. App. p. 323. Br. in Ross's Voy. ed. 2. v. 2. p. 192. Br. Spitzb. Pl. in Scoresby's Arctic Reg. v. 1. App. p. 75. Pursh. Fl. N. Amer. v. 1. p. 316. Grev. Pl. of W. Greenl. p. 428. Hook. Fl. Scot. P. I. p. 129. Hook. in Scoresby's Pl. of E. C. of W. Greenl. p. 411. Br. in Parry's 1st Voy. App. p. cclxxiii. Don. in Linn. Soc. Trans. p. 400. Richardson in Franklin's Journ. App. p. 737.

HAB. Igloolik. 1822. Repulse Bay. Winter Island. Upper Savage Island. Hudson's Strait.

In Mr. Edwards's collection are some specimens of this with a pure white flower, such as are found occasionally in the Highlands of Scotland.

29. S. *Hirculus.* Linn. Sp. Pl. p. 576. Richardson in Franklin's Journal. App. p. 737.

β. petalis obovatis, ungue nudo, caule unifloro. Br. in Parry's 1st Voyage. App. p. cclxxiii.

S. *propinqua.* Br. in Ross's Voyage. ed. 2. v. 2. p. 192.

Hirculus propinquus. Haw. Sax. Enum. p. 41.

HAB. β. Igloolik. 1822 and 1823. Neerlo-Nakto. Duke of York's Bay. Southampton Island.—Island, 1822. Barrow River.

In all the specimens the stem is single-flowered, and the claw of the petal is naked; but the petal of many can scarcely be called obovate. They accord with Dr. Richardson's plants and others gathered in England. It abounds on the E. Coast of W. Greenland*.

* It is worthy of remark, that the curious S. *flagellaris,* so common in Melville Island and on the E. Coast of W. Greenland, and found likewise on the N. W Coast of America, should not have been met with in this voyage, nor by Dr. Richardson.

30. S. *aizoides*. Linn. Sp. Pl. p. 576. Fl. Dan. t. 72. (S. *autumnalis*). Smith Fl. Brit. p. 452. Eng. Bot. t. 39. Wahl. Lapp. p. 115. Hook. Icel. Tour. App. p. 323. Fl. Scot. P. I. p. 129. Pursh Fl. N. Am. v. 2. p. 312. Richardson in Franklin's Journ. App. p. 737.

Hab. Igloolik. 1823.

31. S. *tricuspidata*. "Röttb. in Act. Hafn. v. 10. p. 446. t. 6. n. 21." Fl. Dan. t. 976. Sternb. Saxifr. p. 54. Pursh Fl. N. Am. v. 1. p. 312. Br. in Ross' Voy. ed. 2. v. 2. p. 192. Hook. Icel. Tour. App. p. 323. Br. in Parry's 1st Voy. App. p. cclxxiv. Richardson in Franklin's Journ. App. p. 737.

Hab. Igloolik. 1822. Duke of York's Bay. Southampton Island. South side of the strait of the Fury and Hecla. Repulse Bay.

32. S. *rivularis*. Linn. Sp. Pl. p. 577. Fl. Dan. t. 118. Smith Fl. Brit. p. 454. Eng. Bot. t. 2275. Wahl. Lapp. p. 117. Gmel. Siber. v. 4. p. 170. Hook. Fl. Scot. P. I. p. 130. Icel. Tour, App. p. 323.

S. *hyperborea*? Br. in Parry's 1st Voy. App. p. cclxxiv.

Hab. Igloolik. 1822 and 1823. Eastern entrance of the Frozen Strait. Upper Savage Island. Duckett Cove. S. side of the strait of the Fury and Hecla.

The various specimens perfectly accord with my individuals of *rivularis* from Scotland and Norway, and what I have seen of the Melville Island plants, which I presume to be S. *hyperborea*, appear to be not different.

33. S. *cæspitosa*, Linn. Sp. Pl. p. 578. Hook. Fl. Scot. P. I. p. 131.

Var. Surculis nullis, foliis plerumque trifidis subciliatis, caule uni-trifloro, calyce nigro-pubescente glanduloso.

S. *uniflora*? Br. in Parry's 1st Voy. App. p. cclxxiv.

Hab. Igloolik. 1822 and 1823. Five Hawser Bay. Neerlo-Nakto Bay. Barrow River. Fern Island.

Gunner's figure of S. *cæspitosa*, t. 7. f. 4, is an excellent representation of this plant, as far as regards the inflorescence; but the leaves are more frequently quinquefid than trifid. This state of the plant is exactly similar to what Captain Sabine has brought from the E. Coast of W. Greenland.

The more common varieties of this plant are to be found upon most of the northern mountains of Europe.

34. S. *foliolosa*, foliis radicalibus cuneatis subdentatis, (scapis divisis) ramis apice unifloris infra tectis foliolis nanis fasciculatis, calycibus inferis obovatis, petalorum laminis cordato-lanceolatis. Br.

S. *foliolosa*. Br. in Parry's 1st Voy. App. p. cclxxv.

S. *stellaris*. γ. Linn. Lapp. ed. Sm. p. 144. t. 2. f. 3.

S. *stellaris*. β. comosa. Willd. Sp. Pl. v. 2. p. 644.

Three specimens only of this plant exist in Mr. Edwards's collection; and I have no hesitation in referring them, as that gentleman had already done, to Mr. Brown's S. *foliolosa*. The scape indeed is not divided; nor is there a single perfect flower upon the spike; nothing but tufts of small ovate thick succulent reddish green leaflets; bearing, as it appears to me, the same relationship with S. *stellaris* that my variety, noticed below, of S. *nivalis* does to that species. These leaflets are probably a kind of gemmæ which, on falling off, become new plants. This is found on the E. Coast of West Greenland, as well as in Spitzbergen, by Captain Sabine.

S. *nivalis*. Linn. Sp. Pl. p. 573. Fl. Dan. t. 28. Smith Fl. Brit. p. 449. Engl. Bot.

t. 440. Wahl. Lapp. p. 113. Hook. Icel. Tour. App. p. 323. Fl. Scot. P. I. p. 129. Hook. in Scoresby's E. C. of W. Greenl. App. p. 411. Pursh. Fl. N. Am. v. 1. p. 310. Br. in Parry's 1st Voy. App. p. cclxxv.

Hab. Igloolik. 1822 and 1823. Barrow River. South side of the strait of the Fury and Hecla. Repulse Bay. Duckett Cove. Neerlo-Nakto.

One of the individuals of this species, from Duckett Cove, has the scape branched at the top, and, instead of flowers, it bears clusters of small leaflets, exactly similar to those of S. *foliolosa*.

36. S. *plantaginifolia;* (nov. sp.) pubescens, foliis elliptico-rhomboideis nervosis grosse dentatis in petiolum decurrentibus, scapo nudo, panicula interrupte spicata foliacea, petalis ligulatis calyce brevioribus.

Hab. Igloolik. 1823. Neerlo-Nakto.

Radix crassa, fibrosa. *Caulis* nullus. *Folia* pauca, in orbem disposita bi-triuncialia, elliptico-rhomboidea, viridia vel ad marginem purpurascentia, pubescentia, ad marginem præcipue, superne grosse serrato-dentatis, inferne integerrimis in petiolum decurrentibus, petiolo pubescente ciliato. *Scapus* uncialis ad spithamæam, nudus, teres, pubescens. *Panicula* in spicam oblongam interruptam, bracteatam. *Bracteæ* oblongæ, foliaceæ, dentatæ, superiores minores, purpureæ. *Pedicelli* perbreves, fere nulli. *Calyx* atro-sanguineus, semi-inferus, quinquefidus, segmentis patentibus, obtusiusculis. *Petala* parva, ligulata, purpurea, uninervia, segmentis calycinis breviora. *Stamina* decem. *Antheræ* intense croceæ. *Capsula* semisupera, birostrata.

A species in appearance more nearly allied to S. *pennsylvanica* than to the common state of S. *nivalis*, especially resembling the former in its leaves, which have their central rib very conspicuous, and are also furnished with two lateral nerves, which are more or less evident. A striking character of this plant may be found in its generally interrupted leafy spike, which is almost entirely of a deep purple colour, and which is, as it were, speckled, with the orange-red coloured anthers.

37. S. *cernua*. Linn. Sp. Pl. p. 577. Fl. Dan. t. 390. Smith Fl. Brit. p. 453. Engl. Bot. t. 664. Gmel. Siber. v. 4. p. 163. Wahl. Lapp. p. 116. Hook. Icel. Tour. App. p. 323. Fl. Scot. P. I. p. 130. Br. in Ross' Voy. ed. 2. v. 2. App. p. 192. Br. Spitz. Pl. in Scoresby's Arctic Reg. v. 1. App. p. 75. Grev. Pl. of W. Greenl. p. 428. Hook. in Scoresby's E. C. of W. Greenland. App. p. 411. Br. in Parry's 1st Voy. App. p. cclxxv. Richardson in Franklin's Journ. App. p. 737.

Hab. Igloolik. 1822 and 1823. Fern Island. Duckett Cove. Five Hawser Bay.

18. Chrysosplenium.

38. Chrysosplenium *alternifolium*. Linn. Sp. Pl. p. 569. Fl. Dan. t. 366. Smith Fl. Brit. p. 447. Eng. Bot. t. 54. Gmel. Siber. v. 3. p. 29. Wahl. Lapp. p. 111. Hook. Fl. Scot. P. I. p. 128. Br. in Parry's 1st Voy. App. p. cclxxv. Richardson in Franklin's Journ. App. p. 737.

Hab. Igloolik. 1823.

VI. ROSACEÆ.

19. Dryas.

39. Dryas *integrifolia*. "Vahl. in Act. Hafn. v. 4. P. II. p. 172." Fl. Dan. t. 1216. Br. in Ross' Voy. ed. 2. v. 2. p. 193. Br. in Parry's 1st Voy. App. p. cclxxvi. Richardson in Franklin's Journ. App. p. 740. Goldie, Pl. of Canad. in Edin. Phil. Journ. v. 6. p. 328.

D. *tenella*. Pursh. Fl. N. Am. v. 1. p. 350.

Hab. Igloolik. 1822 and 1823. Barrow River. Duke of York's Bay. Repulse Bay. South side of the Strait of the Fury and Hecla. Duckett Cove. Neerlo-Nakto.

This elegant little plant has been found as far south as the White Hills of N. Hampshire, N. America. I fear, however, that it is not sufficiently distinct from *D. octopetala*.

20. Potentilla.

40. Potentilla *pulchella*. Br. in Ross' Voy. App. p. cclxxvii.

P. *sericea?* Grev. in Pl. of W. Greenl. p. 430.

Hab. Igloolik. 1822 and 1823.

Flowers small; petals scarcely longer than the calyx, of a pale and dingy yellow colour.

41. P. *nivea*. Linn. Sp. Pl. p. 715. Fl. Dan. t. 1035. Wahl. Lapp. p. 146. Gmel. Siber. v. 3. p. 183. t. 36. f. 1. Nestl. Potent. p. 73. Lehmann Potent. p. 184. Pursh. Fl. C. N. Am. v. 1. p. 353. Richardson in Franklin's Journ. App. p. 740.

α. foliis super villosiusculis viridibus subter niveo-tomentosis. *Br.*

β. foliis utrinque villosiusculis paginis concoloribus. *Br.*

P. *nivea*. β. Wahl. Lapp. p. 147.

P. *grœnlandica*. Br. in Ross' Voy. ed. 2. v. 2. p. 193.

P. *frigida?* Grev. Pl. of W. Greenl. p. 430. (*fide Br.*)

P. *Jamesoniana?* Grev. loc. cit.

P. *hirsuta*. (Vahl mss.) Fl. Dan. t. 1390.

P. *vahliana*. Lehm. Potent. p. 172.

P. *verna*. Hook. in Scoresby's E. C. of W. Greenl. App. p. 413. (*fide Br.**)

Hab. α. Repulse Bay. Barrow River. South shore of the strait of the Fury and Hecla.

β. Repulse Bay. Winter Island. Five Hawser Bay. South side of the strait of the Fury and Hecla.

Flowers large, handsome, deep yellow. Plentiful on the E. Coast of W. Greenland. (Captain Sabine.)

VII. LEGUMINOSÆ.

21. Astragalus.

42. Astragalus *alpinus*. Linn. Sp. Pl. p. 1070. Fl. Lapp. p. 218. t. 9. f. 1. Fl. Dan. t. 51. Gmel. Siber. v. 4. p. 45. Wahl. Lapp. p. 190. t. 12. f. 5. (fruit.) Wahl. Fl. Helv. p. 131. Wahl. Fl. Carpat. p. 228. Pursh Fl. N. Am. v. 2. p. 472.

* Unfortunately, I possess no specimens to verify the observation of Mr. Brown, that the *P. verna* of my account of Scoresby's plants is the same as *P. nivea*. I certainly ought to have known *P. verna*, and to have been able to have distinguished *P. nivea* from it.

Phaca *astragalina*. De Cand. Astrag. p. 52. Richardson in Franklin's Journ. App. p. 745.

A single specimen in Mr. Edwards's collection.

22. Oxytropis.

43. Oxytropis *campestris*. De Cand. Astrag. p. 74. Richardson in Franklin's Journal, App. p. 745.

Astragalus *campestris*. Linn. Sp. Pl. p. 1072. Smith Engl. Bot. t. 2532. Hook. Fl. Scot. P. I. p. 216.

A. *uralensis*. Fl. Dan. t. 1041?

Hab. Repulse Bay. Duke of York's Bay. South shore of the Strait of the Fury and Hecla.

In most of the specimens the calyx is clothed with shaggy black hairs, and the teeth are black.

44. Oxytropis *uralensis*. De Cand. Astrag. p. 69. Richardson in Franklin's Journal. App. p. 746.

Astragalus *uralensis*. Linn. Sp. Pl. p. 1071. Smith Fl. Brit. p. 780. Eng. Bot. t. 466. Hook. Fl. Scot. P. I. p. 216.

Hab. Repulse Bay.

45. Oxytropis *arctica*. Subacaulis sericea, stipulis petiolaribus, foliolis oppositis alternisque ovali-oblongis, capitulo subumbellato paucifloro, leguminibus erectis oblongis acuminatis calycibusque nigro-pubescentibus. Br.

α. *subumbellata*, major, floribus plerumque quaternis.

O. *arctica*. Br. in Parry's 1st Voy. App. p. cclxxviii.

β. *uniflora*, minor, floribus plerumque solitariis.

Hab. α. β. Barrow River.

Two specimens in Mr. Edwards's collection, both in fruit, of *var.* α.

This variety (β.) is noticed by Mr. Brown at the end of his valuable *Remarks on the Flora of Melville Island*, as discovered by the gentlemen of the present expedition; and he says of it, "Varietas notabilis, vix enim distincta videtur species, statura minore, scapo sæpe unifloro passimque umbella biflora, dentibus calycis respectu tubi paulo longioribus, foliolis sæpe 7, quandoque 9, villis persistentibus utrinque argenteo-sericeis." Br. in Parry's 1st Voy. App. p. cccix. To these remarks I may add, that the plants are not above half the size of α, the stems less woolly, the leaflets fewer, denser, and covered with short, very white, silky hairs. The peduncle scarcely rises above the leaves, and rarely bears more than one flower, occasionally two; and each subtended by a small bractea. The corolla is of a most beautiful deep purplish blue: the calyx and legume black, from the quantity of black hairs; but these are mixed with several longer white ones. The contrast between the deep blue of the corolla and the dense, white, and silvery leaves renders this a most lovely little plant.

VIII. ONAGRARIÆ.

23. Epilobium.

46. Epilobium *latifolium*. Linn. Sp. Pl. p. 494. Gmel. Siber. v. 3. p. 164. Oed. Fl. Dan. t. 565. Pursh Fl. N. Am. v. 1. p. 259. Richardson in Franklin's Journ. App. p. 736. Hook. in Scoresby's Pl. of the E. C. of W. Greenl. App. p. 410.

Chamænerium *halamifolium*. Salisb. Hook. in Icel. Tour. App. p. 320.

Hab. Lyon-inlet. 9th September, *in fruit*. Duckett Cove. Five Hawser Bay.

IX. COMPOSITÆ.

24. Leontodon.

47. Leontodon *palustre*. Smith Fl. Brit. p. 823. Engl. Bot. t. 553. Fl. Dan. t. 1708. Richardson in Franklin's Journal. App. p. 746. Br. in Parry's 1st Voy. App. p. cclxxviii. Hook. Fl. Scot. P. I. p. 227.

L. *lividus*. Waldstein and Kitaibel Pl. Rar. Hungar. v. 2. t. 115.

L. *Taraxacum?* Br. in Ross' Voy. ed. 2. v. 2. p. 194.

Hab. Duckett Cove.

25. Crepis.

48. Crepis *nana*, glaberrima, foliis ovatis integerrimis, pappo sessili. Richardson in Franklin's Journ. App. p. 746. (App. Tab. I.)

Hab. Repulse Bay. Five Hawser Bay. Lyon Inlet.

There are but few specimens of this singular plant, of which an excellent description is given by Dr. Richardson, in the page above quoted. The only station assigned for it by that gentleman is the Copper-mine River.

26. Cineraria.

49. Cineraria *congesta*, capitulo lanato, foliis lineari-lingulatis undulatis, caule simplicissimo. Br. in Parry's 1st Voy. App. p. cclxxix.

Hab. Igloolik. 1822, 1823. Neerlo-Nakto.

This plant varies from three to seven inches in height. The leaves are sometimes merely undulated; at other times furnished with long, spreading, sharp, unequal, tooth-like processes. Generally the flowers are collected into a remarkably compact head; but in two of the specimens several of its flower-stalks spring singly from the axils of the leaves up the whole length of the stem; they are mostly single-flowered in that case, bracteated, and leafy; but always clothed, as well as the involucre, with a beautiful long and dense silky wool, by which character this species appears to be principally distinguished from C. *palustris*. Whether or not this be really a species, specimens exactly according with the individuals in this collection were gathered by Dr. Richardson in Bathurst Inlet, on the shore of the Arctic Sea, on the 25th July *.

27. Antennaria.

50. Antennaria *alpina*. Br. in Linn. Trans. v. 12. p. 123. Br. in Parry's 1st Voy. App. p. cclxxx.

Gnaphalium *alpinum*. Linn. Sp. Pl. p. 1199. Fl. Dan. t. 1512. Richardson in Franklin's Journ. p. 743. Wahl. Fl. Lapp. p. 202. Grev. Pl. of W. Greenl. p. 431. Hook. in Scoresby's Journ. of E. C. of W. Greenl. App. p. 413. Hook. Icel. Tour, App. p. 331. Pursh Fl. N. Am. v. 2. p. 520.

* Mr. Edwards is of opinion that those specimens of this plant, in Captain Parry's collection, which have elongated flower-stalks, were drawn out by having been made to grow on board ship; at least he has seen such treatment produce this effect. He observes, too, that he never saw the plant, in its native place of growth, otherwise than remarkably dense and crowded in its inflorescence.

HAB. Duckett Cove. South shore of the Strait of the Fury and Hecla.

These specimens, like those which were brought from Melville Island, are all female plants.

28. ERIGERON.

51. Erigeron *uniflorum.* Linn. Sp. Pl. p. 1211. Fl. Lapp. ed. Sm. p. 250. t. 9. f. 3. Smith Eng. Bot. t. 2416? Fl. Dan. t. 1397. Wahl. Fl. Lapp. p. 207. Hook. in Scoresby's E. C. of W. Greenl. App. p. 413. Richardson in Franklin's Journ. App. p. 747.

HAB. Five Hawser Bay. Lyon Inlet. Repulse Bay.

29. CHRYSANTHEMUM.

52. Chrysanthemum *integrifolium,* pilosum, foliis linearibus integerrimis, caule subaphyllo unifloro. Richardson in Franklin's Journ. App. p. 749.

HAB. Duke of York's Bay. Five Hawser Bay.

53. C. *grandiflorum* (*nov. sp.*), foliis (omnibus) bipinnatifidis, laciniis linearibus acutis, caule unifloro.

HAB. Repulse Bay. Fern Bay. Neerlo-Nakto.

Radix perennis, lignosa, subfusiformis, fibrosa. *Caulis* digitalis ad palmarem, simplex, basi plerumque decumbens, dein erectus, glaber, foliosus. *Folia* biuncialia et ultra, pinnatifida, glabra, segmentis iterum pinnatifidis, laciniis paucis, omnibus linearibus acutis. *Flos* terminalis, sesquiunciam latus. *Involucrum* plano-hemisphæricum e squamis numerosis imbricatis, viridibus, margine lato, scarioso, nigro. *Corollæ radii* albæ, ligulatæ, apice tridentatæ, disci planæ, luteæ, tubulosæ.

Evidently allied to the *Pyrethrum Halleri* and *alpinum* of Willdenow (*Chrysanthemum auct.*), but differing from them in its more numerous leaves, and in having all the foliage, that of the stem as well as of the root, equally cut into numerous bipinnatifid, linear and acute segments, and also in the great size of the flower as considered in proportion to that of the plant. In one specimen, there appear to be one or two abortive flowers in the axils of the leaves, besides the terminal perfect inflorescence. From the *Chrysanthemum* (or Pyrethrum) *inodorum* it is distinguished by its diminutive stature, simple stem, with the much narrower, more regularly pinnatifid leaves, and the broad black scariose margin to the scales of the involucre.

X. CAMPANULACEÆ.

30. CAMPANULA.

54. Campanula *uniflora.* Linn. Sp. Pl. p. 231. Fl. Lapp. ed. Sm. t. 9. f. 5, 6. Wahl. Lapp. t. 3. Fl. Dan. t. 1512. Svensk. Bot. t. 526. Richardson in Franklin's Journ. App. p. 733. Br. in Parry's 1st Voy. App. p. cclxxx.

HAB. Five Hawser Bay.

Found on the E. Coast of W. Greenland by Captain Sabine.

XI. MONOTROPEÆ.

31. PYROLA.

55. Pyrola *rotundifolia.* Linn. Sp. Pl. p. 567. Smith Fl. Brit. p. 444. Engl. Bot. t. 213. Fl. Dan. t. 110. Hook. Fl. Scot. P. I, p. 127. Wahl. Lapp. p. 110. Gmel. Siber. v. 4.

p. 128. Br. in Ross' Voy. ed. 2. v. 2. p. 192. Hook. Icel. Tour, App. p. 322. Richardson in Franklin's Journ. App. p. 737. Pursh. Fl. N. Am. v. 1. p. 299. Goldie, Pl. of Canad. in Edin. Phil. Journ. v. 6. p. 326.

HAB. Five Hawser Bay.

56. P. *chlorantha*. Swartz Act. Holm. 1810. p. 190. t. 5. Svensk Bot. t. 453. Nutt. Gen. of N. Am. Pl. v. 1. p. 273.

HAB. Duckett Cove.

As far as the form of the style is concerned, both of the above species, if they may be called distinct, come between the P. *rotundifolia* and P. *media* of our country.

XII. VACCINEÆ. D.C.

32. VACCINIUM.

57. Vaccinium *uliginosum*. Linn. Sp. Pl. p. 499. Smith Fl. Brit. p. 415. Engl. Bot. t. 581. Fl. Dan. t. 231. Hook. Fl. Scot. P. I. p. 118. Wahl. Lapp. p. 96. Grev. Pl. of W. Greenl. p. 428. Hook. Icel. Tour, App. p. 321. Richardson in Franklin's Journ. App. *MSS.* Pursh Fl. N. Am. v. 1. p. 288.

V. *pubescens*. Fl. Dan. t. 1516. Hook. in Scoresby's E. C. of W. Greenl. App. p. 410.

HAB. Five Hawser Bay. Repulse Bay. South side of the strait of the Fury and Hecla.

XIII. ERICINEÆ.

33. RHODODENDRON.

58. Rhododendron *lapponicum*. Wahl. Fl. Lapp. p. 104. Grev Pl. of W. Greenl. p. 427. Richardson in Franklin's Journ. App. p. 737.

Azalea *lapponica*. Linn. Sp. Pl. p. 214. Fl. Lapp. t. 6. f. 1. Pall. Ross. p. 52. t. 7. f. 1. A. B. Fl. Dan. t. 966.

HAB. Five Hawser Bay. Lyon Inlet.

Found, by Mr. Boott, on the summit of White Mountains, N. America.

34. LEDUM.

59. Ledum *palustre*. Linn. Sp. Pl. p. 561. Fl. Dan. t. 1031. Pursh Fl. N. Am. v. 1. p. 300. Richardson in Franklin's Journ. App. p. 737.

HAB. Five Hawser Bay. Duckett Cove.

According to Dr. Richardson, this plant is noticed in Hearne's expedition, under the name of Wishia-Kapucca, and is found to be a better substitute for tea than L. *latifolium*.

35. AZALEA.

60. Azalea *procumbens*. Linn. Sp. Pl. p. 215. Smith Fl. Brit. p. 231. Engl. Bot. t. 865. Gmel. Siber. v. 4. p. 136. Hook. Icel. Tour. App. p. 317. Wahl. Lap. p. 62.

Fl. Dan. t. 9. Hook. Fl. Scot. P. I. p. 73. Pursh Fl. N. Am. v. 1. p. 154. Richardson in Franklin's Journ. App. p. 733.

HAB. Upper Savage Island.

It has been found on the N. W. Coast of America by Mr. Menzies, and on the summit of the White Mountains by Mr. Boott.

36. ARBUTUS.

61. Arbutus *alpina*. Linn. Sp. Pl. p. 566. Smith Fl. Brit. p. 442. Fl. Dan. t. 73. Eng. Bot. t. 2030. Lightf. Scot. v. 1. p. 215. t. 11. f. *a*. *b*. Hook. Fl. Scot. P. I. p. 126. Iceland Tour, App. p. 322. Pall. Siber. v. 3. p. 24, 27, 33. Pursh Fl. N. Am. v. 1. p. 283. Wahl. Lapp. p. 109. Wahl. Helv. p. 75. Richardson in Franklin's Journ. App. p. 737.

HAB. Five Hawser Bay.

There is only one specimen of this plant in Captain Parry's collection, and it bears but a single fully-formed fruit. Another specimen is in Mr. Edwards's collection.

62. A. *Uva Ursi*. Linn. Sp. p. 566. Lightf. Scot. p. 216. t. 11. Linn. Fl. Lapp. ed. Sm. v. 2. p. 129. t. 6. f. 3. Sm. Fl. Brit. p. 443. Eng. Bot. t. 714. Hook. Fl. Scot. P. I p. 126. Wahl. Lapp. p. 109. Hook. Icel. Tour, v. II. App. p. 322. Wahl. Helv. p. 75. Wahl. Carpat. p. 115. Richardson in Franklin's Journ. App. p. 737.

One specimen in Mr. Edwards's collection. The N. American Indians are accustomed to smoke this plant; and because it is carried in the smoking-bags of the trading clerks, Dr. Richardson tells us it has got the name of *sac à Commis*. In Lapland, the leaves are used for tanning and dyeing, as they are in Iceland: and Linnæus, in his interesting *Lachesis Lapponica*, says, that many barrels of them were annually sent for sale to Stockholm.

37. ANDROMEDA.

63. Andromeda *tetragona*. Linn. Sp. Pl. p. 563. Fl. Lapp. ed. Sm. p. 135. t. 1. f. 4. Fl. Dan. t. 1030. "Pall. Ross. v. 2. p. 56. t. 73. f. 4. (haud in Sibiria." Wahl.) Wahl. Lapp. p. 107. Pursh Fl. N. Am. v. 1. p. 290. "Brown Spitz. Pl. in Scoresby's Arctic Reg. v. 1. App. p. 75." Br. in Ross' Voy. ed. 2. v. 2. App. p. 192. Grev. in Pl. of W. Greenl. p. 428. Hook. in Scoresby's E. C. of W. Greenl. App. p. 410. Br. in Parry's 1st Voy. App. p. cclxxxi. Richardson in Franklin's Journ. App. p. 737.

HAB. Barrow River. Duke of York's Bay. Repulse Bay.

38. EMPETRUM.

64. Empetrum *nigrum*. Linn. Sp. Pl. p. 526. Sm. Fl. Brit. p. 1072. Eng. Bot. t. 526. Fl. Dan. t. 975. Lightf. Scot. p. 612. Pall. Siber. v. 3. p. 33 and 286. Wahl. Lapp. p. 274. Pursh Fl. N. Am. p. 93. Bieberst. Tauric. Caucas. v. 2. p. 415. Wahl. Carp. p. 320. Wahl. Helv. p. 186. Hook. Fl. Scot. P. I. p. 287. Br. in Ross' Voy. ed. 2. v. 2. p. 194. Hook. Icel. Tour, App. p. 335. Hook. in Scoresby's E. C. of W. Greenl. App. p. 413. Grev. in Pl. of W. Greenl. p. 432. Richardson in Franklin's Journ. App. p. 753.

HAB. Barrow River. Duckett Cove.

Wahlenberg observes that the berries of this plant are of a very diminutive size when produced upon the Swiss Alps. In Lapland, they attain a larger growth upon the mountains than in the woods, and are by no means despised by the Laplanders. Dr. Richardson assures us that in high northern latitudes this fruit, after the first frost, becomes very juicy and pleasant, and that it is hoarded up by the different species of Marmots, and forms the autumnal food of the *Anas hyperborea*. It is found on the summit of the White Mountains, N. America.

XIV. BORAGINEÆ.

39. Lithospermum.

65. Lithospermum *maritimum*. Lehm. Asperif. p. 291. Hook. Fl. Scot. Pl. I. p. 68.
Pulmonaria *maritima*. Linn. Sp. Pl. p. 195. Lightf. Fl. Scot. v. 1. p. 134. t. 7. Smith Fl. Brit. p. 218. Eng. Bot. t. 368. Hook. Icel. Tour, App. p. 316. Fl. Dan. t. 25. Gunner Fl. Norveg. p. 17. Wahl. Lapp. p. 57. Richardson in Franklin's Journ. App. p. 733.
P. *parviflora*. Pursh Fl. N. Am. v. 1. p. 131.

Hab. Eastern entrance of the Frozen Strait.

The specimens of this plant are very small; not exceeding three or four inches in length.

XV. SCROPHULARINÆ.

40. Pedicularis.

66. Pedicularis *flammea*. Linn. Sp. Pl. p. 846. Fl. Lapp. ed. Sm. p. 210. t. 4. f. 2. Fl. Dan. t. 30. Gmel. Siber. v. 3. p. 212. Hook. Icel. Tour, v. 2. App. p. 318. Pursh, Fl. N. Am. v. 2. p. 426. Grev. in Pl. of W. Greenl. p. 430. (excl. syn. Hall.) Richardson in Franklin's Voy. App. p. 742.

Hab. Five Hawser Bay.

"Corolla flavissima, galea sanguinea." *(Rich. MSS.)*

The Swiss P. *flammea* of De Candolle, Wahlenberg considers to be a distinct species.

67. Pedicularis *sudetica*. Willd. Sp. Pl. v. 3. p. 209? Richardson in Franklin's Journ. App. p. 742.

Hab. Duke of York's Bay.

"*Radix* fibrosa. *Caulis* plerumque solitarius, spithamæus et ultra, sæpe tortus, inferne glaberrimus. *Folia radicalia* circumscriptione lineari-lanceolata, acuta, profunde pinnatifida, elongato-petiolata, pinnis alternis oppositisve, lineari-lanceolatis, regulariter serratis, serraturis fuscis. *Folia caulina* interdum petiolata, interdum sessilia, juniora pubescentia. *Spica* pilis intricatis nitentibus obvoluta, bracteata. *Calyx* florens, sessilis, villosissimus, segmentis quinque linearibus, serratis, acutis. *Corolla* erecta, roseo-rubra: *fauce* aperta, subventricosa, purpureo-maculata; *tubo* calycem æquanti; *galea* columbino-rubra, obtusissima, brevissime rostrata, rostro deciso, leviter eroso, crenata et dentibus duobus subulatis deorsum directio munito; labio inferiori profundius trilobato, lobis repandis erosis, dentatisve. *Stylus* exsertus." *Rich. MSS.*

The three specimens of this plant which exist in the collection, accord perfectly with the above description by Dr. Richardson of P. *sudetica*. That gentleman expresses a doubt, in his manuscript notes, if it be really the P. *sudetica* of Willdenow. Mr. Brown's observation upon it is "P. *sudetica*, Richardson in Franklin's Journal, p. 742. à *sudetica vera* vix diversa est nisi corollæ labio superiore breviore, denticulo longiore caule subunifolio, nec species distincta videtur." The same author remarks that the true P. *sudetica* comes very near to his P. *arctica* *, being however of larger stature, having the stems glabrous, the lobes of the leaves linear, inciso-pinnatifid; those of the stem not dilated in the petiole, and the lower lip of the corolla manifestly toothed.

68. P. *hirsuta*. Linn. Sp. Pl. p. 847. Fl. Lapp. ed. Sm. p. 211. t. 4. f. 3. "Pall. Sib. v. 3. p. 34." Fl. Dan. t. 1105. Br. in Ross' Voy. ed. 2. v. 2. App. p. 192. Br. in Spitz. Pl. (fide Grev.) Grev. in Pl. of W. Greenl. p. 431. Hook. in Scoresby's E. C. of W. Greenl. p. 413. Richardson in Franklin's Journ. App. p. 742.

Hab. Igloolik, 1822, 1823. Five Hawser Bay. South shore of the Strait of the Fury and Hecla. Neerlo-Nakto. Repulse Bay. Savage Island. Hudson's Strait. Barrow River.

"Corolla tota rosea." *Rich. MSS.*

69. Pedicularis *Nelsonii*, subpubescens, caule brevi subaphyllo, foliis pinnatifidis pinnis ovatis incisis, floribus (2-4) capitatis corolla calyce quadruplo longiore, galea obtusa, pistillo breviore. (App. Tab. I.)

P. *Nelsonii*. Br. MSS. in Herb. Banks. Richardson in Franklin's Journ. App. p. 743.

P. *verticillata*. Pursh. Fl. N. Am. v. 2. p. 426 (fide Rich.)

P. *capitata*. Fischer, MSS. in Herb. Hook.

Hab. Duke of York's Bay. Igloolik. Duckett Cove.

Radix parva, subfusiformis, parum fibrosa. *Caulis* solitarius, nunc duo ex eadem radice, erectus, digitalis ad palmarem, vel "spithamæam," (*Rich. MSS.*), fere semper aphyllus, nunc unifoliatus, pubescens, viridis vel purpureus. *Folia* fere omnino radicalia, ad basin squamis ovatis, fuscis, imbricatis circumdata, plerumque bina, nunc terna vel quaterna ad singulum caulem, una cum petiolum longiusculum, bi-triuncialia, circumscriptione lanceolata, profunde pinnatifida, pinnis ovatis, dentatis incisis, nunc iterum subpinnatifidis, pubescentibus præcipue subtus margineque. *Bracteæ* foliaceæ, floribus breviores. *Calyx* quinquelobus, obo superiore breviore, omnibus ovato-lanceolatis, crenatis, pubescentibus. *Corolla* calyce quadruplo longiore, curvata, "primulaceo-flava, edentula" (*Rich. MSS.*), labio superiore, seu galea, fornicato, obtusissimo, pistillo breviore, marginibus clausis, labio inferiore dilutissime carneo-rubro, trilobato, tricarinato, superiore multum breviore.

The specimens of this plant coincide precisely with those of *P. Nelsonii*, which I have received from Dr. Richardson, and also with individuals which Dr. Fischer had sent me from Unalascka under the name of *P. capitata*. The latter appellation, however, as far as I can discover, has never been published.

To the *P. verticillata* of Wildenow and Jacquin (Fl. Austr. t. 206.), with which Pursh appears to have confounded this species, it seems to bear little or no resemblance. Its nearest affinity, especially when we consider the large size of its flowers and their situation, is with *P. Sceptrum Carolinum*. That plant, however, is three or four times the size of the present individual, has the leaves far less deeply pinnatifid, the lower lip of the corolla longer, the style included, and the whole plant is glabrous.

XVI. PRIMULACEÆ.

41. Diapensia.

70. Diapensia *lapponica*, Linn. Sp. Pl. p. 202. Fl. Lapp. p. 57. t. 1. Fl. 1. Fl. Dan. t. 47. Wahl. Fl. Lapp. p. 58. t. 9 (fruct.) "Rottb. Pl. Greenl. in Act. Hafn. v. 10." Svensk. Fl. t. 517.

* P. *arctica*; caule simplici lanato, foliis pinnatifidis, lobis subovatis dentato-incisis: adultis glabris; caulinis petiolo dilatato; calycibus quinquefidis lanatis, galea obtusa truncata bidentata, filamentis longioribus hirsutis." Br. in Parry's 1st Voy. App. p. cclxxx.

D. *obtusifolia*. Pursh. Fl. N. Am. v. 2. p. 147.

HAB. Upper Savage Island.

This plant seems to be of rare occurrence, as it has not been noticed by any of our recent Arctic Voyagers, and as only one individual of it exists in the present collection.

It occurs on the summit of the White Mountains, N. America, where it has been gathered by Mr. Boott.

XVII. PLUMBAGINEÆ.

42. STATICE.

71. Statice *Armeria*, Linn. Sp. Pl. p. 394. Lightf. Scot. p. 173. Sm. Fl. Brit. p. 340. Engl. Bot. t. 226. Pall. Sib. v. 3. p. 33. Wahl. Lapp. p. 76. Hook. Icel. Tour, v. 2. p. 319. Hook. Fl. Scot. P. I. p. 97. Grev. in Pl. of W. Greenl. p. 427. Pursh. Fl. N. Am. v. 212. Richardson in Franklin's Journ. App. p. 735.

HAB. Repulse Bay. Duckett Cove. Five Hawser Bay.

XVIII. POLYGONEÆ.

43. OXYRIA.

72. Oxyria *reniformis*. Hook. Fl. Scot. P. 1. p. 111. Richardson in Franklin's Journ. p. 735. Br. in Parry's 1st Voy. App. p. cclxxxii.

Rumex *digynus*. Linn. Sp. Pl. p. 480. Lightf. Scot. v. i. p. 190. Sm. Fl. Brit. p. 395. Engl. Bot. t. 910. Fl. Dan. t. 14. "Pall. Sib. v. 3. p. 33. Mart. Spitzb. Phipps Pol." Hook. Icel. Tour. App. p. 320. Br. in Ross' Voy. ed. 2. v. 2. p. 192. Pursh. Fl. N. Am. v. 1. p. 248.

Rheum *digynum*. Wahl. Lapp. p. 101. t. 9. f. 2. (fruit). Wahl. Helv. p. 74. Fl. Carp. p. 114. Grev. Pl. of W. Greenl. p. 427.

HAB. Igloolik. Duckett Cove. Eastern entrance of the Frozen Strait. South side of the Strait of the Fury and Hecla.

This grows on the summit of the Rocky Mountains, N. America, at an elevation of 10,000 feet, according to Dr. Torrey, in the Annals of the Lyceum of Nat. Hist. of New York.

44. POLYGONUM.

73. Polygonum *viviparum*. Linn. Sp. Pl. p. 516. Lightf. Scot. p. 206. Sm. Fl. Brit. p. 428. Engl. Bot. t. 669. Fl. Dan. t. 13. Fl. Kamtsch. in Arct. Zool. p. 195. Mart. Spitzb. Pl. Cap. b. t. 1. f. a. Gmel. Siber. v. 3. p. 44. t. 7. f. 2. Wahl. Lapp. p. 99. Hook. in Fl. Lond. cum fig. Hook. Fl. Scot. P. 1. p. 120. Hook. Icel. Tour, App. p. 321. Pursh. Fl. N. Am. v. 1. p. 271. Bieb. Fl. Tauric. Cauc. v. 1. p. 301. Wahl. Helv. p. 73. Wahl. Carpath. p. 114. Grev. in Pl. of W. C. of Greenl. p. 427. Hook. in Scoresby's E. C. of W. Greenl. p. 410. Svensk. Bot. p. 336. Br. in Parry's 1st Voy. App. p. cclxxxi. Richardson in Franklin's Journ. App. p. 737.

HAB. Duckett Cove.

Mr. Boott has found it on the summit of the White Mountains.

XIX. AMENTACEÆ.

45. Salix.

74. Salix *reticulata*. Linn. Sp. Pl. p. 1446. Fl. Lapp. ed. Sm. p. 296. t. 8. f. 1. t. 7. f. 1, 2. Fl. Dan. t. 212. Lightf. Scot. p. 601. Sm. Pl. Brit. t. 1057. Engl. Bot. t. 1968. Wahl. Lapp. p. 262. Wahl. Helv. p. 184. Wahl. Carpath. p. 313. Hook. Icel. Tour, App. 335. Hook. Fl. Scot. P. 1. p. 283. Pursh. Fl. N. Am. v. 2. p. 610. Richardson in Franklin's Journ. App. p. 752.

Hab. Duckett Cove.

Only one specimen, and probably a rare plant. The present individual is a variety, with the leaves small, almost orbicular, thick, rigid, and deeply reticulated.

75. Salix *arctica*. Br. in Ross' Voy. ed. 2. v. 2. App. p. 194. Br. in Parry's 1st Voy. App. p. cclxxxii. Richardson in Franklin's Journ. App. p. 752. Salix, No. 37. Hook. in Scoresby's E. C. of W. Greenl. App. p. 414 (descr. sine nom.) Salix, Grev. in Pl. of W. Greenl. p. 432. (fide Br.)

Hab. Igloolik. Barrow River. South shore of the Strait of the Fury and Hecla. Upper Savage Island. Hudson's Strait.

This is the only species of Willow noticed in Mr. Brown's List of the Plants of Melville Island. Dr. Richardson, in a *MS.* note to his Appendix, observes that Professor Hornemann is said to have referred some specimens of Willow, collected in Captain Parry's 1st Voyage, to the *S. versifolia* of Wahlenberg, from which it appears that this plant is the one intended. The *S. versifolia* of *Flora Lapponica* differs not only in its much narrower leaves (folia oblonga oblique accuminata), but also in the very small and lanceolate scales of the catkin, which are represented as shorter than the pedicel of the germen. *S. arctica* is however an extremely variable plant: one specimen in Mr. Edwards's collection has the underside of its leaves thickly covered with a white silky pubescence, like that of *S. arenaria*.

76. S. *herbacea*. Linn. Sp. Pl. p. 1445. Fl. Lapp. ed. Sm. p. 294. t. 8. f. 2. t. 7. f. 3, 4. Lightf. Scot. p. 600. Fl. Dan. t. 117. Sm. Fl. Brit. p. 1066. Engl. Bot. t. 1907. "Pall. Sib. v. 3. p. 33. Pall. Fl. Ross. v. 2. p. 85. Wahl. Lapp. p. 260. Wahl. Carpat. p. 315. Wahl. Helv. p. 184. Pursh. Fl. N. Am. v. 2. p. 617. Hook. Icel. Tour, App. p. 334. Hook. Fl. Scot. P. 1. p. 283. Grev. Pl. of W. Greenl. p, 432.

Hab. Duckett Cove.

MONOCOTYLEDONES.

XX. Junceæ.

46. Juncus.

77. Juncus *biglumis*. Linn. Sp. Pl. p. 467. Lightf. Scot. p. 1100. Smith Fl. Brit. p. 382. Engl. Bot. t. 898. Fl. Dan. t. 120. Br. in Parry's 1st Voy. App. p. cclxxxii. Hook. Icel. Tour. App. p. 319. Hook. Fl. Scot. P. 1. p. 106.

One specimen in Mr. Edwards's collection.

47. Luzula.

78. Luzula *hyperborea*, spicis multifloris subumbellatis pedunculatis sessilibusque (nunc omnibus sessilibus), bractea umbellæ foliacea; partialibus omnibus fimbriatis, capsulis obtusis perianthia acuta subæquantibus, caruncula basilari seminis obsoleta, foliis planis. *Br.*

α. *major*, foliis angustioribus, bracties partialibus insigniter albo-fimbriatis.

L. *hyperborea*. Br. in Parry's 1st Voy. App. p. cclxxxiii.

L. *campestris*, Br. Spitzb. Pl. in Scoresby's Arct. Reg. 1. App. p. 75.

Juncus *arcuatus*. Hook. in Scoresby's Greenl. App. p. 410 (fide Br.)

J. *campestris*. Soland. in Phipps' Voy. (fide Br.)

β. *minor*, foliis latioribus, bracteis partialibus vix fimbriatis.

Hab. α. Duke of York's Bay, Southampton Inlet. Duckett Cove.—β. Igloolik. S. shore of the Strait of the Fury and Hecla. Neerlo-Nakto. Duke of York's Bay.

It is very easy, with the numerous specimens which I have seen both in Captain Parry's and Mr. Edwards's collections, to separate the individuals which I have indicated above as constituting the varieties α and β of this species; and it is possible, when the perfect fruit of the latter shall be discovered, that it may furnish more important characters than any I have yet detected, and enable us to make of it a new species. The broad-leaved variety, indeed, appears more distinct from α, than the latter does from the *Luzula arcuata* of Flora Londinensis (*Juncus arcuatus* of Wahlenberg). In their deeply fimbriated partial bracteas the two plants agree; and the *L. hyperborea*, from the single head or spike which it bears, often throws out two, more or less pedunculated spikelets; but then, however long these peduncles may be, I have never seen them in an arcuate state, nor bearing so small a number of flowers as does *L. arcuata*.

It must be confessed that the difficulty of distinguishing these, as well as the *L. sudetica* of Willdenow and the *L. congesta* of *Flora Danica*, from *L. campestris*, is very great; and perhaps all of them might, without much impropriety, be united together under the same head *.

XXI. CYPERACEÆ.

18. Carex.

* *Spicis divisis.*

79. Carex *scirpoidea*. Mich. Fl. Bor. Am. v. 2. p. 171. Pursh. Fl. N. Am. v. i. p. 34. Richardson in Franklin's Journ. App. p. 750.

C. *Wormskioldiana*. Fl. Dan. t. 1528.

Hab. Duke of York's Bay. Southampton Inlet. Five Hawser Bay. Lyon Inlet. South shore of the Strait of the Fury and Hecla.

* Since the above was written, I find in Captain Sabine's collection from the E. Coast of W. Greenland some specimens of *Luzula hyperborea* with the pedicels curved, and in no respect differing from the true *Luzula arcuata* but in having a greater number of flowers in each spikelet; thus very nearly indeed agreeing with the "*Juncus campestris, var.*" of Fl. Dan. t. 1380, found in alpine moors in Norway.

** *Spicis androgynis pedunculatis.*

80. Carex *atrata*. Linn. Sp. Pl. p. 1386. Lightf. Scot. p. 555. Fl. Dan. t. 158. Smith Fl. Brit. p. 987. Engl. Bot. t. 2044. De Cand. Fl. Gall. Syn. p. 141. Wahl. Helv. p. 174. Wahl. Carpath. p. 302. Hook. Icel. Tour. App. p. 333. Hook. Fl. Scot. P. 1. p. 266.

Hab. South shore of the Strait of the Fury and Hecla.

There is but one imperfect specimen of what I consider to be this species; but its fructification is in too young a state for me to feel certain on the point.

81. Carex *fuliginosa*. Sternb. and Hopp. in Act. Bot. Soc. Ratisb. v. i. p. 159. t. 3. Richardson in Franklin's Journ. App. p. 750.

C. *misandra?* Br. in Parry's 1st Voy. App. p. cclxxxii.

β. *squamis*. Capsulisque pallide fuscis.

Hab. Duke of York's Bay. Southampton Island.—β. Five Hawser Bay. Duckett Cove.

*** *Spicis plurimis, sexu distincto.*

† *Mascula solitaria.*

82. Carex *ustulata*. Will. Sp. Pl. v. 4. p. 293. Smith Engl. Bot. t. 2404. Hook. Fl. Scot. P. 1. p. 266.

C. *atro-fusca*. Schkuhr. Caric. p. 106. t. Y. n. 82.

Hab. Repulse Bay.

83. Carex *cæspitosa*. Linn. Sp. Pl. p. 1388. Smith Fl. Brit. p. 1000. Engl. Bot. t. 1507. Lightf. Fl. Scot. p. 560. De Cand. Fl. Gall. Syn. p. 141. Wahl. Helv. p. 175. Wahl. Carpath. p. 304. Hook. Fl. Scot. P. 1. p. 268.

β. foliis latioribus, bracteis foliaceis, spicis cylindraceis, culmo lævi.

C. *concolor?* Br. in Parry's 1st Voy. App. p. cclxxxiii. et p. cccix.

Hab. Igloolik.

This species is found on the summit of the White Mountains, N. America, by Mr. Boott.

84. Carex *membranacea*, spica mascula subsolitaria, femineis magis minusve pedicellatis, oblongo-cylindraceis erectis obtusis (atro-fusis nitidis), fructu lævi rotundato inflato breviter acuminato bifido pedicellato, vaginis perbrevibus.

Hab. Duke of York's Bay.

Caulis 6-10 pollicaris erectus, obtuse triqueter, superne quandoque, non semper, foliaceus, scaber. *Folia* longitudine caulis, lineari-acuminata, duas vel etiam tres lineas lata, plana, lævia, vel ad marginem minutissime scabra, siccitate margine subincurvo; vaginis longis glaberrimis, ore integerrimo. *Bractea* inferior foliacea, spicas æquans, basi breviter vaginata exauriculata; superiores multoties minores fere subulatæ, basi subauriculatæ, suprema squamæ ovatæ, fuscæ; auriculæ breves, fuscæ.

Spicæ masculæ terminales, solitariæ vel binæ, clavato-cylindraceæ; squamis obovatis obtusis intense purpureo-fuscis, margine versus apicem tenuissime hyalinis, nervo pallidiore.

Spicæ femineæ 2 vel 3, oblongo-cylindraceæ, unciam ad duas uncias longæ, 4 lineas latæ, obtusæ, omnino purpureo-fuscæ, nitidæ; inferior plerumque sublonge pedunculata; reliquæ fere vel omnino sessiles; squamæ obovato-oblongæ, longitudine fructus, atro-sanguineæ, nitidæ, tenerrimæ, concolores. *Fructus* rotundatus, inflatus, lævis, (siccitate rugosus) nitidus, intense purpureo-fuscus, basi solummodo pallidiore, viridi, apice in acumen breve, bifidum, concolorum productus, basi pedicellatus. *Stigmata* 3, pubescentia. *Achenium* circumscriptione late ovatum vel fere obovatum, triangulare, pallide flavo-fuscum, sessile, cupula dimidio brevius, apice stylo duro persistente terminatum.

I know of no species of *Carex* which, for peculiarity of fructification, can be compared to the present one. Its most striking character consists in the deep purple brown colour and the shining surface of its spikes. Both the scales and fruit, or at least the covering of the fruit, (cupula or urceolus), are singularly membranaceous and thin; not retaining their form when dry, but becoming shrivelled. The achenium is small when ripe, not occupying above half of the urceolus, and the urceolus itself is placed upon a most decided, though short, footstalk. In this peculiarity the *C. membranacea* approaches the *C. podocarpa* of Brown, in the Appendix to Franklin's Journal, (a species very closely allied to *C. rariflora* of English Botany), but it resembles it in no other respects. I may add, that in *C. podocarpa* the fruit tapers down gradually into the footstalk; whereas here the base of the fruit is almost truncated, and is set upon the decided peduncle.

49. Eriophorum.

85. Eriophorum *capitatum*. Host Gram. Aust. t. 38. Schrad. Fl. Germ. v. i. p. 152. Smith Engl. Bot. t. 2387. Wahl. Fl. Lapp. p. 18. Fl. Dan. t. 1502. De Cand. Fl. Gall. Syn. p. 145. Br. in Parry's 1st Voy. App. p. cclxxxiv. Hook. Icel. Tour, App. p. 313. Hook. Fl. Scot. P. 1. p. 20. Hook. in Scoresby's E. C. of West Greenl. App. p. 410. Wahl. Helv. p. 11.

E. *Scheuchzeri*. Roth. in Sims' and Kœn. Ann. of Bot. v. 1. p. 149.

In Mr. Edwards's collection is one specimen of this plant.

86. E. *gracile*. Roth. in Sims' and Kœn. Ann. of Bot. v. 1. p. 150. Smith Engl. Bot. t. 2402. Wahl. F. Lapp. p. 19. De Cand. Fl. Gall. Syn. p. 145. Hook. Fl. Scot. P. I. p. 20.

E. *triquetrum*. Hoppe Taschenbuch for 1800, p. 106; 1801, p. 133; 1802, p. 62 (fid. Wahl.) Fl. Dan. t. 1441.

Hab. Duke of York's Bay. Southampton Inlet.

87. E. *angustifolium*. Hoffm. Fl. Germ. ed. 1. v. i. p. 19. Smith Engl. Bot. t. 564. Pursh. Fl. N. Am. v. i. p. 58. Fl. Dan. t. 1442. De Cand. Fl. Gall. Syn. p. 145. Br. in Parry's 1st Voy. App. p. cclxxxiv. Hook. Fl. Scot. P. 1. p. 22. Richardson in Franklin's Journ. App. p. 731.

E. *polystachion*. Curt. Fl. Lond. ed. 1. Wahl. Fl. Lapp. p. 18. Wahl. Carpath. p. 15. Wahl. Helv. p. 11. Grev. Pl. of W. Greenl. p. 426.

Hab. Duke of York's Bay. Southampton Inlet. Igloolik. Duckett Cove. Repulse Bay.

XXII. GRAMINEÆ.

50. Alopecurus.

88. Alopecurus *alpinus*. Smith Engl. Bot. t. 1126. Fl. Brit. p. 1386. Hook. Fl. Scot. P. 1. p. 22. Br. in Ross. Voy. ed. 2. v. 2. p. 91. Br. in Parry's 1st Voy. App. p. cclxxxiv. Richardson in Franklin's Journ. App. p. 731. Grev. Pl. of W. Greenl. p. 427. Hook. in Scoresby's E. C. of W. Greenl. App. p. 410.

A. *ovatus*. Fl. Dan. t. 1565.

A. *antarcticus*. Gieseke Greenl. in Brewster's Edin. Encycl. (fid. Brown.

HAB. Igloolik. Duckett Cove. Barrow River. Duke of York's Bay. Southampton Inlet.
It is most abundant on the E. Coast of W. Greenland. (Capt. Sabine.)

51. COLPODIUM.

89. Colpodium *latifolium*, panicula coarctata lanceolata, foliis planis lato-linearibus, Br. (APP. TAB. II.)

C. latifolium, Br. in Parry's 1st Voy. App. p. cclxxxvi. et p. cccix.

Agrostis *paradoxa*. Br. in Ross' Voy. App. ed. 2. v. 2. p. 192.

HAB. Igloolik. Duke of York's Bay.

52. POA.

90. Poa *angustata*, panicula simplici coarctata lineari-lanceolata, locustis 4-5 floris, gluma inferiore dimidio minore, perianthiis apice erosis: valvula inferiore basi elanata lateribus glabriusculis, foliis angusto-linearibus. *Br.*

P. *angustata*. Br. in Parry's 1st Voy. App. p. cclxxxvii. et p. cccix.

HAB. Igloolik: and two specimens in Mr. Edwards's collection, mixed with *Poa arctica*.
This is plentiful in Captain Sabine's collection from the E. Coast of W. Greenland.

91. P. *abbreviata*; panicula simplicissima coarctata subovata, locustis 4-5 floris, glumæ valvulis subæqualibus acutissimis perianthia basi lanata lateribus pubescentia æquantibus, foliis involuto-setaceis. *Br.*

P. *abbreviata*. Br. in Parry's 1st Voy. App. p. cclxxxvii. et p. cccix.

HAB. Igloolik. A few specimens in Mr. Edwards's collection.

92. P. *arctica*; panicula effusa: ramis paucifloris capillaribus lævibus locustisque coloratis ovatis 3-4 floris, glumis subæqualibus, perianthii valvula inferiore basi lanata carina lineaque submarginali sericeis: interstitiis pubescentibus, foliis linearibus: ligula subquadrata erosa. *Br.*

P. *arctica*. Br. in Parry's 1st Voy. App. p. cclxxxviii.

HAB. Igloolik. Repulse Bay. Duke of York's Bay. Southampton Inlet, plentiful.
Found on the E. Coast of W. Greenland, by Captain Sabine.

53. FESTUCA.

93. Festuca *brevifolia*, racemo subsimplici erecto, flosculis teretibus supra scabriusculis arista duplo longioribus, foliis setaceis vaginisque lævibus: culmeo supremo multoties breviore vagina sua laxiuscula. *Br.*

F. *brevifolia*. Br. in Parry's 1st Voy. App. p. cclxxxix. et cccix.

HAB. Duke of York's Bay. Duckett Cove. Igloolik.

54*. Pleuropogon.

94. Pleuropogon *Sabinii*. Br. in Parry's 1st Voy. App. p. cclxxxix. Tab. D.

Hab. Duke of York's Bay. Southampton Inlet.

55. Elymus.

95. Elymus *arenarius*. Linn. Sp. Pl. p. 122. Smith Fl. Brit. p. 152. Eng. Bot. t. 1672. Pallas Itin. Sib. v. 3. p. 316. Wahl. Fl. Lapp. p. 45. Fl. Dan. t. 847. De Cand. Fl. Gall. Syn. p. 137. Hook. Icel. Tour. App. p. 315. Hook. Fl. Scot. P. I. p. 46.

Hab. Duke of York's Bay. Five Hawser Bay.

The whole plant is not above six or eight inches high.

56†. Dupontia.

96. Dupontia *Fisheri*. Br. in Parry's 1st Voy. App. p. ccxci.

There are but two specimens of this grass; which are in Mr. Edwards's collection.

57. Deschampsia.

97. Deschampsia *brevifolia;* panicula coarctata lanceolata: pedicellis lævibus, locustis bi-trifloris, arista stricta valvulum subæquante, foliis involutis: caulinis abbreviatis. Br.

D. *brevifolia*. Br. in Parry's 1st Voy. App. p. ccxci.

In Mr. Edwards's collection.

58. Trisetum.

98. Trisetum *subspicatum* Palisot Agrostogr. p. 88. Br. in Parry's 1st Voy. App. p. ccxcii.

T. *airoides*. Rœm. et. Schult. Syst. Veg. v. 2. p. 666.

Aira *spicata*. Linn. Sp. Pl. p. 95. Fl. Dan. t. 228. Wahl. Fl. Lapp. p. 33. Hook. in Scoresby's E. C. of W. Greenl. p. 410. Richardson in Franklin's Journ. App. p. 731.

A. *subspicata*. Willd. Sp. Pl. v. 1. p. 377. Wahl. Helv. p. 15. Hook. Icel. Tour, App. p. 314.

Avena *airoides*. De Cand. Fl. Gall. Syn. p. 147.

Hab. Duckett Cove.

* Mr. Brown's character of *Pleuropogon* is as follows; Char. Gen. *Locustæ* multifloræ, cylindraceæ. *Gluma* abbreviata, inæquivalvis, mutica. *Perianthii valvula inferior mutica*, obtusa, concava, nervosa, apice scarioso; *superior* nervo utroque lateraliter bisecto! *Lodiculæ* distinctæ. *Styli* 2. *Stigmata* plumosa. *Caryopsis* libera, lateribus compressis.

† The following is Mr. Brown's generic definition of *Dupontia*. "*Gluma* subæquivalvis, scariosa, concava, mutica, locustam 2-3-floram subæquans. *Perianthia* mutica, scariosa, (basi barbata,) altero pedicellato; valvulis integris, inferiore concava. *Lodiculæ* 2. *Ovarium* imberbe. *Stigmata* subsessilia."

59. Hierochloe.

99. Hierochloe *alpina*. Rœm. et Schult. Sys. Veg. v. 2. p. 515. Br. in Ross' Voy. ed. 2. v. 2. p. 194. Richardson in Franklin's Journ. App. p. 731. Br. in Parry's 1st Voy. App. p. ccxciii.

Holcus *alpinus*. Fl. Dan. t. 1508. Svensk. Bot. t. 438. Wahl. Lapp. p. 31. t. 2.

Hab. Repulse Bay. South side of the strait of the Fury and Hecla.

This has been found by Mr. Boott on the summit of the White Mountains in N. America.

100. Hierochloe *pauciflora*, racemo simplici, flosculo masculo superiore brevissimo setigero, foliis culmi brevissimis; radicalibus involutis. Br. App. T. II.

H. *pauciflora*. Br. in Parry's 1st Voy. App. p. ccxcii.

Hab. Igloolik. Neerlo-Nakto.

ACOTYLEDONES.

XXIII. FILICES.

60. Aspidium.

101. Aspidium *fragrans*. Willd. Sp. Pl. p. 253.

Nephrodium *fragrans*. Richardson in Franklin's Journ. App. p. 754.

Polypodium *fragrans*. Linn. Sp. Pl. p. 1550. (excl. Syn. Huds.)

Hab. Duckett Cove.

102. Aspidium *fragile*. Swartz Syn. Fil. p. 58. Wahl. Lapp. p. 283. Wahl. Helv. p. 191. Fl. Carpat. p. 329. Hook. Fl. Scot. P. II. p. 155.

Athyrium *fragile*. Richardson in Franklin's Journ. App. p. 755.

Cyathea *fragilis*. Sm. Fl. Brit. p. 1139. Eng. Bot. p. 1587.

Polypodium *fragile*. Linn. Sp. Pl. p. 1139.

Dr. Graham and Mr. Greville inform me that they have observed this species in some collections made during this expedition; but I have not had the opportunity of seeing the plant myself.

XXIV. LYCOPODINEÆ.

61. Lycopodium.

103. Lycopodium *Selago*. Linn. Sp. Pl. p. 1565. Lightf. Scot. p. 687. Smith Fl. Brit. p. 1111. Eng. Bot. t. 233. Richardson in Franklin's Journ. App. p. 754. Wahl. Fl. Lapp. p. 291. Fl. Dan. t. 104. Hook. Icel. Tour, App. p. 336. Hook. Fl. Scot. P. II. p. 159.

Hab. Upper Savage Island. South side of the strait of the Fury and Hecla.

XXV. EQUISETACEÆ.

62. Equisetum.

104. Equisetum *variegatum*. Schleich. Cat. Pl. Helv. p. 21. Willd. Sp. Pl. p. 7. Smith Eng. Bot. t. 1987. Richardson in Franklin's Journ. App. p. 754. Hook. Fl. Scot. P. II. p. 161.

E. *reptans*. Wahl. Fl. Lapp. p. 298.

Hab. Igloolik.

XXVI. MUSCI.

63. Bryum.

* *Capsulis sulcatis.*

105. Bryum *palustre*. Sw. Smith Eng. Bot. t. 391. Hooker and Tayl. Musc. Brit. p. 11. t. 28. Hook. Fl. Scot. P. II. p. 149.

Mnium *palustre*. Linn. Sp. Pl. p. 1574. Mich. Fl. Am. Sept. p. 305. Richardson in Franklin's Journ. App. p. 756.

Hab. Duke of York's Bay. Southampton Island.

No fructification on the few specimens of this moss which exist in the collection.

106. Bryum *turgidum*.

Mnium *turgidum*. Wahl. Fl. Lapp. p. 351. Br. in Ross' Voy. ed. 2. v. 2. p. 194. Br. in Parry's 1st Voy. App. p. ccxcv. Richardson in Franklin's Journ. App. p. 756.

Hab. Igloolik (barren.)

** *Capsulis lævibus,* (*esulcatis.*)

* *Dentibus peristomii externi interiore brevioribus.* (Meesia, Hedw.)

107. Bryum *trichodes*. Linn. Sp. Pl. p. 1585. Smith Eng. Bot. t. 1517. Hooker and Tayl. Musc. Brit. p. 116. t. 28. Hook. Fl. Scot. P. II. p. 149.

Meesia *uliginosa*. Hedw. Stirp. Crypt. v. 1. t. 1, 2. Richardson in Franklin's Journ. App. p. 756. Wahl. Fl. Lapp. p. 357.

Hab. Duke of York's Bay. Southampton Island.

** *Dentibus peristomii externi interioris longitudine.*

108. Bryum *crudum*. Huds. Angl. p. 491. Sm. Fl. Brit. p. 1361. Engl. Bot. t. 1604. Hook. Fl. Scot. P. II. p. 150. Hooker and Tayl. Musc. Brit. p. 119. t. 28.

Mnium *crudum*. Linn. Sp. Pl. p. 1576. Wahl. Lapp. p. 355. Fl. Carpat. p. 351. Richardson in Franklin's Journ. App. p. 756.

In Mr. Edwards's collection.

109. Bryum *cæspititium*. Linn. Sp. Pl. p. 1586. Engl. Bot. t. 1904. Hooker and Tayl. Musc. Brit. p. 121. t. 29. Hook. Fl. Scot. P. II. p. 150. Richardson in Franklin's Journ. App. 756. Hook. Tour in Icel. App. 340. Wahl. Fl. Lapp. p. 300.

Amongst the numerous individuals of this species, the most striking varieties are:

Foliis acuminatis, capsulis elongatis.

HAB. Duke of York's Bay. Southampton Island. Igloolik. Neerlo-Nakto. N. E. Coast of America, lat. 67½ north. Barrow River.

Foliis rotundato-ovatis acuminatis concavis, capsula brevi-pyriformi.

HAB. Duke of York's Bay. Southampton Island.

It is not improbable that among the plants which I have placed under the name of *Bryum cæspititium*, there may be found Mr. Brown's three new species, viz. *Pohlia bryoides*, *Pohlia arctica* and *Pohlia purpurascens*: "omnes," as Mr. Brown observes. "*Br. cæspititio* quam maxime affines." I confess, indeed, that the peristome of several of these arctic mosses appears to be that of a *Pohlia*; yet in their whole habit, and in all the essential characters, they so precisely accord with *B. cæspititium*, that I am unwilling to separate them. In some of the specimens, although I have examined them with the greatest care, I can find no internal peristome at all; in others, only imperfect ciliæ, more or less completely attached and adhering to the outer peristome, and very closely resembling the figure of *Ptychostomum compactum*, given in t. 115 of Schweigrichen's Supp. v. 3; a moss which in no respect, saving the structure of its internal peristome, differs from our *Bryum cæspititium*. The *Ptychostomum* is a very alpine plant, and it seems probable that climate may have the effect of rendering occasionally imperfect the inner peristome of this moss.

110. B. *turbinatum*. Sw. Musc. Suec. p. 49. Engl. Bot. t. 1572? Hooker and Tayl. Musc. Brit. p. 122. t. 20. Hook. Fl. Scot. P. II. p. 151. Hook. Icel. Tour. App. p. 340.

Mnium *turbinatum*. Hedw. St. Cr. v. 3. t. 8.

HAB. Igloolik.

β. Foliis brevioribus.

HAB. Duke of York's Bay. Southampton Island.

111. B. *nutans*. Schreb. Fl. Lips. p. 81. Smith Engl. Bot. t. 1240. Hooker and Tayl. Musc. Brit. p. 123. t. 29. Hook. Fl. Scot. P. II. p. 151. Wahl. Fl. Lapp. p. 358.

Webera *nutans*. Hedw. Stirp. Cr. v. 1. t. 4. Richardson in Franklin's Journ. App. p. 756.

HAB. Barren. Duke of York's Bay. Southampton Island.—Var. minuta. fr. Neerlo-Nakto. Igloolik.

112. B. *alpinum*. Linn. Mant. v. 2. p. 309. Engl. Bot. t. 1623. Schwaegr. Suppl. v. 2. t. 73. Hooker and Tayl. Musc. Brit. p. 121. t. 28. Hook. Fl. Scot. P. II. p. 151. Wahl. Fl. Lapp. p. 360.

In Mr. Edwards's collection.

113. B. *punctatum*. Schreb. Fl. Lips. p. 85. Engl. Bot. t. 1183. Hooker and Tayl. Musc. Brit. p. 124. t. 30. Hook. Fl. Scot. P. II. p. 151.

Mnium *punctatum*. Hedw.

M. *serpyllifolium*. α. Linn. Sp. Pl. p. 1577.

M. *serpyllifolium*. Wahl. Fl. Lapp. p. 353.

A small specimen in Mr. Edwards's collection.

114. Bryum *calophyllum;* foliis ovatis obtusis concavis, marginibus simplicibus integerrimis. Br. in Parry's 1st Voy. App. p. ccxcvii.

HAB. Igloolik.

115. B. *cuspidatum*. Schreb. Fl. Lips. p. 84. Smith Engl. Bot. t. 1474. Hooker and Tayl. Musc. Brit. p. 127. t. 31. Hook. Fl. Scot. P. II. p. 152.

Mnium *cuspidatum*. Hedw. Sp. Musc. t. 45. f. 5—8. Richardson in Franklin's Journ. App. p. 756.

M. *serpyllifolium*. β. Linn. Sp. Pl. p. 1577.

In Mr. Edwards's collection.

64. Cinclidium.

116. Cinclidium *stygium*. Sw. in Schrader's Diar. Bot. 1802. p. 12. t. 2. Schwaegr. Supp. v. 2. p. 85. Wahl. Fl. Lapp. p. 355.

Meesia *stygia*. Brid. Musc. II. 3. p. 172.

Hab. Without fructification, at Igloolik; along with *Hypnum moniliforme* and other mosses.

65. Hypnum.

* *Surculis planis.*

117. Hypnum *denticulatum*. Linn. Sp. Pl. p. 1588. Engl. Bot. t. 1260. Hooker and Tayl. Musc. Brit. p. 92. t. 24. Hook. Fl. Scot. P. II. p. 141. Richardson in Franklin's Journ. App. p. 756. Hook. Tour in Icel. App. p. 341. Wahl. Fl. Lapp. p. 371.

Hab. With other mosses, Neerlo-Nakto.

Surculis cylindraceis.

Foliis directione æquali.

118. H. *serpens?* Linn. Sp. Pl. p. 1396. Smith Eng. Bot. t. 1037. Wahl. Fl. Lapp. p. 375. Hooker and Tayl. Musc. Brit. p. 94. t. 24. Hook. Fl. Scot. P. II. p. 142.

H. *contextum* et H. *spinulosum*. Hedw. Richardson in Franklin's Journ. App. p. 756.

H. *subtile*. Eng. Bot. t. 2496.

Among Mr. Edwards's collection.

119. H. *Schreberi*. Willd. Fl. Berol. p. 325. Smith Engl. Bot. t. 1621. Hooker et Tayl. Musc. Brit. p. 96. t. 24. Hook. Fl. Scot. P. II. p. 143. Richardson in Franklin's Journ. App. p. 756.

H. *purum*. Ehrhart.

H. *compressum*. Schreber.

H. *muticum*. Swartz.

Hab. Barrow River.

120. H. *moniliforme*. Wahl. Fl. Lapp. p. 376. t. 24. Hooker and Tayl. Musc. Brit. p. 96. t. 24. Hook. Fl. Scot. ed. 2. (*ined.*)

Leskea *julacea*. Mohr.

Hypnum *julaceum*. Schwaegr. Suppl. t. 89.

Pterogonium *julaceum*. Smith Eng. Bot. t. 2525.

Hab. Igloolik; with *Cinclidium stygium*, and other mosses. It exists in this collection only in a barren state.

121. Hypnum *trifarium*. Web. et Mohr. St. Suec. t. 2. f. 2. *a—d*. Crypt. Germ. p. 319. Wahl. Fl. Lap. 381. Hook. Fl. Scot. ed. 2. (*ined.*)

H. *stramineum* β. *trifarium*. Schwaegr. Suppl. v. 2. p. 213.

HAB. With other mosses, Neerlo-Nakto.

122. H. *nitens*. Schreb. Fl. Lips. p. 92. Smith Eng. Bot. t. 1646. Hooker and Tayl. Musc. Brit. p. 100. t. 25. Hook. Fl. Scot. P. II. p. 144. Hooker Tour in Icel. App. p. 341. Wahl. Fl. Lapp. p. 381. Richardson in Franklin's Journ. App. p. 756. Br. in Parry's 1st Voy. App. p. ccxcv.

In Mr. Edwards's collection, without fructification.

123. H. *albicans*. Neck. Meth. Musc. p. 180. Hedw. St. Cr. v. 4. t. 5. Smith Engl. Bot. t. 1300. Hooker et Tayl. Musc. Brit. p. 100. t. 25. Hook. Fl. Scot. P. II. p. 144.

HAB. Barrow River.

124. H. *abietinum*. Linn. Sp. Pl. p. 1590. Hedw. St. Cr. v. 4. t. 32. Eng. Bot. t. 2037. Hook. Fl. Scot. ed. 2. (*ined.*) Mich. Fl. N. Am. p. 316. Hooker et Tayl. Musc. Brit. p. 104. t. 25. Richardson in Franklin's Journ. App. p. 756.

Among Mr. Edwards's plants.

125. H. *cuspidatum*. Linn. Sp. Pl. p. 1595. Eng. Bot. t. 2407. Hooker et Tayl. Musc. Brit. p. 107. t. 26. Hooker Fl. Scot. P. II. p. 146. Hook. Tour in Icel. App. p. 341. Wahl. Fl. Lapp. p. 376.

Mr. Edwards's collection: no fructification.

126. H. *cordifolium*. Hedw. St. Cr. v. 4. t. 37. Eng. Bot. t. 1147. Hooker and Tayl. Musc. Brit. p. 107. t. 26. Hook. Fl. Scot. P. II. p. 146. Br. in Parry's 1st Voy. App. p. ccxcv.

HAB. Igloolik: no fructification.

127. H. *stellatum*. Screb. Fl. Lips. p. 92. Eng. Bot. t. 1302. Hooker and Tayl. Musc. Brit. p. 108. t. 26. Hook. Fl. Scot. P. II. p. 146.

HAB. Duke of York's Bay. Southampton Island. Igloolik.

Small barren specimens mixed with other mosses.

Foliis falcato-secundis.

128. H. *fluitans*. Linn. Fl. Suec. ed. 2. p. 399. Hedw. St. Cr. v. 4. t. 36. Engl. Bot. t. 1448. Hooker and Tayl. Musc. Brit. p. 98. t. 24. Hook. Fl. Scot. P. II. p. 147. Wahl. Fl. Lapp. p. 378. Richardson in Franklin's Journ. App. p. 757.

In Mr. Edwards's collection.

129. H. *aduncum*. Linn. Sp. Pl. p. 1592. Sm. Fl. Brit. p. 1327. Eng. Bot. t. 2073. Br. in Parry's 1st Voy. App. p. ccxcv. Hooker and Tayl. Musc. Brit. p. 111. t. 26. Hook. Fl. Scot. P. II. p. 147. Hooker Tour in Iceland. App. p. 341. Wahl. Fl. Lapp. p. 378.

HAB. Duke of York's Bay, and Southampton Inlet, mixed with other mosses, but without fruit.

130. H. *cupressiforme*. Linn. Sp. Pl. p. 1592. Hedw. St. Cr. v. 4. t. 23. Eng. Bot. t. 1860. Hooker et Tayl. Musc. Brit. p. 113. t. 27. Hook. Fl. Scot. P. II. p. 148. Hook. Tour in Icel. App. p. 341. Wahl. Fl. Lapp. p. 377.

Small specimens in Mr. Edwards's collection.

66. ORTHOTRICHUM.

131. **Orthotrichum** *speciosum;* "peristomio externo et interno dentibus 8, vel 16 per paria approximatis, theca exserta, calyptra et vaginula pilosis." Nees ab Esenb. in Sturm Fl. Germ. No. 17. Funck Deutsch. Moose. p. 34. t. 23. f. 4. Richardson in Franklin's Journ. App. 757. Hook. Fl. Scot. ed. 2. *(ined.)*

Fine specimens in Mr. Edwards's collection.

In almost all the specimens, the capsule is raised upon a footstalk, which is considerably longer than the leaves; in which respect this moss appears chiefly to differ from the O. *rupincola* of Funck. The plants are two and three inches long, and of that rich brown colour which is so common to the tropical Orthotrichoid species.

The O. *speciosum*, figured by Sturm, seems entirely to agree with this; as do the specimens which bear the same name in the Appendix to Franklin's Journal. In Germany, however, this moss inhabits trees, as it probably does in the situation where Dr. Richardson found it, since it was discovered in the woody country. The eight teeth, when recurved, divide into sixteen.

67. DIDYMODON.

132. Didymodon *purpureum*. Hooker and Tayl. Musc. Brit. p. 65. t. 20. Hook. Fl. Scot. P. II. p. 135.

Dicranum *purpureum*. Hedw. Sp. Musc. t. 36. Eng. Bot. t. 2262. Hook. Tour in Icel. App. p. 339. Wahl. Fl. Lapp. p. 341. Richardson in Franklin's Journ. App. p. 755.

Mnium *purpureum*. Linn.

Dicranum *strictum*. Eng. Bot. t. 2294.

Bryum *bipartitum*. Eng. Bot. t. 2357.

Trichostomum *papillosum*. Eng. Bot. 2533.

HAB. Repulse Bay.

133. Didymodon *capillaceum*. Schrad. Spic. p. 64. Sw. Musc. Suec. p. 28. Wahl. Fl. Lapp. p. 314. Hooker et Tayl. Musc. Brit. p. 67. t. 20. Hook. Fl. Scot. P. II. p. 136. Richardson in Franklin's Journ. App. p. 755. Br. in Parry's 1st Voy. App. p. ccxcvii.

Swartzia *capillacea*. Hedw. St. Cr. v. 2. p. 26.

Cynontodium *capillaceum*. Hedw. Sp. Musc.

Trichostomum *capillaceum*. Engl. Bot. t. 1152.

β. *Statura humiliori, foliis strictioribus et brevioribus. Br.*

Didymodon *subulatum*. Schkuhr Deutsch. Moos. p. 65. t. 28.

HAB. Igloolik. Neerlo-Nakto. N. E. Coast of America, lat. 67¼ north.

The variety β., unquestionably the Didymodon *subulatum* of Schkuhr, is the more common of the two kinds in this collection; at the same time, there are intermediate states of it, which prove that Mr. Brown is correct in considering the two as but different appearances of the same species. The variety β. is also common in Switzerland, and I have lately found it upon the Breadalbane Mountains of Scotland.

68. Trichostomum.

134. Trichostomum *lanuginosum*. Hedw. St. Cr. v. 3. t. 2. Eng. Bot. t. 1348. Hooker et Tayl. Musc. Brit. p. 60. t. 19. Hook. Fl. Scot. P. II. p. 134. Richardson in Franklin's Journ. App. p. 755. Br. in Parry's 1st Voy. App. p. ccxcvii. Wahl. Fl. Lapp. p. 329.

Bryum *hypnoides*. α. Linn. Sp. Pl.

Hab. Duke of York's Bay. Southampton Island: no fructification.

135. T. *ellipticum*. Hooker et Tayl. Musc. Brit. p. 63. t. 19. Hook. Fl. Scot. ed. 2. (*ined.*)

Dicranum *ellipticum*. Turner Musc. Hib. p. 76. t. 6. Eng. Bot. t. 1901. Schwaegr. Suppl. v. 1. t. 47.

Hab. South shore of the strait of the Fury and Hecla.

The specimens are without fruit, yet I have no doubt that they are plants of Trichostomum *ellipticum*.

69. Dicranum.

136. Dicranum *virens*. Hedw. St. Cr. v. 3. p. 32. Engl. Bot. t. 1462. Hooker et Tayl. Musc. Brit. p. 54. t. 17. Hook. Fl. Scot. P. II. p. 132. Richardson in Franklin's Journ. App. p. 755. Wahl. Fl. Lapp. p. 338.

Hab. Repulse Bay. Upper Savage Island.

137. D. *strumiferum*. Eng. Bot. t. 2410. Hooker et Tayl. Musc. Brit. p. 54. t. 17. Hook. Fl. Scot. P. II. p. 132. Richardson in Franklin's Journ. App. p. 755.

Fissidens *strumifer*. Hedw. St. Cr. v. 2. t. 32. Wahl. Lapp. p. 335.

Bryum *inclinans*. Dicks.

Hab. South shore of the strait of the Fury and Hecla.

138. Dicranum *flavescens?* Eng. Bot. t. 2263.

D. *gracilescens*. Web. et Mohr. Schwaegr. Supp. v. 1. t. 46.

D. *rupestre*. Wahl. Lapp. p. 339. t. 21.

Bryum *flavescens*. Dicks.

Hab. Duke of York's Bay. Southampton Island.

The specimens are barren, on which account I am rather uncertain of the species.

139. Dicranum *scoparium*. Hedw. Sp. Musc. p. 172. Hooker et Tayl. Musc. Brit. p. 58. t. 18. α. Hook. Fl. Scot. P. II. p. 133. Hook. Tour in Icel. App. p. 339. Richardson in Franklin's Journ. App. p. 755.

Bryum *scoparium*. Linn. Sp. Pl. p. 1582. Eng. Bot. t. 1490.

Hab. Barrow River.

Very imperfect and barren specimens.

140. Dicranum *fuscescens*. Turn. Musc. Hib. p. 60. Eng. Bot. t. 1597. Richardson in Franklin's Journ. App. p. 755.

D. *congestum*. Schwaegr. Suppl. v. 1. t. 42.

D. *scoparium*. β. fuscescens. Hooker and Tayl. Musc. Brit. p. 58. t. 18. Hook. Fl. Scot. P. II. p. 133.

In Mr. Edwards's collection.

141. Dicranum *elongatum*. Schleich. Pl. Helv. Crypt. Enum. Cat. III. p. 27. Schwaegr. Supp. p. 171. t. 43.

D. *sphagni*. Richardson in Franklin's Journ. App. p. 755. Wahl. Fl. Lapp p. 337.

Hab. Duke of York's Bay. Southampton Island.

70. Pterogonium.

142. Pterogonium *filiforme*. Hedw. St. Cr. v. 4. p. 7. Eng. Bot. t. 2297. Hooker and Tayl. Musc. Brit. p. 41. t. 14. Hook. Fl. Scot. P. II. p. 129. Wahl. Lapp. p. 319.

Grimmia *filiformis*. Web. et Mohr. Crypt. Germ. p. 150.

Hab. With Trichostomum *ellipticum* in Captain Parry's collection.

71. Weissia.

143. Weissia *crispula*. Hedw. Sp. Musc. t. 12. f. 1—6. Hooker and Tayl. Musc. Brit. p. 46. t. 15. Hook. Fl. Scot. P. II. p. 131.

Grimmia *crispula*. Turn. Musc. Hib. Eng. Bot. t. 2203.

Hab. South shore of the strait of the Fury and Hecla. Neerlo-Nakto.

A large quantity of this moss in Mr. Edwards's collection.

144. Weissia *curvirostra*. Hedw. St. Cr. v. 1. t. 7. Wahl. Lapp. p. 321. Hook. Fl. Scot. P. II. p. 130.

W. *recurvirostra*. Hooker et Tayl. Musc. Brit. p. 46. t. 14.

Grimmia *recurvirostra*. Turn. Musc. Hib. p. 29. Eng. Bot. t. 1438.

Hab. Duke of York's Bay. Southampton Island.

Mixed with *Brya*.

72. Encalypta.

145. Encalypta *affinis*. Hed. fil. in Web. et Mohr. Beitr. v. 1. p. 121. t. 4. Schwaegr. Supp. p. 58. t. 16.

E. *alpina*. Eng. Bot. t. 1419. Wahl. Lapp. p. 312. Hook. Tour in Icel. App. p. 329.

E. *ciliata*. β. Hooker et Tayl. Musc. Brit. p. 35. Hook. Fl. Scot. P. II. p. 128. Fl. Dan. t. 1425.

Hab. South shore of the strait of the Fury and Hecla. Igloolik.

So constant does this plant appear to its characters, not only in the specimens of the present collection, but also in several individuals which I lately gathered in the Breadalbane Mountains, of Scotland; that I feel anxious to restore to it the old name of *affinis*.

73. Tortula.

146. Tortula *ruralis*. Ehrh.—Sw. Musc. Suec.—Engl. Bot. t. 2070. Hooker et Tayl. Musc. Brit. p. 31. t. 12. Hook. Fl. Scot. P. II. p. 127. Richardson in Franklin's Journ. App. p. 755.

Barbula *ruralis*. Hedw. Spec. p. 112. Wahl. Fl. Lapp. p. 318.

Syntrichia *ruralis*. Web. et Mohr. p. 215. Br. in Parry's 1st Voy. App. p. ccxcviii. Hook. Tour in Icel. App. p. 339.

Hab. Neerlo-Nakto.

This plant grows frequently in alpine situations in Britain, as well as upon the roofs of houses near the sea coast. Upon the Mont Cenis, I have seen it just on the limits of perpetual snow.

147. Tortula *mucronifolia*. Schwaeg. Suppl. v. 1. p. 136. t. 35. Wahl. Lapp. p. 31.

Syntrichia *mucronifolia*. Br. in Parry's 1st Voy. App. p. ccxcviii.

In Mr. Edwards's collection, abundant.

74. Polytrichum.

148. Polytrichum *juniperinum*. Hedw. Sp. Musc. t. 18. Engl. Bot. t. 1200. Menzies in Linn. Trans. v. 4. t. 6. f. 4. Hooker et Tayl. Musc. Brit. p. 25. t. 10. Wahl. Fl. Lapp. p. 344. Hook. Fl. Scot. P. II. p. 126.

P. *juniperifolium*. Hoffm. Mohr.

P. *strictum*. Menzies in Linn. Trans. v. 4. t. 7. f. 1.

P. *alpestre*. Hoppe.—Schwaeg. Suppl. t. 97.

Mr. Edwards's collection.

149. P. *septentrionale*. Sw. Musc. Suec. t. 9. f. 18. Menzies in Linn. Trans. v. 4. t. 7. f. 5. Hooker et Tayl. Musc. Brit. p. 25. t. 10. Hook. Fl. Scot. P. II. p. 126. Wahl. Fl. Lapp. p. 347.

P. *sexangulare*. Hoppe.—Engl. Bot. t. 1906. Hook. Tour in Icel. App. p. 340.

P. *norvegicum*. Hedw. Sp. Musc. t. 22.

P. *crassisetum*. De Cand. Fl. Fr.

Hab. South shore of the Strait of the Fury and Hecla.

The specimens in Captain Parry's collection are all barren, in which state it is mostly found in Scotland. Among Mr. Edwards's plants, are a few in fructification.

150. P. *alpinum*. Linn. Sp. Pl. p. 1593. Menzies in Linn. Trans. v. 4. p. 83. Engl. Bot. t. 1905. Hooker et Tayl. Musc. Brit. p. 27. t. 11. Hook. Tour. in Icel. App. p. 340. Wahl. Fl. Lapp. p. 346. Hooker Fl. Scot. P. II. p. 126.

P. *sylvaticum*. Menzies in Linn. Trans. v. 4. t. 7. f. 6.

P. *arcticum*. Swartz. Musc. Suec. t. 8. f. 17.

In Mr. Edwards's collection.

75. * Aplodon.

151. Aplodon *Wormskioldii*. Br. in Parry's 1st Voy. App. p. ccxcix.

Splachnum *Wormskioldii*. Fl. Dan. t. 1659. Schwaegr. Suppl. v. 3. p. 27. t. 108.

α. "Folia *acuminata*." *Br.*

Hab. Igloolik.

* Mr. Brown's character of the genus Aplodon stands thus:—"*Peristomium* simplex; *dentibus* 16, æquidistantibus, indivisis, reflexilibus. *Capsula* apophysata, erecta. *Calyptra* lævis. *Flores* terminales: *masculi* discoideo-capituliformes."

β. "*Folia acutiuscula.*" *Br.*

Hab. Repulse Bay. Igloolik. N. E. coast of America, lat. 67½ north.

This moss varies in the colour of its capsules, which are of a paler or deeper brown, as well as in the form of its leaves. The columella, when perfect, is much protruded and capitate; the seta singularly pale and succulent, much resembling that of a *Sphagnum*. It is the most beautiful moss in the whole collection, forming dense tufts of many inches in diameter.

76. Splachnum.

152. Splachnum *mnioides*.

α. *minus, caule brevi.* Hooker et Tayl. Musc. Brit. p. 20. t. 9.

S. *mnioides.* Linn. fil. Meth. Musc. p. 6. Hedw. St. Cr. v. 2. t. 11. Eng. Bot. t. 1539. Hook. Fl. Scot. P. II. p. 124. Hooker Tour in Icel. App. p. 338. Richardson in Franklin's Journ. App. p. 755. S. urceolatum β. Wahl. Lapp. S. urceolatum Dicks. Crypt. fasc. 2. p. 2.

β. *majus, caule elongato.* Hooker et Tayl. Musc. Brit. p. 20. t. 9.

S. *fastigiatum.* Dicks. Crypt. fasc. 3. p. 2. Eng. Bot. 786.

S. *Brewerianum.* Hedw. St. Cr. v. 2. t. 38. Dill. Musc. t. 44. f. 5. Richardson in Franklin's Journ. App. p. 755.

Hab. Igloolik.

The leaves are here more concave, than they are in my British and European specimens of this moss; and those of S. *urceolatum* are less so; thus, as it were, uniting the two species.

153. Splachnum *urceolatum.* Hedw. St. Cr. v. 2. t. 13. Richardson in Franklin's Journ. App. p. 755. Hooker Tour in Icel. App. p. 338. Wahl. Fl. Lapp. (α.)

β. *pallidum.*

Hab. South shore of the strait of the Fury and Hecla. Repulse Bay. Igloolik. Neerlo-Nakto. N. E. coast of America, lat. 67½ north.

It grows in Lapland, Greenland, and Iceland; but not in Scotland, as it has been said to do.

A remarkable variety exists in Mr. Edwards's collection, with the capsules of the same pale colour as those of S. *Frœlichianum*, and frequently of the very same shape. Others of the capsules, again, in the same tufts, are similar to those of S. *urceolatum* and S. *mnioides*, in their form; so that I am induced to refer it to the present species. In all these *Splachna*, although the suture of the operculum, (or the mark where it it set upon the capsule) is very indistinct, yet the operculum is readily removed entire; and I can detect among them no specimens according with the curious Splachnum *paradoxum* of Brown.

154. Splachnum *vasculosum.* Hedw. St. Cr. v. 2. p. 15. Hooker et Tayl. Musc. Brit. p. 21. Suppl. t. 1. Hook. Fl. Scot. P. II. p. 125. Richardson in Franklin's Journ. App. p. 755. Hook. Tour in Icel. App. p. 339. Br. in Parry's 1st Voy. App. p. ccci. Wahl. Fl. Lapp. p. 338.

Hab. Neerlo-Nakto.

Very variable in the more or less remote insertion of its leaves, and in the length of the fruit-stalk.

77. Voitia.

155. Voitia *hyperborea.* Grev. and Arn. in Wern. Trans. v. 4. t. 7. f. 19. capsula; et f. 2. folium. Br. in Parry's 1st Voy. App. p. ccclv.

Hab. N. E. coast of America, in latitude 67½ north.

78. Andræa.

156. Andræa *rupestris*. Hedw. Sp. Musc. p. 47. t. 7. f. 2. Eng. Bot. t. 1277. Hooker in Linn. Trans. v. 10. p. 391. t. 31. f. 2. Hooker et Tayl. Musc. Brit. p. 2. t. 8. Hook. Tour in Iceland. App. p. 338. Wahl. Fl. Lapp. p. 306. Hook. Fl. Scot. P. II. p. 121.

Jungermannia *rupestris*. Linn.

In Mr. Edwards's collection.

XXVII. HEPATICÆ.

79. Marchantia.

157. Marchantia *polymorpha*. Linn. Sp. Pl. p. 1603. Eng. Bot. t. 210. Hook. Fl. Scot. P. II. p. 119. Richardson in Franklin's Journ. App. p. 758. Br. in Parry's 1st Voy. App. p. cccv. Wahl. Fl. Lapp. p. 397. Fl. Dan. t. 1427.

Hab. Igloolik.

Fructification in Mr. Edwards's collection.

80. Jungermannia.

158. Jungermannia *byssacea*. Hooker Monog. Brit. Jung. t. 12.—Fl. Scot. P. II. p. 113.—Tour in Iceland, App. p. 342.

Hab. Barrow River. Imperfect specimens, creeping upon Peltidea *aphthosa*.

159. Jungermannia *setiformis*. Hooker Monog. Brit. Jung. t. 20.—Fl. Scot. P. II. p. 114. Richardson in Franklin's Journ. App. p. 758. Wahl. Fl. Lapp. p. 385.

From Mr. Edwards's collection.

160. Jungermannia *minuta*. Hook. Monog. Brit. Jung. t. 44.—Fl. Scot. P. II. p. 115. Schreb. in Crantz Grönl. p. 285. Wahl. Fl. Lapp. p. 393. Eng. Bot. t. 225. Br. in Parry's 1st Voy. App. p. cccv.

J. *bicornis*. Fl. Dan. t. 888. f. *a*. Richardson in Franklin's Journ. App. p. 757.

In Mr. Edwards's collection.

161. J. *scalaris*. Hook. Monog. Brit. Jung. t. 61.—Fl. Scot. P. II. p. 115.—Tour in Icel. App. p. 342.

In Mr. Edwards's collection.

162. J. *barbata*. Hooker Monograph. of Brit. Jung. t. 70. Fl. Scot. P. II. p. 116.

J. *quinquedentata*. Huds. Ang. p. 571. Eng. Bot. t. 2517. Wahl. Lapp. p. 395. Richardson in Franklin's Journal App. p. 757.

Amongst mosses.

163. J. *ciliaris*. Hooker Monog. Brit. Jung. t. 65.—Fl. Scot. P. II. p. 117.—Tour in Icel. App. p. 342. Wahl. Fl. Lapp. p. 385.

J. *pulcherrima*. Schwaegr. Prodr. p. 21. Richardson in Franklin's Journ. App. p 758.

In Mr. Edwards's collection.

164. J. *pinguis*. Hooker Monog. Brit. Jung. t. 46. Fl. Scot. P. II. p. 118. Eng. Bot. p. 185.

Amongst mosses, growing in wet places.

XXVIII. FUNGI.

81. Cantharellus.

165. Cantharellus *muscigenus*. Fries. Syst. Mycol. v. 1. p. 323.

Merulius *nigrescens*. Bull. Champ. t. 288.

Helvella *dimidiata*. Bull. Champ. t. 498. f. 2.

Hab. Igloolik.

82. Lycoperdon.

166. Lycoperdon *Bovista*. Pers. Syn. Fung. p. 141. Hook. Fl. Scot. P. II. p. 11. Wahl. Fl. Lapp. p. 526.

Hab. Upper Savage Island. Hudson's Bay Straits.

XXIX. LICHENES.

83. Lecidea.

167. Lecidea *confluens*. Ach. Syn. p. 16. Hooker Fl. Scot. P. II. p. 37. Richardson in Franklin's Journ. App. p. 757.

Lichen *confluens*. Engl. Bot. t. 1964.

Hab. South shore of the Strait of the Fury and Hecla.

168. Lecidea *sabuletorum*. Ach. Syn. p. 20. Wahl. Fl. Lapp. p. 470. Hook. Fl. Scot. ed. 2. MSS. Richardson in Franklin's Journ. App. p. 757.

Lichen *muscorum*. Engl. Bot. t. 626.

Hab. Igloolik.

169. Lecidea *fusco-lutea*. Ach. Syn. p. 42. Hook. Fl. Scot. P. II. p. 39.

Lichen *fusco-luteus*. Dicks. Crypt. Fasc. Engl. Bot. t. 1007.

Hab. With *Dufourea ramulosa*, Igloolik.

84. Gyrophora.

170. Gyrophora *tesselata*. Ach. Syn. p. 64.

Hab. Igloolik. South shore of the Strait of the Fury and Hecla. Repulse Bay.

171. G. *erosa*. Ach. Syn. p. 69. Engl. Bot. t. 2066. Hook. Tour in Icel. App. p. 343. Br. in Scoresby's Arctic Regions (*fide Grev.*) Hook. Fl. Scot. P. II. p. 42.

Gyromium *erosum*. Wahl. Fl. Lapp. p. 482.

Hab. Upper Savage Island. Hudson's Bay Straits.

172. Gyrophora *deusta*. Ach. Syn. p. 65. Hooker, Tour in Icel. App. p. 343. Hook. Fl. Scot. P. II. p. 42.

Lichen *flocculosus*. Wulfen in Jacq. Coll. Bot. v. 3. p. 99. t. 1. f. 2.

In Mr. Edwards's collection.

173. Gyrophora *vellea*. Ach. Syn. p. 68. Fl. Dan. t. 1354. Richardson in Franklin's Journ. App. p. 759.

Gyromium *velleum*. Wahl. Fl. Lapp. p. 484.

From Mr. Edwards's collection.

85. Lecanora.

174. Lecanora *Epibryon*. Ach. Syn. p. 155. Wulf. in Jacq. Coll. Bot. v. 4. t. 7. f. 2. Richardson in Franklin's Journ. App. p. 760.

Lichen *Epibryon*. Wahl. Fl. Lapp. p. 408.

Hab. Upon mosses, Igloolik.

175. Lecanora *ventosa*. Ach. Syn. p. 159. Hook. Fl. Scot. P. II. p. 46. Richardson in Franklin's Journ. App. p. 760.

Lichen *ventosus*. Engl. Bot. t. 906. Wahl. Fl. Lapp. p. 406.

Hab. South shore of the Strait of the Fury and Hecla.

176. L. *illimata*. Ach. Syn. p. 148.

L. *illimatus*. Wahl. Fl. Lapp. p. 413.

Mr. Edwards's collection.

177. L. *tartarea*. Ach. Syn. p. 172. Grev. in Pl. of W. Greenl. p. 432. Hook. Fl. Scot. P. II. p. 49. Richardson in Franklin's Journ. App. p. 760.

Parmelia *tartarea*. Hook. Tour in Icel. App. p. 344.

Lichen *tartareus*. Eng. Bot. t. 156. Wahl. Fl. Lapp. p. 403.

α. *gonatodes*. Ach. Wahl. Fl. Lapp. 403.

Isidium *gonatodes*. Ach. Meth. Lich. p. 137.

I know of no lichen whose crust is so variable as this is. It is sometimes simply granulated, sometimes it throws out *spiculæ*, whilst, at other times, it forms itself into a mass of cylindrical, erect, branched processes, so exactly resembling, when in that state, those of an *Isidium*, that it is no wonder that Acharius once ranked this appearance in that genus. Indeed, had I not seen on it the shields of *L. tartareus*, I should hardly have ventured to remove it from *Isidium*. Fructification I have, in abundance, upon specimens given me by my friend, Charles Mackintosh, esq., of Glasgow, who imported it from Corsica, and by whom it is used as cudbear.

178. Lecanora *elegans*. Ach. Syn. p. 182. Richardson in Franklin's Journ. App. p. 760. Br. in Parry's 1st Voy. App. p. cccv.

Lichen *elegans*. Wahl. Fl. Lapp. p. 417.

Hab. Igloolik. Barrow River. South shore of the Strait of the Fury and Hecla. Fern Island.

Inhabits the E. Coast of W. Greenland. *Captain Sabine*.

86. Parmelia.

179. Parmelia *omphalodes*. Ach. Syn. p. 203. Hook. Fl. Scot. P. II. p. 53.

Lichen *omphalodes*. Engl. Bot. t. 604. Wahl. Fl. Lapp. p. 428.

Parmelia *omphalodes*. Hook. Tour in Icel. App. p. 344.

Hab. Winter Island.

180. P. *saxatilis*. Ach. Syn. p. 203. Hook. Fl. Scot. P. II. p. 53. Hook. Tour in Icel. App. p. 344. Richardson in Franklin's Journ. App. p. 761.

Lichen *saxatilis*. Eng. Bot. t. 603. Wahl. Fl. Lapp. p. 428.

Hab. Igloolik.

181. Parmelia *stygia*. Ach. Syn. p. 204. Hooker Fl. Scot. P. II. p. 54. Hook. Tour in Icel. App. p. 344. Brown in Scoresby's Arct. Reg. Richardson in Franklin's Journ. App. p. 761.

Lichen *stygium*. Wahl. Fl. Lapp. p. 427.

Hab. Igloolik.

182. Parmelia *conspersa*. Ach. Syn. p. 209. Richardson in Franklin's Journ. App. p. 761.

Lichen *conspersus*. Wahl. Fl. Lapp. p. 42.

L. *centrifugus*. Engl. Bot. t. 2097.

Hab. South shore of the Strait of the Fury and Hecla.

87. Cetraria.

183. Cetraria *nivalis*. Ach. Syn. p. 228. Hook. Tour in Icel. App. p. 345. Br. in Scoresby's Arctic Reg. Hook. Fl. Scot. P. II. p. 57. Richardson in Franklin's Journ. App. p. 761. Br. in Parry's 1st Voy. App. p. cccvi.

Lichen *nivalis*. Engl. Bot. t. 1994. Wahl. Fl. Lapp. p. 433.

Hab. Igloolik. Upper Savage Island. Hudson's Bay. Winter Island.

Barren specimens.

184. C. *cucullata*. Ach. Syn. p. 228. Richardson in Franklin's Journ. App. p. 761. Br. in Parry's 1st Voy. App. p. cccvi.

Lichen *cucullatus*. Smith in Linn. Trans. v. 1. p. 84. t. 4. f. 7. Wahl. Fl. Lapp. p. 438.

Hab. Igloolik.

185. C. *islandica*. Ach. Syn. p. 229. Hooker Tour in Icel. App. p. 345. Grev. Pl. of W. Greenl. p. 43. Hook. Fl. Scot. P. II. p. 58. Richardson in Franklin's Journ. App. p. 768. Br. in Parry's 1st Voy. App. p. cccvi.

Lichen *islandicus*. Wahl. Fl. Lapp. p. 434. Engl. Bot. t. 1330.

Var. *Thallo opaco, ramulis numerosissimis*.

Hab. Igloolik.

186. C. *juniperina*. Ach. Syn. p. 226. Hook. Fl. Scot. P. II. p. 57. Richardson in Franklin's Journ. App. p. 761. Br. in Parry's 1st Voy. App. p. cccv.

Lichen *juniperinus*. Engl. Bot. t. 2111. Wahl. Fl. Lapp. p. 432.

Hab. Igloolik.

All the specimens of this lichen prove to be the same variety which Mr. Brown has noticed among the Melville Island plants, having the margin of its thallus neither crisped nor pulverulent.

88. Peltidea.

187. Peltidea *aphthosa*. Ach. Syn. p. 238. Hook. Tour in Icel. App. 345. Br. in Scoresby's Arct. Reg. Hook. Fl. Scot. P. II. p. 57. Richardson in Franklin's Journ.

App. p. 761. Engl. Bot. t. 1119. Br. in Parry's 1st Voy. App. p. cccvi. Wahl. Fl. Lapp. p. 446.

HAB. Barrow River.

89. DUFOUREA.

188. Dufourea *arctica*. Richardson in Franklin's Journ. App. p. 762.

D. *rugosa*. Br. in Ross' Voy. ed. 2. v. 2. App. p. cccvi.

HAB. Duckett Cove. Barrow River. Igloolik.

This fine lichen, which Dr. Richardson found in fructification rather abundantly, exists both in Capt. Parry's and Mr. Edwards's collections, but quite in a barren state.

The *D. rugosa* of Brown in Ross' Voyage, appears to be a small aud somewhat lacunose variety of this plant.

189. D. *ramulosa:* thallo fuscescente fistuloso tereti compresso vix lacunoso valde ramoso, ramis tuberculato-ramulosis obtusiusculis.

HAB. Igloolik.

Planta singularis, cæspites laxos diametro bipollicares efformans. *Thallus* erectus, uncialis, fistulosus, inferne nudiusculus, flavo-fuscescens (siccitate glaucescens), superne valde ramosus, olivaceo-fuscus, tereti-compressus, sublacunosus, ramis subdichotomis ramulis parvis vel tuberculis obtusis instructis. *Substantia* tenera, submembranacea, siccitate fragilis. *Fructificatio* ignota.

In habit this plant comes nearest to *D. madreporiformis* of the Swiss Alps; but is of a very different colour, much more branched, beset with small ramuli, or tubercles, and internally quite fistulose, like the thallus of *Dufourea arctica*: in which latter peculiarity, according to the character given by Acharius, this plant differs from the genus *Dufourea*.

There is no appearance of fructification; and the species appears to be rare, as Captain Parry's collection contains but three individuals of it, and these were all found at Igloolik.

90. CENOMYCE.

190. Cenomyce *alcicornis*. Ach. Syn. p. 251. Hook. Fl. Scot. P. II. p. 62.

Lichen *alcicornis*. Eng. Bot. t. 1392.

Mr. Edwards's collection.

191. Cenomyce *pyxidata*. Ach. Syn. p. 252. Hook. Fl. Scot. P. II. p. 62. Richardson in Franklin's Journ. App. p. 762. Br. in Parry's 1st Voy. App. p. cccvii.

Lichen *pyxidatus*. Eng. Bot. t. 1393.

Bæomyces *pyxidatus*. Wahl. Fl. Lapp. p. 453. Hook. Tour in Icel. App. p. 345.

HAB. Igloolik. South shore of the strait of the Fury and Hecla. Island off Cape Wilson.

192. Cenomyce *gracilis*. Hook. Fl. Scot. P. II. p. 63.

C. *ecmocyna*. α. *gracilis*. Ach. Syn. p. 261. Richardson in Franklin's Journ. App. p. 762.

Lichen *gracilis*. Eng. Bot. t. 1264.

Bæomyces *gracilis*. Wahl. Fl. Lapp. t. 455.

Mr. Edwards's collection.

193. Cenomyce *rangiferinus*. Ach. Syn. p. 177. Grev. in Pl. of W Greenl. p. 433. Hooker Fl. Scot. P. II. p. 65. Richardson in Franklin's Journ. App. p. 762.

Lichen *rangiferinus*. Eng. Bot. t. 173.

Bæomyces *rangiferinus*. Wahl. Fl. Lapp. p. 458. Hook. Tour in Icel. App. p. 346.

HAB. Upper Savage Island. Hudson's Bay.

194. Cenomyce *vermicularis*. Ach. Syn. p. 278. Hook. Fl. Scot. P. II. p. Richardson in Franklin's Journ. App. p. 762.

Lichen *vermicularis*. Engl. Bot. t. 229.

Cerania *vermicularis*. Br. in Parry's 1st Voy. App. p. cccvii.

Bæomyces *vermicularis*. Wahl. Fl. Lapp. p. 458. Hook. Tour in Icel. App. p. 346.

HAB. Barrow River.

91. ISIDIUM.

195. Isidium *oculatum*. Ach. Lichen. Univ. p. 570.

Lecanora *oculata*. Ach. Syn. Lich. p. 148. Hook. Fl. Scot. P. II. p. 47. Richardson in Franklin's Journ. App. p. 760.

Lichen *oculatus*. Dicks. Crypt. fasc. 2. p. 17. t. 6. f. 5.

Lichen *dactyliferum*. Wahl. Fl. Lapp. p. 414.

HAB. Igloolik.

92. STEREOCAULON.

196. Stereocaulon *paschale*. Ach. Syn. p. 284. Hook. Tour in Icel. App. p. 348. Grev. Pl. of W. Greenl. p. 433. Hook. Fl. Scot. P. II. p. 66. Richardson in Franklin's Journ. App. p. 762. Br. in Parry's 1st Voy. App. p. cccvii.

Lichen *paschalis*. Eng. Bot. t. 282.

Bæomyces *paschalis*. Wahl. Fl. Lapp. p. 450.

HAB. Igloolik. Winter Island.

93. SPHÆROPHORON.

197. Sphærophoron *fragile*. Ach. Syn. p. 287. Hook. Fl. Scot. P. II. p. 67

Lichen *fragilis*. Eng. Bot. t. 2479. Wahl. Fl. Lapp. p. 448.

HAB. Igloolik.

94. ALECTORIA.

198. Alectoria *jubata*. β. *chalybeiformis*. Ach. Syn. p. 291. Br. in Scoresby's Arct. Reg. Hook. Fl. Scot. P. II. p. 67. Richardson in Franklin's Journ. App. p. 762.

Lichen *chalybeiformis*. Linn. Fl. Suec. p. 1127. Wahl. Fl. Lapp. p. 437.

Mr. Edwards's collection.

95. CORNICULARIA.

199. Cornicularia *aculeata*. Ach. Syn. p. 299. Hook. Fl. Scot. P. II. p. 69.

Lichen *aculeatus*. Wahl. Fl. Lapp. p. 439.

β. *spadicea*. Ach. Br. in Scoresby's Arc. Reg. Hook. Fl. Scot. P. II. p. 68.

Lichen *hispidus*. Eng. Bot. t. 452.

γ. *muricata*.

Lichen *muricatus*. Ach. in Nov. Act. Holm. v. 22. p. 544. t. 4. f. 5.

HAB. Igloolik.

200. Cornicularia *ochroleuca*. Ach. Syn. p. 301. Hook. Fl. Scot. P. II. p. 69. Richardson in Franklin's Journ. App. p. 762. Br. in Parry's 1st Voy. App. p. cccvi.

Lichen *ochroleucus*. Wahl. Fl. Lapp. p. 438. Engl. Bot. t. 2374.

Parmelia *ochroleuca*. Hook. Tour in Icel. App. p. 345.

β. *nigricans*. Ach.

HAB. Igloolik. Upper Savage Island. South shore of the Strait of the Fury and Hecla. (β. with α.)

201. Cornicularia *divergens*. Ach. Syn. p. 300. Meth. p. 305. t. 6. f. 1. (male.) Rich. in Franklin's Journ. App. p. 762.

Lichen *divergens*. Wahl. Lapp. p. 439. Fl. Dan. t. 262.

In Mr. Edwards's collection.

202. Cornicularia *bicolor*. Ach. Syn. p. 301. Hook. Fl. Scot. P. II. p. 69.

Lichen *bicolor*. Eng. Bot. t. 1853.

In Mr. Edwards's collection.

203. Cornicularia *lanata*. Ach. Syn. p. 302. Hook. Tour in Icel. App. p. 345. Hook. Fl. Scot. P. II. p. 69. Br. in Parry's 1st Voy. App. p. cccvi.

Lichen *lanatus*. Engl. Bot. t. 3846. Wahl. Fl. Lapp. p. 440.

HAB. Igloolik.

204. Cornicularia *pubescens*. Ach. Syn. p. 302. Hook. Tour in Icel. App. p. 345. Hook. Fl. Scot. P. II. p. 69. Richardson in Franklin's Journ. App. p. 762.

Lichen *pubescens*. Engl. Bot. t. 2318. Wahl. Fl. Lapp. p. 441.

HAB. Igloolik.

96. ULVA.

205. Ulva *compressa*. Linn. Sp. Pl. p. 1632. Engl. Bot. t. 1739. Wahl. Lapp. p. 508. Hook. Fl. Scot. P. II. p. 91.

Received by Mr. Greville from some gentleman of the Expedition; but without any station being assigned to it. It was, probably, picked up in Hudson's Strait, as no Marine Alga appears to have been found further to the westward by this Expedition; and the only species gathered by Dr. Richardson on the shores of the Arctic Sea were *Fucus ceranoides*, a *Conferva*, a... the fragment of a *Floridea* of Laman.

XXX. ALGÆ.

97. FUCUS.

206. Fucus *vesiculosus*. Linn. Sp. Pl. p. 1626. Eng Bot. t. 1066. Wahl. Fl. Lapp. p. 490. Hook. Fl. Scot. P. II. p. 94.—Tour in Icel. p. 346. Turner Hist. Fuc. t. 88. Syn. Fuc. n. 24. Lyngb. Hydroph. Dan. p. 3.

HAB. Floating in the Sea about the middle of Hudson's Straits: also found in the Esquimaux Canoes. Upper Savage Island.

98. ODONTHALIA.

207. Odonthalia *dentata*. Lyngb. Hydroph. Dan. p. 9. t. 3.

Sphærococcus *dentatus*. Agardh. Syn. p. 22. Hook. Fl. Scot. P. II. p. 102.

Delesseria *dentata*. Lam. Thal. p. 36.

Fucus *dentatus*. Linn. Mant. p. 135. Fl. Norv. v. 2. p. 91. Turn. Syn. Fuc. p 149. Hist. Fuc. t. 13. Hook. Tour in Icel. App. p. 347.

F. *pinnatifidus*. Fl. Dan. t. 354.

Floating on the Sea about the middle of Hudson's Strait: in fructification in July.

99. Sphærococcus.

208. Sphærococcus *laciniatus*. Hook. Fl. Scot. P. II. p. 104. Lyngb. Hydroph. Dan. p. 12. t. 4.

Fucus *laciniatus*. Lightf. Scot. p. 947. Turn. Syst. Fuc. n. 161. Hist. Fuc. t. 69. Engl. Bot. t. 1068.

F. *miniatus*. Fl. Dan. t. 769.

Hab. Floating on the Sea about the middle of Hudson's Strait.

100. Laminaria.

209. Laminaria *Saccharina*. Lam. Thal. p. 22. Agardh. Syn. p. 17. Hook. Fl. Scot. P. II. p. 98.

Fucus *saccharinus*. Linn. Sp. Pl. p. 1630. Lightf. Scot. p. 940. Engl. Bot. t. 1331. Fl. Norv. t. 52. Turn. Syn. Fuc. n. 37.—Hist. Fuc. t. 163. Hooker Tour in Iceland, App. p. 347.

Hab. Floating on the Sea about the middle of Hudson's Strait.

210. Laminaria *Agarum*. Lam. Thal. p. 22. Agardh. Syn. Alg. 17.

Fucus *Agarum*. Gmel. Hist. Fuc. p. 210. t. 32. Fl. Dan. t. 1542. Turner Hist. Fuc. t. 75.

F. *Clathrus*. Esper Hist. Fuc. 128.

Hab. Found on the surface of the Sea, about the middle of Hudson's Strait.

This remarkable *Alga* was likewise detected by Dr. Richardson, at the mouth of Hayes River, Hudson's Bay.

101. Desmia.

211. Desmia *aculeata*. Lyngb. Hydroph. Dan. p. 34. t. 44.

Sporochnus *aculeatus*. Agard. Syn. p. 10. Hook. Fl. Scot. P. II. p. 96.

Fucus *aculeatus*. Lightf. Scot. p. 924. Turn. Syst. Fuc. n. 48.—Hist. Fuc. t. 187. Fl. Dan. t. 355.

F. *muscoides*. Hook. Tour in Icel. App. p. 347.

Desmarestia *aculeata*. Lam. Thal. 25.

Hab. Found in the Esquimaux Canoes, Lower Savage Island, Hudson's Strait.

102. Ptilota.

212. Ptilota *plumosa*. Agardh. Syn. 39. Hook. Fl. Scot. P. II. p. 106. Lyngb. Hydroph. Dan. p. 38. t. 9.

Fucus *plumosus*. Lightf. Scot. p. 955. Fl. Dan. t. 350. Fl. Norv. v. 2. p. 91. Turn. Syn. Fuc. p. 296.—Hist. Fuc. t. 60. Hooker Tour in Icel. App. p. 347.

F. *pectinatus*. Fl. Norv. v. 2. p. 122. t. 2. f. 8.
F. *ptilotus*. Fl. Norv. v. 2. p. 135. t. 2. f. 15.
Plocamium *plumosum*. Lam. Thal. p. 50.
Floating on the sea about the middle of Hudson's Strait.

103. Gigartina.

213. Gigartina *confervoides*. Lam. Thal. p. 48. Lyngb. Hydroph. Dan. p. 43.
Fucus *confervoides*. Linn. Sp. Pl. p. 1629. Fl. Norv. v. 2. p. 92. Engl. Bot. t. 1688. Turn. Syn. Fuc. p. 328.—Hist. Fuc. t. 84. Hook. Tour in Iceland, App. p. 347.
F. *elongatus*. Fl. Norv. v. 2. p. 143.
Floating on the sea about the middle of Hudson's Strait.

104. Palmella. *Lyngbye.*

Massa gelatinosa, subhyalina, granulis solitariis globosis farcta. *Lyngb.*

214. Palmella *nivalis*, massa tenuis, superficie sporulis sphæricis parvis, sed magnitudine inæqualibus, numerosis, intense rubris granulata.

Uredo *nivalis*. Bauer in Brande's Quarterly Journ. of Sciences and the Arts. v. 7. t. 222. t. 7.

Algarum species, Brown in Ross' Voy. ed. 2. v. 2. App. p. 195.

Hab. Igloolik, &c. On snow; and also attached to stones and covering mosses with a thin gelatinous crust.

After the admirable history and figures of this curious substance (so well known to our Arctic navigators by the name of *Red Snow*), that are given by Mr. Bauer, both in the Quarterly Journal of Science, and in the Philosophical Transactions for 1820, p. 165, t. 17, scarcely any thing is left for me to say upon the subject of its structure and mode of growth. Mr. Bauer has satisfactorily proved the red snow to be a vegetable, and if other naturalists had, like myself, possessed the advantage of seeing it covering stones and mosses, like many other Cryptogamic vegetables, there would have been no cause for discussion relative to the kingdom of Nature to which this subject should belong.

That a plant should vegetate, in and upon snow, and that it should do so, too, to such an extent as to cover a tract of eight miles in length, and frequently to a depth through the snow of ten or twelve feet, must, indeed, excite our astonishment. Growing upon stones and turf, it assumes an appearance very similar to that of some of our own vegetables; and there is one plant particularly, familiar to the Crytogamic Botanist of this country, to which this individual, in its general structure, may well be compared, which is the *Tremella cruenta* of *English Botany* (unquestionably a true *Palmella.*) Its similarity to this did not escape my acute friend. Mr. Brown, who, in a note in the Appendix to Ross' Voyage, expresses his opinion that it is nearly allied to it. Mr. Bauer is disposed to agree with Mr. Brown, although unacquainted with the plant in question, upon the ground that (according to the description given by the author of *Eng. Bot.*) the *T. cruenta* is formed of a "congeries of extremely minute, pellucid, globular granulations, all equal in size;" whence Mr. Bauer infers, that the plant is an *Uredo*. The true nature of the *T. cruenta* is not, in *English Botany*, correctly defined; it forms, in reality, a thin gelatinous stratum, or mass, in which (entirely immersed and imbedded) are numerous extremely minute, spherical granules, all equal in size, and of a dull purplish red colour. From these circumstances we may perceive, that our present plant differs in nothing from *T. cruenta*, except in its granules being *external*, and in their size and colour.

In regard to its right to a place in the genus *Uredo*, where the able Mr. Bauer has placed it, unquestionably, in looking at the figure above quoted of his *U. nivalis*, ff. 1—8, *U. Graminis*, 9—10, and *U. fœtida*, f. 11, these would all appear to belong to one and the same genus. I do not possess, at this time, any specimens of *U. fœtida*, but I presume that it denotes the *Stinking* or *Bladder Brand* of the Norfolk farmer, the *U. Caries* of *De Candolle*, of *Hooker's Fl. Scotica*, and *Greville's Fl. Edinensis*; the *U. sitophila* of Ditmar in *Sturm's Fungi of Germany, tab.* 34. If this be the case, then, setting aside the different places of growth, which I must yet allow to be of some consequence in these minute vegetables, there is the remarkable distinction that the extremely minute *sporules* are themselves enclosed in a *sporidium* or kind of capsule, which is not the case with our plant. The *Uredo Segetum* I take to be that of Persoon, and most authors; and, to quote figures, the *Reticularia Segetum* of Bulliard's *Champignons*, t. 472, the *Ustilago Segetum* of Link, in *Sturm's Fungi of Germany*, t. 33, what is commonly called the *Smut* or *Pepper Brand* by agriculturists. I am aware that most authors, and amongst them I myself in the *Flora Scotica*, have described this species as having its sporules forming a copious black dust, *naked*, attached within the fruit or glume of grasses; in other words, *destitute* of *sporidium*; and, on again looking casually at my specimens, I find such to be the case in a great many instances; but, on a more strict investigation, I clearly discover a number of *sporidia*, which have not yet shed their dust*; so far according with the character of *U. Caries* (or *fœtida*), but differing in the shape of their sporidia. Mr. Bauer has, perhaps, only observed the sporidia before they were burst, and I am the more inclined to this supposition from the circumstance of his having given that tuberculated appearance to his plants (f. 9.), which indicate their containing sporules. Nothing of this kind is observable in the Arctic plants.

Upon a consideration of all these circumstances, I cannot but think that the *Red Snow*, although not decidedly a *Palmella*, since the granules are not immersed, yet approaches much nearer to it than to *Uredo*†: and, perhaps, Lyngbye's generic character might, without inconvenience, be modified so as to include it.

On a subject, however, of such minuteness, and which has excited so much attention, I was not willing to rest satisfied with the result of my own unaided investigations. Mr. Greville, who has examined the plant, quite agrees in the above remarks; and Captain Carmichael, to whom I communicated specimens, was kind enough to write to me as follows respecting it:—"I was anxious to see the *Red Snow*, having read a great deal of discordant opinion respecting its nature; I have examined it with some care, and from all I know of *Uredo*, it does not appear to have the slightest affinity with that genus. The *Uredos* are all parasitical, and the sporidia are attached by more or less of a pedicel to the matrix. But there cannot be parasites upon snow, any more than on water; and, as you have remarked, the sporules of this plant are merely imbedded in gelatine, without any kind of attachment. A *Palmella* it may be, according to the present loose construction of that genus, but surely very far removed from *P. cruenta*. In the latter, the sporules are all of the same size, and buried in the gelatine; whereas in this plant, they are of twenty different sizes, and the larger of them are twenty times the size of those of *P. cruenta*. They are, besides, protruded in such a manner as to render the whole surface granular. Of all the plants I am acquainted with, it comes the nearest, in general habit, to *P. botryoides*; but its internal structure is widely different. On the whole, I should think, as you have asked me to give my opinion, that you may safely arrange the *Red Snow* among the *Palmellæ*. It has, at least, a better title to rank there than *P. botryoides*. The great diversity in the size of the sporules, peculiar, I believe, to the Arctic plant, cannot be considered as a generic objection, though it will form a good specific distinction."

* If a fully formed sporidium be put into water, it bursts after a little time, and the numerous sporules, which have been considered to form the entire plant, will float about in great numbers upon the table of the microscope.

† Professor Agardh, of Lund, has, since the above account was written, described the Red Snow as a new genus, under the name of *Rotococcus nivalis*.

REFERENCE TO THE BOTANICAL PLATES.

APP. TAB. I.

PEDICULARIS NELSONII. p. 402.

FIG. 1. Plant, *natural size.*
2. Calyx and bractea, *magnified.*
3. Corolla, *magnified.*
4. Anther, *magnified.*
5. Pistil, *magnified.*

CREPIS NANA, p. 397.

FIG. 1. Plant, *natural size.*
2. Single flower, *magnified.*
3. Floret, *magnified.*
4. Involucre, with the ripe fruit, *magnified.*
5. Pericarp, *magnified.*
6. Hair of the pappus, *magnified.*
7. Involucre and receptacle, as seen after the falling away of the seeds, *magnified.*

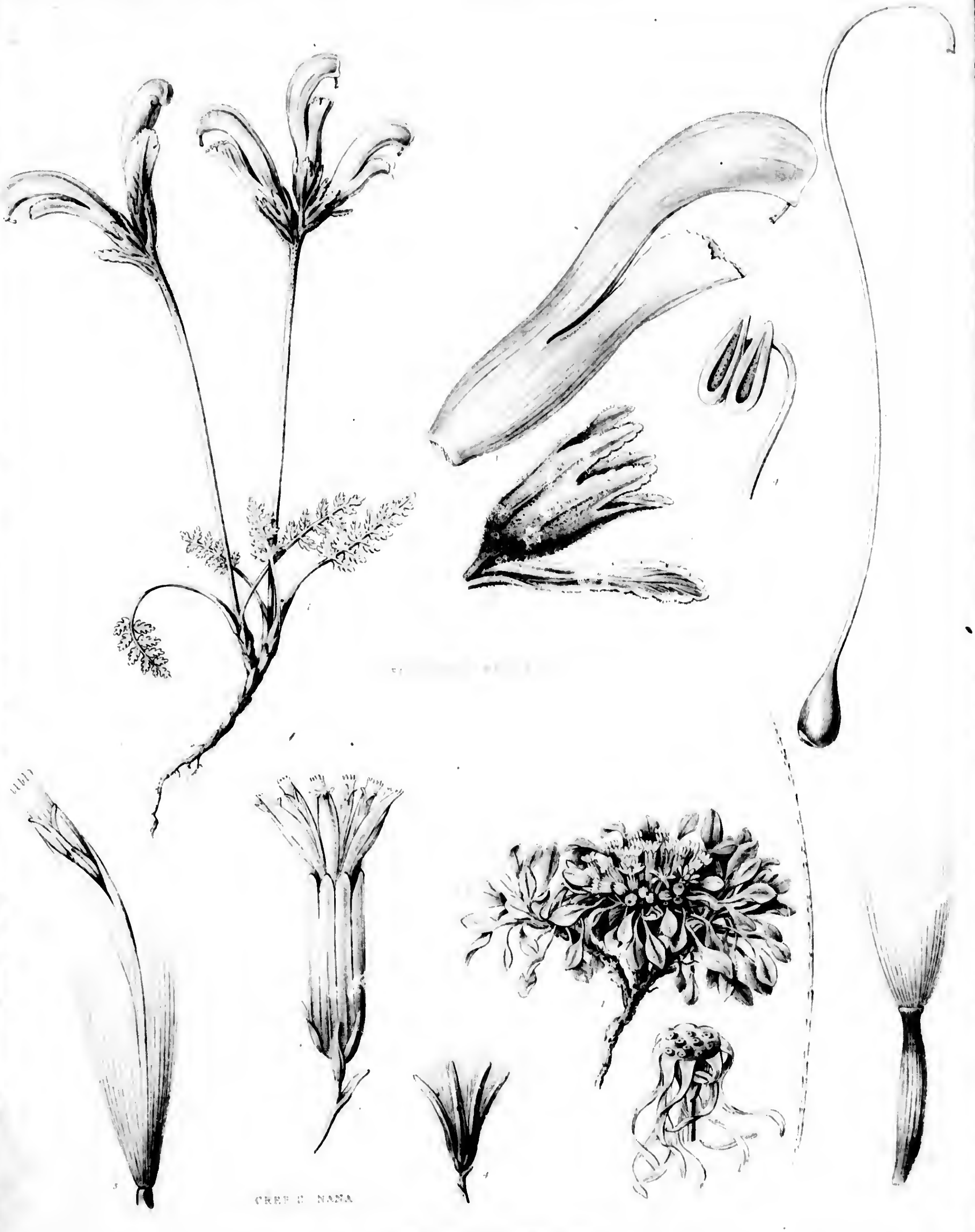
APP. TAB. II.

COLPODIUM LATIFOLIUM, p. 408.

FIG. 1. Plant, *natural size.*
2. Spikelet, *magnified.*
3. Spikelet, before the expansion of the flower, *magnified.*
4. Superior valve of the Corolla, *magnified.*

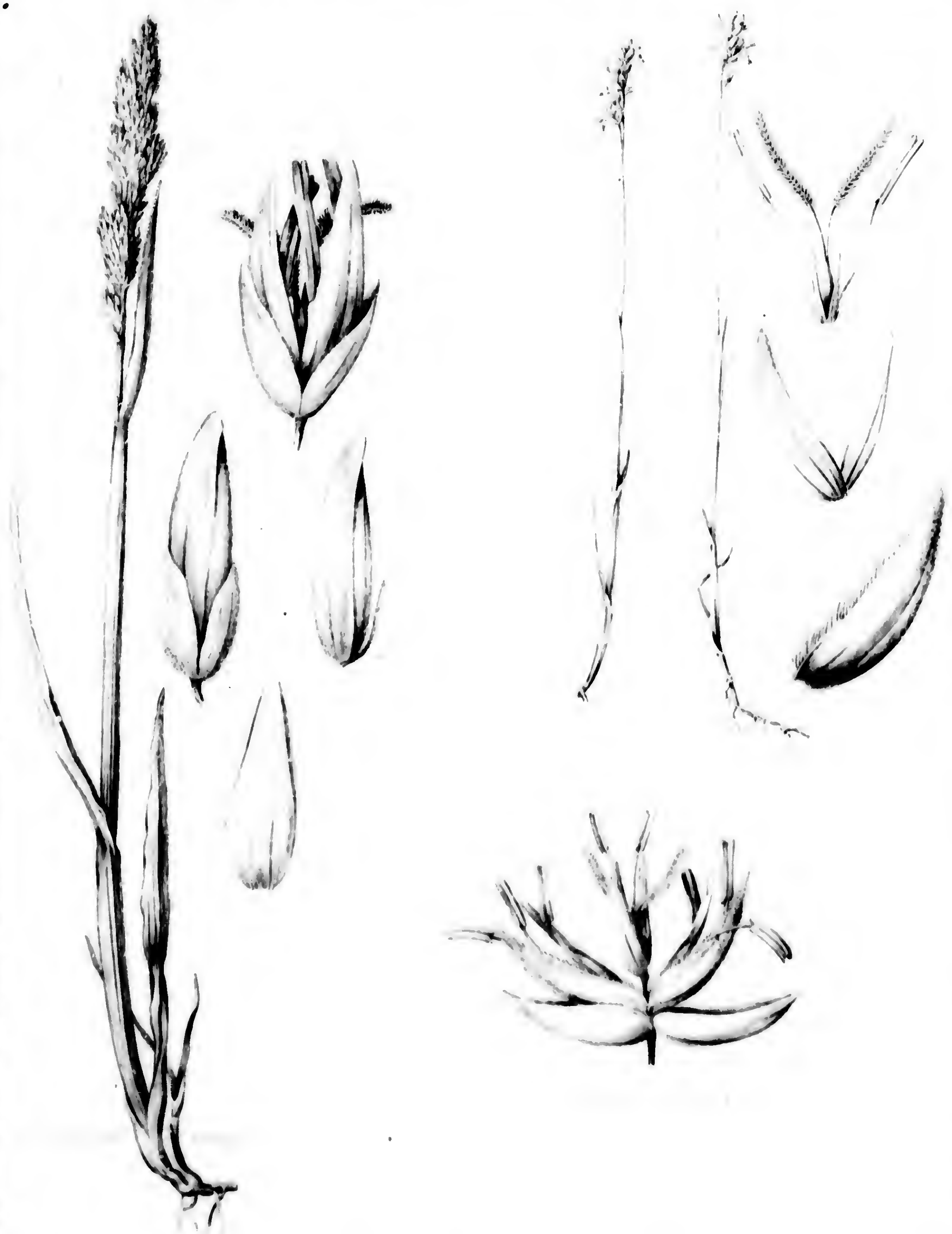
HIEROCHLOE PAUCIFLORA, p. 410.

FIG. 1. Plant, *natural size.*
2. Spikelet, shewing the florets, *magnified.*
3. Inferior valve of a lateral floret, *magnified.*
4. Superior floret, *magnified:* from which are removed and represented at
5. The two stamens, the pistil, and the hypogynous scales or lodiculæ, *magnified.*



CREPIS NANA

London. Published by John Murray Feb 1 18



LIST OF ZOOPHYTES,

BY

JOHN FLEMING, D.D., F.R.S.E., &c. &c.

ZOOPHYTES.

All the species are marked as having been "found on the surface of the sea, about the middle of Hudson's Strait, 29th July 1821." They appear to have floated about in the sea for some time, as they are generally in a bleached state.

1. Flustra *pilosa*. (Solander.) Ellis's Corallines, p. 73. No. 4. Table xxxi. Investing, sparingly, the Cellaria loriculata.

2. Cellaria *loriculata*. (Sol.) Ellis's Cor. p. 40. No. 7. Tab. xxi. fig. b. B. In the form of a large tuft.

3. C. *ciliata*. (Sol.) Ellis's Cor. p. 38. No. 5. Tab. xx. fig. d. D. A single small branch adhering to the preceding.

4. Tubularia? In the single tuft of this which has been preserved, there are several slender tubes, with a few scattered branches. But the absence of wrinkles on the stalks, the canal of the branches being closed at the base, and the soft decomposed aspect of the inner surface, lead to the suspicion, that it is an altered sea weed, and not a subject of the animal kingdom.

5. Sertularia *argentea*. (Sol.) Ellis's Cor. p. 6. No. 4. fig. c. C. The specimens exhibited the remains of the vesicles or ovaria.

6. S. *cupressina*. (Sol.) Ellis's Cor. p. 7. 1105. Tab. iii. fig. a. A. In the examples of this variable species, the lateral branches are, for the most part, simple, a character resulting from its growth in deep water.

7. S. *repens*. (Sol.) Ellis's Cor. p. 25. Tab. xiv. fig. b. B. Creeping on the surface of *Sphærococcus laciniatus*.

8. Plumularia (Lamarck) *bullata*. N. S. This coralline is irregularly branched; each branch arises from a cell (or denticle) which has enlarged into an ovate vesicle, slightly wrinkled across. From the top of this vesicle a tubular stem proceeds, thinly covered, on one side, with a row of cells, some of which are enlarged into vesicles supporting other branches. The base of the vesicle is united with the mouth of the cell; but the line of separation is distinct, in consequence of the cell and branch with which it is connected, being of a denser substance. In the younger branches, the communication between the central tube of the stem and the cavity of the vesicle is free; in the older portions, however, this connexion ceases. At the external base of the vesicle, from one to three tubular radicles take their rise, and descend along the supporting stem and others which are inferior to it, closely adhering to their surface. These tubes are, like the stems and branches, destitute of joints.

Each cell is short, scarcely the diameter of the stem which supports it, with a horizontal or slightly oblique mouth, and destitute of lateral or inferior processes. In all the cells, I observed portions of a thin membrane, connected or continuous with the margin, and more or less cup-shaped, which appeared to be the remains of vesicles, similar to those which give rise to the branches. Their nature was likewise pointed out by the remains of the tubular radicles, still in connexion with some of the largest portions. To some of the cells cylindrical bodies were attached, which, after maceration, appeared of the consistence of the body of the polypi of several sertulariæ; but instead of terminating in a tentacular head, became contracted, and gave rise to branches bearing cells. In some cases, two contiguous cells supported each a vesicle bearing a branch.

The preceding description will suffice to show that this coralline differs from all those described by Ellis, among his vesiculated corallines; by Lamarck, in his genus *Plumularia*; or by Lamouroux, in his genus *Aglaophenia*. But the mutilated condition of the specimen leaves much to be desired in the characters of the species. I have observed in other vesiculated corallines (Edinburgh Philosophical Journal, vol. ii. p. 86) a capability, when placed in circumstances unfavourable for ordinary growth, of converting the polypi, in the cells, into branches bearing cells. The anomalous appearances of this species seem to indicate that it had recently been placed in a condition where the exertion of similar energies was requisite, in converting polypi and ovaria into branches; thus exhibiting a curious example of viviparous reproduction or extension.

9. MILLEPORA *pumicosa*. (Sol.) Ellis' Cor. p. 75. No. 7. Tab. xxx. fig. d. D. A small mass adhering to Cellaria loriculata.

10. M. *tubulosa*. (Sol.) Ellis's Cor. p. 74. No. 6. Tab. xxvii. fig. e. E. A small portion only adhering to the ODONTHALIA *dentata*. I observed, resting on the same plant, a microscopic shell agreeing with the NAUTILUS *umbilicatus* of Montagu's Testacea Britannica Supp. p. 78. Tab. xviii. f. 1.

11. SPONGIA *infundibuliformes*, of Linnæus. A single, young, bleached, worn and damaged specimen. By comparing its skeleton, under the microscope, with a portion of the same species from Orkney, I could not discover any definite distinguishing character. The latter, being in a more perfect state, exhibited the spiculæ held in closer connexion by the gelatine.

12. S. *parasitica*, of Montagu: "Memoirs of the Wernerian Society of Edinburgh, Vol. ii. p. 114. No. 34. A small macerated portion of this sponge adhered to the ODONTHALIA *dentata*. Under the microscope the skeleton corresponded with the species to which we have referred.

THE END.

LONDON:—Printed by W. CLOWES, Northumberland-Court, Strand.