

fieurs *Daubenton* and *Adanson*, a great number of experiments, of which the duke has favoured the public with a particular account.

In the year 1757, there were two accounts published upon this subject: the one is a memoir of M. *Æpinus*, read to the Royal Academy at Berlin, intituled, *De quibusdam experimentis electricis notabilioribus*. The other is a treatise in quarto, printed at Rostock, intituled, *Disputatio de electricitatibus contrariis*. *Auctore Joanne Carolo Wilke*. Since which time, Dr. Heberden, who is ever desirous of extending the bounds of science, having procured some of these stones from Holland, a great number and variety of experiments with them have been made here, particularly by the ingenious Mr. Wilson; an account of which he has very lately communicated to the Royal Society.

XXXVIII. *An Attempt to account for the regular diurnal Variation of the horizontal magnetic Needle; and also for its irregular Variation at the Time of an Aurora Borealis: By John Canton, M. A. and F. R. S.*

Read Dec. 13, 1759. **T**HE late celebrated Mr. George Graham made a great number of observations on the diurnal variation of the magnetic needle, in the years 1722 and 1723; but declared himself ignorant of the cause of that variation, in No 383 of the Philosophical Transactions, where many of those observations are to be found. About
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the year 1750, Mr. Wargentin, secretary of the Royal Academy of Sciences in Sweden, took notice, both of the regular diurnal variation of the needle, and also of its being disturbed at the time of an aurora borealis, as recorded in the 47th volume of the Philosophical Transactions; but is silent as to the cause. I had no opportunity of making observations of this sort myself, till the latter end of the year 1756; but, since that time, I have made near four thousand, with an excellent variation-compass, of about nine inches in diameter. The number of days, on which these observations were taken, is 603; and the diurnal variation on 574 of them was *regular*; that is, the absolute variation of the needle westward, was *increasing* from about eight or nine o'clock in the morning, till about one or two in the afternoon, when the needle became stationary for some time; after that, the absolute variation westward was *decreasing*, and the needle came back again to its former situation, or near it, in the night, or by the next morning. The diurnal variation is *irregular*, when the needle moves slowly eastward in the latter part of the morning, or westward in the latter part of the afternoon; also when it moves much either way after night, or suddenly both ways within a short time. These irregularities seldom happen more than once or twice in a month, and are always accompanied (so far as I have been able to observe) with an aurora borealis. Thus having explained what I mean by the regular and irregular diurnal variation, and shewn, that this variation is generally regular; I shall now, in the first place, endeavour to account experimentally for the regular variation; then offer a conjecture concerning the

the cause of the irregular variation ; and, lastly, attempt to make it appear probable, that the aurora borealis arises from the same cause.

The attractive power of the magnet, (whether natural, or artificial) will *decrease* while the magnet is *heating*, and *increase* while it is *cooling* ; as will appear by the following experiments.

Experiment 1. About E. N. E. from a compass, a little more than three inches in diameter, I placed a small magnet two inches long, half an inch broad, and three-twentieths of an inch thick, parallel to the magnetic meridian ; and at such a distance, that the power of the south end of the magnet was but just sufficient to keep the north end of the needle to the N. E. point, or to 45° . The magnet being covered by a brass weight of sixteen ounces, about two ounces of boiling water was poured into it, by which means the magnet was gradually heating for seven or eight minutes ; and during that time, the needle moved about three quarters of a degree westward, and became stationary at $44^\circ \frac{1}{4}$; in nine minutes more, it came back a quarter of a degree, or to $44^\circ \frac{1}{4}$; but was some hours before it gained its former situation, and stood at 45° . *N. B.* The greater the power of the same magnet, the more it will lose in a given degree of heat.

Exp. 2. On each side of the compass, and parallel to the magnetic meridian, I placed a strong magnet of the size above-mentioned ; so that the south ends of both the magnets acted equally on the north end of the needle, and kept it in the magnetic meridian ; but if either of the magnets was removed, the needle was attracted by the other, so as to stand at 45° degrees.

grees. The magnets were both covered with brass weights of sixteen ounces each. Into the eastern weight I poured about two ounces of boiling water; and the needle in one minute moved half a degree, and continued moving westward for about seven minutes, when it arrived at $2^{\circ} \frac{3}{4}$. It was then stationary for some time; but, in twenty-four minutes from the beginning, it came back to $2^{\circ} \frac{1}{2}$, and in fifty minutes to $2^{\circ} \frac{1}{4}$. I then filled the western weight with boiling water, and in one minute, the needle came back to $1^{\circ} \frac{3}{4}$; in six minutes more, it stood half a degree eastward; and after that, in about forty minutes, it returned to the magnetic north, or its first situation.

It is evident, that the magnetic parts of the earth in the north on the east side, and the magnetic parts of the earth in the north on the west side of the magnetic meridian, equally attract the north end of the needle. If then the eastern magnetic parts are heated faster by the sun in the morning, than the western, the needle will move westward, and the absolute variation will increase; when the attracting parts of the earth on each side of the magnetic meridian have their heat increasing equally, the needle will be stationary, and the absolute variation will then be greatest; but, when the western magnetic parts are either heating faster, or cooling slower than the eastern, the needle will move eastward, or the absolute variation will decrease; and when the eastern and western magnetic parts are cooling equally fast, the needle will again be stationary, and the absolute variation will then be least. This may be still further illustrated, by placing the compass and two magnets, as in the last experiment,

ment, behind a screen near the middle of the day in summer ; then, if the screen be so moved, that the sun may shine only on the eastern magnet, the needle will sensibly vary in its direction, and move towards the west ; and if the eastern magnet be shaded, while the sun shines on the western, the needle will move the contrary way. By this theory, the diurnal variation in the summer ought to exceed that in the winter ; and I accordingly find by observation, that the diurnal variation in the months of June and July, is almost double that of December and January.

The irregular diurnal variation must arise from some other cause than that of heat communicated by the sun ; and here I must have recourse to subterranean heat, which is generated without any regularity as to time, and which will, when it happens in the north, affect the attractive power of the magnetic parts of the earth on the north end of the needle. The reverend Dr. Hales has a good observation on this heat, in the Appendix to the second volume of his Statical Essays, which I shall here transcribe. “ That the warmth of
 “ the earth, at some depth under-ground, has an
 “ influence in promoting a thaw, as well as the
 “ change of the weather from a freezing to a thaw-
 “ ing state, is manifest from this observation ; viz.
 “ Nov. 29, 1731, a little snow having fallen in the
 “ night, it was, by eleven the next morning, mostly
 “ melted away on the surface of the earth, except in
 “ several places in *Bushy-Park*, where there were
 “ drains dug, and covered with earth, where the
 “ snow continued to lie, whether those drains were
 “ full of water, or dry ; as also where elm-pipes lay
 “ under-ground ; a plain proof that these drains inter-
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 “ cepted

“ cepted the warmth of the earth from ascending
 “ from greater depths below them; for the snow lay
 “ where the drain had more than four feet depth of
 “ earth over it. It continued also to lie on thatch,
 “ tiles, and the tops of walls.”

That the air nearest the earth will be most warmed by the heat of it, is obvious; and this has frequently been taken notice of in the morning, before day, by means of thermometers at different distances from the ground, by the reverend Dr. Miles, at Tooting in Surrey; and is mentioned in p. 526, of the 48th volume of the Philosophical Transactions.

The aurora borealis, which happens at the time the needle is disturbed by the heat of the earth, is supposed to be the electricity of the heated air above it; and this will appear chiefly in the northern regions, as the alteration in the heat of the air in those parts will be greatest. This hypothesis will not seem improbable, if it be considered, that electricity is now known to be the cause of thunder and lightning; that it has been extracted from the air at the time of an aurora borealis; that the inhabitants of the northern countries observe the aurora to be remarkably strong, when a sudden thaw happens after severe cold weather; and that the curious in these matters, are now acquainted with a substance, that will, without friction, both emit and absorb the electrical fluid, only by the increase, or diminution of its heat: for if the *Tourmalin* be placed on a plane piece of heated glass, or metal, so that each side of it, by being perpendicular to the surface of the heating body, may be equally heated; it will, while heating, have the electricity of one of its sides positive, and that of the other

negative, this will likewise be the case when it is taken out of boiling water, and suffered to cool; but the side that was positive while it was heating, will be negative while it is cooling, and the side that was negative, will be positive*.

For the sake of those who may be desirous of examining the diurnal variations of the needle very minutely, I shall annex a complete year's observations; and shall deduce, from the regular variations during that time, the mean diurnal variation belonging to each month: whence it will appear, that the diurnal variation increases from January to June, and decreases from June to December.

In the following table, the first column contains the day of the month; and the second, the hour and minute of the day (according to equal time), when each observation was made. The third column contains the absolute variation of the needle westward, or the angle it made with a true meridian line at the respective times; which differs less than two minutes of a degree from that at Greenwich, where the reverend Dr. Bradley was so kind as to give me several opportunities of taking it, in his presence, by the curious apparatus for that purpose, belonging to the royal observatory. And in the fourth column are set down the degrees of heat, by a Fahrenheit's thermometer, hung without, in the shaded air, on the north side of the house.

* See the Gentleman's Magazine for last September.

Spital Square, London, 1759.

January.					January.				
D.	H.	M.	°	Th.	D.	H.	M.	°	Th.
1	1	M	0 18	54 34	6	0	A	5 19	6 89
	10		15 18	56 37		1	10	19	6 40
	11		0 18	57 38		1	30	19	5 40
	0	A	15 18	59 40		2	30	19	4 39
	1		0 19	0 42		9	10	18	54 33 $\frac{1}{2}$
	1		45 18	59 42	7	11	M	0 18	59 42
	8		0 18	54 40		0	A	30 19	0 44
2	10	M	30 18	56 45		1		0 19	1 45
	1	A	12 18	59 46		1	30	19	0 47
3	0	M	10 18	54 45		2	30	18	59 46
	10		0 18	57 45		8	50	18	55 44
	0	A	20 19	2 44 $\frac{1}{2}$	8	0	M	40 18	53 45
	1		0 19	3 44		8	45	18	53 47
	1		30 19	4 44		9	45	18	55 47 $\frac{1}{2}$
	2		0 19	3 44		1	A	25 19	1 50
	4		0 18	59 45		4	50	18	56 48
	9		0 18	54 46		9	10	18	52 47
4	0	M	18 18	54 47	9	0	M	25 18	54 46
	9		30 18	56 49		8	53	18	57 44
	11		58 18	58 52		0	A	30 19	0 46
	1	A	55 18	58 53		1	15	19	0 47
	3		12 18	58 52 $\frac{1}{2}$		9		0 18	57 49
5	0	M	30 18	54 51		11	30	19	0 52
	10		0 18	57 47		11	40	19	2 52
	0	A	30 19	0 46	10	9	M	0 18	55 52
	1		15 19	1 45 $\frac{1}{2}$		10	10	18	56 52 $\frac{1}{2}$
	2		20 19	0 45		1	A	0 18	59 54
	4		0 18	57 44		1	30	18	59 54 $\frac{1}{2}$
	9		30 18	54 42		2	20	18	59 54
6	0	M	20 18	54 40		3		0 18	58 54
	10		15 19	2 37		9	10	18	55 53 $\frac{1}{2}$
	10		45 19	4 38		11	45	18	55 52

January.						January.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
11	8	M	40	18 54	48	15	3	A	50	18 58	51
	9		40	18 55	49		9		10	18 55	50
	10		40	18 58	49	16	0	M	25	18 55	50
	11		50	19 0	49½		8		20	18 55	48
	0	A	40	19 2	51		9		20	18 55	49
	1		20	19 2	51		10		30	18 57	49½
	2		10	19 1	51		11		30	18 59	50
	2		45	19 0	51		1	A	0	19 2	50
	0	M	15	18 57	47		2		55	19 0	49
	9		0	18 54	48		5		50	18 59	48½
12	10		10	18 56	48	17	9		0	18 58	48
	11		5	18 58	48½		0	M	10	18 54	47
	0	A	5	19 0	49½		9		0	18 55	44
	1		20	19 1	50		10		15	18 56	45
	2		30	19 0	50		0	A	20	18 59	46
	5		15	18 57	49½		1		10	19 0	46½
	8		30	18 56	48		2		45	18 59	46½
	0	M	30	18 56	46		6		0	19 1	46½
	9		20	18 55	47		9		0	18 48	46½
	10		20	18 56	47		9		5	18 45	46½
13	11		50	18 58	48		9		20	18 46	46½
	1	A	15	19 0	45	18	9		30	18 47	46½
	2		30	18 59	44		0	M	20	18 50	46
	7		0	18 57	42		8		30	18 54	48½
	0	M	10	18 58	43		10		0	18 55	48½
	9		45	18 56	46		11		30	18 58	49
	10		45	18 57	50		0	A	10	19 0	49½
14	9	A	10	18 55	48	19	1		55	19 1	50
	0	M	10	18 55	47		5		20	18 59	47
	8		30	18 55	48		0	M	5	18 55	43
	10		20	18 56	51		8		45	18 56	37
	11		35	18 58	52		11		0	18 59	39
	0	A	45	19 0	52½		0	A	20	19 1	39
15	1		35	19 0	52		0		45	19 3	39½

January.						January.						
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.	
19	1	A	20	19	4 39	22	2	A	45	19	2 36½	
	2		15	19	3 39		3		45	19	0 35	
	3		35	19	1 38		8		0	18	58 32	
	6		15	19	4 37		9		10	18	57 34	
	6		32	19	0 37		23	0	M	10	18	59 31
	6		53	19	0 36			8		50	18	55 28
	9		0	18	59 34			9		50	18	56 29
	0	M	5	18	57 32½			11		25	18	59 33
	8		35	18	56 32½			1	A	10	19	2 37
	9		45	18	58 34			3		45	19	3 36½
	0	A	45	19	3 38			5		10	19	0 35
	1		25	19	4 40			7		0	18	59 34
2		10	19	2 39½	9			0	18	56 33		
7		15	18	58 37	24	0		M	25	18	56 32	
8		45	18	54 36		9			0	18	57 35	
9		20	18	54 35		10			0	18	59 38	
0	M	10	18	58 33		11		45	19	1 41		
10		0	18	57 32		0	A	15	19	2 42		
11		0	18	59 33		0		40	19	3 42		
12		0	19	1 35		1		15	19	4 42		
1	A	0	19	2 37		2		0	19	4 42½		
1		35	19	2 37½		3		0	19	4 43		
2		45	19	1 36½		3		55	19	2 41		
5		5	19	0 34		6		25	18	59 38		
9		55	18	57 31		25	0	M	25	18	50 38	
0	M	30	18	55 28½	9			0	18	54 38		
8		30	18	54 28	11			0	18	58 43		
9		30	18	55 29	0		A	20	19	0 44		
10		40	18	58 32	1			20	19	1 45		
11		40	19	0 35	1			45	19	1 45		
0	A	30	19	2 36½	2			20	19	1 45		
1		10	19	4 37	4			0	18	59 44½		
1		35	19	4 37	7			45	18	57 44		
2		10	19	3 37	26		0	M	20	18	56 42	

January.						January.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
26	8	M 35	18	55	44	30	0	M 25	18	57	41
	10	40	18	56	46		9	0	18	56	44
	0	A 30	19	1	47		10	0	18	54	46
	1	25	19	4	47½		11	10	18	57	47
	2	20	19	3	47		1	A 0	19	3	48½
	4	30	19	0	46		6	30	18	58	47½
	9	0	18	57	45		11	55	18	54	47
	11	45	18	56	44	31	8	M 30	19	0	45
27	8	M 40	18	53	43		10	0	18	57	46
	10	0	18	54	44		11	0	18	58	47
	11	30	18	58	46		12	0	18	59	48
	1	A 7	19	0	48		0	A 58	19	1	49
	1	30	19	0	49		1	50	19	3	49
	2	10	19	1	49		2	15	19	2	49
	3	35	18	59	48		4	0	18	59	48½
	8	20	18	57	47		7	10	18	58	47
	11	55	18	56	47		11	55	18	57	46
28	10	M 0	18	55	49	February.					
	11	0	18	56	49	D.	H.	M.	°	'	Th.
	1	A 0	19	1	49	1	8	M 40	18	54	39
	1	30	19	2	49½		9	20	18	54	40
	2	40	19	1	47		10	0	18	55	41
	6	45	18	59	43		11	45	18	58	43
	8	50	18	56	42		0	A 50	19	0	45
29	0	M 25	18	56	39		1	30	19	0	46
	8	40	18	54	35		2	12	18	59	46
	10	15	18	55	38		4	40	18	57	44
	11	40	18	58	42		11	40	18	56	40
	1	A 0	19	2	45	2	9	M 15	18	55	46
	1	25	19	2	45		0	A 10	19	0	49
	2	0	19	3	45		1	15	19	1	50
	2	45	19	2	44		2	10	19	3	49½
	3	35	19	0	43½						
	9	0	18	58	42						

Febru-

February.						February.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
2	2A	40	19	2	49		0A	9	18	57	46
	4	30	18	59	48½		0	18	19	1	46½
	9	20	18	57	48		0	25	19	6	46½
3	0M	23	18	56	48		0	31	19	8	47
	8	30	18	57	49		2	0	19	1	48
	9	30	18	57	49		3	0	18	36	47½
	10	15	18	58	49½		4	25	18	39	46½
	0A	30	19	6	50		4	26½	18	54	46½
	1	5	19	7	50		4	28	19	4	46½
	1	40	19	8	49		4	29½	19	44	46½
	9	0	18	51	43		4	30½	19	46	46½
4	0M	10	18	58	40		4	32½	19	49	46½
	9	30	18	54	42		4	34	19	4	46½
	11	0	18	58	45		4	35½	19	19	46½
	11	20	18	24	45½		4	36½	19	24	46½
	11	22	18	16	45½		4	38	19	34	46½
	11	22½	18	12	45½		4	38½	20	4	46½
	11	24	18	19	45½		4	39⅔	20	54	46½
	11	25½	18	14	45½		4	41	21	24	46½
	11	27	18	21	45½		4	42¾	20	44	46½
	11	29	18	34	45½		4	44⅓	19	24	46½
	11	30	18	29	45½		4	45⅓	17	54	46½
	11	31½	18	29	45½		4	47	18	14	46½
	11	32½	18	24	45½		4	48½	18	32	46½
	11	33	18	19	45½		4	51¾	17	29	46½
	11	35	18	24	45½		4	52¾	17	54	46½
	11	36	18	24	45½		4	54	18	24	46½
	11	38½	18	21	45½		5	7½	17	54	46
	11	42	18	16	45½		5	9½	17	50	46
	11	46	18	34	46		5	39½	18	37	46
	11	48½	18	36	46		5	51	19	9	45½
	11	53	18	45	46		6	44	19	2	44
	12	0	18	51	46		6	53	18	57	43½
	0A	6	18	54	46		8	40	19	2	42

A strong Aurora Borealis.

February.							February.						
D.	H.	M.	°	'	Th.		D.	H.	M.	°	'	Th.	
An Aurora Bor.	4	10 A	10	18 59	41		8	9 A	25	19	1	46	
	5	8 M	32	19 11	43		9	0 M	10	18 59		46	
		11	8	18 59	45			8	55	18 58		45	
		11	58	19 2	47			10	0	18 58		45½	
		0 A	30	18 58	49			11	40	19 0		46	
		1	40	19 4	50			0 A	55	19 4		46½	
		6	0	18 55	48			1	50	19 5		47	
		6	42	18 49	48			2	15	19 4		47	
		7	24	18 44	48			5	35	19 0		45	
		7	28	18 46	48			9	15	18 58		43	
		8	50	18 54	48		10	0 M	50	18 57		42	
		0 M	14	18 55	48½			8	35	18 56		41	
		8	30	18 55	48			10	0	18 56		43	
		10	0	18 55	48½			11	30	18 59		44	
		11	55	19 1	49			1 A	15	19 4		45	
		1 A	5	19 5	50			2	10	19 6		44	
		2	45	19 4	49			8	30	19 2		41	
		5	20	18 57	47		11	1 M	10	18 58		42	
		8	0	18 56	44			10	0	18 58		47	
		11	50	18 50	42			11	0	18 59		49	
	7	8 M	40	18 55	41			0 A	5	19 1		51	
		9	50	18 56	43			1	30	19 3		51½	
		11	20	19 0	45			2	30	19 4		51	
		1 A	17	19 4	49			4	20	19 0		47	
		2	15	19 6	49			7	30	18 59		44	
		6	30	19 1	48			10	5	18 58		43	
8		11	55	18 57	47		12	0 M	45	18 59		42	
		8 M	40	18 56	46			8	40	18 55		41	
		10	10	18 56	48			10	0	18 55		43	
		11	10	18 57	48½			11	0	18 56		45	
		0 A	30	19 2	49			12	0	18 59		48	
		1	40	19 3	49			1 A	0	19 2		49	
		2	20	19 3	48½			2	0	19 4		49	
		3	55	19 2	48			2	45	19 3		48	

February.						February.								
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.			
12	3	A	45	19	3	47	17	0	M	5	18	56	40	
	6		20	18	58	43		8		45	18	54	37	
	9		0	18	57	42		9		50	18	55	38	
	11		50	18	55	40		11		0	18	57	40	
13	1	M	0	18	55	38		0	A	5	19	0	43	
	8		50	19	5	37	1		15	19	2	46		
	9		57	19	2	39	2		10	19	2	48		
	10		50	19	4	43	3		12	19	1	46		
	0	A	35	19	3	48	7		40	18	59	40		
	1		10	19	3	49	18	0	M	30	18	57	35	
	3		20	19	4	48		9		55	18	57	40	
	5		30	18	59	43		11		5	18	59	43	
	6		30	18	59	42		0	A	10	19	1	46	
	14	9		10	18	57	41	1		5	19	2	48	
11			38	18	57	41	2		15	19	2	47		
8		M	50	18	55	40	4		30	19	0	45		
10			10	18	55	40	9		45	18	58	41		
11			50	18	58	40½	19	0	M	30	18	58	42	
2		A	40	19	2	42		8		35	18	56	40	
7			25	18	58	38		10		0	18	56	40½	
0		M	30	18	57	34		11		0	18	58	41	
15		8		55	18	55	34½		0	A	15	19	1	42
		9		55	18	55	37	1		35	19	4	44	
	11		0	18	57	39	2		10	19	5	43		
	0	A	20	19	1	41	3		0	19	5	42		
	1		40	19	5	43	4		0	19	4	41		
	3		15	19	4	42	7		10	19	1	40		
16	0	M	5	18	57	40	9		4	18	47	38½		
	9		40	18	55	40	9		5	18	43	38½		
	11		45	18	58	42	9		7	18	43	38½		
	1	A	0	19	0	43	9		25	18	31	38		
	2		15	19	4	43	9		27	18	29	38		
	5		45	19	0	42	11		40	18	47	38		
	9		5	18	56	41	20	8	M	50	18	54	39	

February.						February.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
20	9	M 55	18	54	40	24	11	M 15	18	56	45
	11	0	18	56	41		1	A 40	19	3	40
	0	A 25	19	1	41½		2	40	19	4	40
	1	15	19	4	42		3	20	19	2	40
	2	30	19	4	41½		4	0	19	1	39
	6	20	19	5	41		7	5	18	59	39
	9	25	18	53	40		9	15	18	49	40
21	1	M 20	18	56	40		11	58	18	57	40
	8	50	18	54	39	25	10	M 0	18	55	40½
	10	0	18	55	39		0	A 28	18	59	41
	12	0	18	58	39		1	55	19	3	41
	1	A 40	19	2	42		3	20	19	2	41
	2	30	19	1	41½		4	20	19	0	42
	4	30	18	59	38		6	25	18	59	42
	8	0	18	57	36		9	55	18	59	43
22	0	M 55	18	58	39	26	9	M 0	18	53	46
	9	5	18	55	40		10	0	18	53	48
	11	0	18	56	44		11	5	18	55	50
	1	A 0	19	0	48		0	A 18	19	0	52
	2	5	19	3	47½		1	30	19	3	54
	3	10	19	2	47		2	22	19	3	53
	5	15	18	59	46½		4	5	19	2	50
	9	25	18	58	46		8	0	18	58	49
23	0	M 25	18	58	45		11	53	18	58	48
	8	50	18	55	43	27	9	M 23	18	59	49
	9	55	18	55	44		10	10	19	1	50
	11	5	18	57	44		11	25	19	2	51
	0	A 13	19	1	43		1	A 25	19	9	52
	1	42	19	4	43		2	15	19	10	52½
	3	8	19	3	43		2	58	19	4	53
	5	22	18	59	43		3	56	19	3	52
	9	40	18	58	40		5	50	19	3	51
24	0	M 50	18	59	38		8	30	18	54	50
	10	0	18	55	44		9	8	18	52	49

Febru-

February.						March.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
28	o	M 18	18	54	46	3	11	M 5	18	57	45
	10	25	18	53	43		o	A 20	19	3	46½
	11	25	18	57	45		1	7	19	7	48
	o	A 25	19	o	47		2	o	19	4	49
	1	10	19	3	49		3	5	19	2	48
	1	57	19	4	48		8	20	18	58	43½
	7	30	18	59	46		11	55	18	54	41½
	9	5	18	59	45	4	9	M 30	18	54	42½
	11	45	18	58	44		11	o	18	56	44
March.							o	A 10	19	1	46
							1	43	19	4	45½
							2	40	19	4	46
							4	30	19	2	45½
							6	50	18	59	43½
							10	10	18	57	42½
						5	o	M 55	18	57	43
							9	o	18	55	42½
							11	10	18	59	45½
							o	A 28	19	4	46½
							1	50	19	5	47
							2	40	19	6	46
							3	56	19	4	44
							7	15	19	o	42½
						6	o	M 45	18	58	42
							8	40	18	56	42
							9	30	18	56	43
							11	23	19	o	43½
							o	A 10	19	2	43½
							1	25	19	4	43
							2	o	19	5	42½
							4	o	19	3	42
							6	20	19	o	42½
							9	40	18	58	43
							11	53	18	57	40½

March.						March.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
7	9	M 15	19	16	42	10	2	A 45	19	2	44
	9	50	19	12	43		3	35	19	1	43 $\frac{1}{2}$
	11	25	19	3	45		4	32	19	0	44 $\frac{1}{2}$
	0	A 19	19	12	46		7	0	18	59	41
	0	43	19	8	47	11	11	47	18	59	36
	1	10	19	4	46 $\frac{1}{2}$		10	M 10	18	58	42 $\frac{1}{2}$
	2	15	19	3	47 $\frac{1}{2}$		11	7	19	0	43
	3	0	19	5	45 $\frac{1}{2}$		12	0	19	1	43
	5	10	19	2	42 $\frac{1}{2}$	12	1	A 15	19	2	44 $\frac{1}{2}$
	7	50	18	59	40		2	35	19	1	44
8	0	M 10	18	57	39		7	32	18	59	40
	8	38	18	58	40		0	M 50	18	59	36
	10	0	18	57	43		8	47	18	57	37 $\frac{1}{2}$
	11	20	18	59	45		10	30	18	59	43
	0	A 15	19	0	46		0	A 28	19	4	47
	1	26	19	1	47		1	55	19	5	49 $\frac{1}{2}$
	2	20	19	0	46 $\frac{1}{2}$		3	15	19	3	47 $\frac{1}{2}$
	4	40	18	58	43		5	5	19	1	46 $\frac{1}{2}$
	6	30	18	58	42	13	0	M 22	18	59	40
	0	M 5	18	54	43		8	56	18	57	42
9	8	30	18	57	40		10	0	18	59	45
	9	55	18	55	41		11	20	19	3	48 $\frac{1}{2}$
	11	55	19	2	45	14	0	A 25	19	6	49 $\frac{1}{2}$
	1	A 12	19	4	48		1	5	19	7	51
	2	5	19	4	49		1	28	19	7	52
	4	7	18	59	48 $\frac{1}{2}$		6	45	18	59	46
	6	35	18	58	46		1	M 17	18	59	42
	8	50	18	59	46		8	45	18	56	48
	11	30	19	0	44 $\frac{1}{2}$		10	0	18	57	51
	10	9	M 20	18	58		11	20	18	59	52
	10	15	18	59	44		0	A 52	19	4	53
	11	30	19	2	42		2	20	19	5	53
10	0	A 52	19	3	42		3	5	19	3	53
	1	30	19	4	42 $\frac{1}{2}$		5	35	19	0	51

March.						March.							
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.		
14	9	A	5	18	59	50	19	8	M	40	18	54	37
15	0	M	7	18	59	49½	10		15	18	56	42	
	8		30	18	55	48	11		20	19	0	43½	
	10		10	18	54	49	0	A	45	19	7	43½	
	11		5	18	56	50	1		22	19	14	42½	
	0	A	20	19	0	51	1		58	19	13	42	
	1		42	19	1	51	2		18	19	11	41½	
	2		35	19	1	51	3		10	19	9	41	
	3		30	19	0	50½	4		0	19	8	41	
	11		55	18	57	50	5		15	18	58	41½	
16	8	M	30	18	53	50½	5		45	18	54	41½	
	10		0	18	54	51	6		33	18	58	43	
	11		10	18	58	52	7		17	19	0	44	
	0	A	16	19	2	53	11		55	18	46	46	
	1		15	19	4	49	20	7	M	55	18	54	45½
	2		20	19	5	47	8		46	18	54	47	
	3		55	19	1	47½	9		46	18	56	48½	
	6		20	18	59	45	10		46	18	58	49	
	9		5	18	58	43	11		46	19	2	49	
17	0	M	35	18	59	40	1	A	0	19	11	48½	
	8		5	18	54	39	1		46	19	9	48	
	9		10	18	53	43	2		58	19	8	49	
	10		15	18	55	45½	3		59	19	6	47½	
	11		20	19	0	48	5		0	19	2	47	
	0	A	25	19	4	49	6		0	19	0	45	
	1		35	19	7	44	8		30	18	55	44½	
	4		0	19	2	46	21	1	M	12	19	4	39½
	8		45	18	58	40½	8		55	18	56	40½	
18	0	M	10	18	57	39½	10		0	18	55	42½	
	9		50	18	55	43	11		0	18	59	42½	
	11		0	18	59	44	0	A	10	19	3	43½	
	4	A	56	19	7	40	1		5	19	5	44½	
	6		37	18	54	39½	1		50	19	6	46	
19	0	M	10	18	55	37	2		50	19	4	45½	

March.

March.						March.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
21	4	A	0	19	1 45	24	9	A	5	19	0 45
	5		30	18	58 43	25	0	M	35	19	1 41
	8		5	18	57 40		10		0	18	58 45½
	11		50	18	57 37½		11		0	19	0 46½
22	9	M	0	18	54 44		0	A	5	19	2 48
	10		0	18	56 46		1		45	19	4 52
	11		0	19	0 48½		2		30	19	3 51½
	12		0	19	3 52½		4		35	19	1 51
	1	A	0	19	6 52		6		43	19	0 49
	1		30	19	6 52½		9		38	18	59 48
	2		0	19	6 53	26	0	M	15	18	59 47½
	3		0	19	6 54		8		30	18	55 47
	4		30	19	8 52		9		20	18	56 48
	7		53	18	48 48		10		5	18	58 49
	9		0	18	26 48½		11		10	19	3 50
23	0	M	50	18	53 44		0	A	5	19	6 51
	9		0	18	59 48		1		12	19	7 51½
	10		0	19	0 50		1		45	19	6 52
	11		0	19	2 53		3		0	19	2 52½
	12		0	19	4 54½		3		50	19	0 52½
	1	A	0	19	5 55		6		56	18	59 49
	2		0	19	5 56		9		2	18	59 46½
	3		0	19	4 57	27	0	M	5	18	59 44
	4		0	19	2 56		8		12	18	53 48
	5		0	19	1 54		9		5	18	52 50
	9		0	18	59 50		10		4	18	56 51½
24	0	M	38	18	58 47		11		15	19	2 53½
	8		54	18	54 50		0	A	10	19	5 55
	10		5	18	56 50		1		15	19	7 57
	11		3	19	0 50½		2		50	19	6 56½
	0	A	2	19	4 52		4		0	19	3 57
	1		5	19	5 51		5		0	18	59 56
	2		2	19	7 51½		6		25	18	59 54
	3		1	19	4 52½		9		40	18	58 50

March.						March.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
28	0	M 40	18	58	49	31	0	M 10	18	59	35½
	8	15	18	52	49		8	25	18	54	35
	9	15	18	54	49½		9	15	18	53	36
	10	0	18	55	50½		10	10	18	54	37½
	0	A 2	19	3	51		11	5	18	58	40
	1	3	19	7	52		0	A 10	19	5	42
	1	47	19	8	52½		1	5	19	8	43
	3	12	19	6	52½		1	35	19	9	43½
	4	20	19	3	52		2	22	19	7	43½
	5	5	19	1	52		4	10	19	3	43½
	8	0	18	59	50		8	10	19	0	40
	9	10	18	54	49	April.					
29	0	M 15	18	58	47	D.	H.	M.	°	'	Th.
	8	10	18	50	49	1	0	M 40	18	59	37
	9	10	18	51	48½		9	50	18	55	50½
	10	10	18	54	51		11	0	18	58	55
	11	20	19	1	52		0	A 2	19	2	55
	0	A 32	19	7	52		1	30	19	6	54½
	1	45	19	9	52		2	0	19	6	55
	2	15	19	9	52		3	2	19	4	54
	3	4	19	6	51		5	15	19	0	54
	4	5	19	2	48½		6	5	18	59	52½
30	0	M 10	18	59	40		9	45	18	59	48
	8	7	18	52	41	2	0	M 40	18	58	45
	9	5	18	52	41		7	50	18	53	44
	10	20	18	56	43		9	10	18	54	48½
	11	15	19	0	45		10	0	18	56	51
	0	A 20	19	6	45½		0	A 10	19	3	55
	1	15	19	8	46		1	3	19	5	57
	1	57	19	8	46½		1	0	19	6	56½
	3	10	19	6	45		2	10	19	6	56
	4	12	19	3	43		3	0	19	5	55
	5	30	19	1	42						
	9	35	18	59	37						

April.						April.							
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.		
2	4	A	0	19	2	53½	5	1	A	30	19	16	58
	4		56	19	1	53	2	20		19	19	57	
	7		20	18	59	47	4	12		19	12	56	
3	0	M	35	18	58	41	7	30		19	1	52	
	8		10	18	54	43	6	0	M	11	19	1	48
	9		15	18	54	48½	8	10		18	54	50	
	10		0	18	56	51	9	9		18	55	50½	
	11		4	19	0	53	10	12		18	58	51	
	0	A	2	19	4	55	11	25		19	3	51	
	1		0	19	7	56	0	A	10	19	4	49½	
	1	20		19	7	56½	1	30		19	5	47	
	4	11		19	2	56	2	15		19	4	46	
	6	15		18	58	52	3	18		19	2	45	
	8	43		18	58	46	5	18		18	58	46½	
4	0	M	40	18	58	42	7	1	M	27	18	58	42
	8		15	18	51	47	8	25		18	53	43½	
	9		10	18	51	48	9	16		18	54	46	
	10		6	18	54	50	10	20		18	57	49½	
	11		7	19	0	52½	11	5		18	59	51	
	12		0	19	5	50½	0	A	16	19	4	50½	
	1	A	0	19	6	52	1	0		19	5	51	
	1	30		19	7	53	2	1		19	5	51	
	2	8		19	7	54	2	40		19	3	52	
	3	13		19	4	54½	9	1		18	59	44½	
	4	20		19	1	54	8	0	M	25	18	59	42½
	5	20		19	0	53	9	48		18	58	47	
	8	45		18	54	50	11	3		19	0	50	
5	0	M	5	18	53	49½	0	A	10	19	3	51	
	8		10	19	24	51	1	45		19	5	49	
	9		8	19	18	53	2	35		19	4	49	
	10		15	19	9	56	4	10		19	2	46	
	11		10	19	10	57½	7	46		19	0	48	
	0	A	7	19	15	58	9	0	M	37	18	59	48
	1		0	19	15	58	9	9		18	54	51½	

April

April.						April.								
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.			
9	10	M	5	18	56	54	12	2	A	0	19	7	54	
	11		6	18	59	54½		3		1	19	5	54½	
		0	A	5	19	4	57		9	5	19	0	48	
		1		5	19	9	57	13	0	M	23	18	56	45
		1		40	19	8	56		9		30	18	57	50
		3		10	19	6	55	10		8	18	59	51½	
		4		7	19	3	54½	11		7	19	3	53½	
		6		45	19	0	53½		0	A	12	19	7	55
	11		40	18	59	46½		1		30	19	12	56	
	10	9	M	10	18	53	47		1		58	19	14	57
		10		1	18	55	48½		2		10	19	15	57
11			3	18	59	49½		2		24	19	13	57	
		0	A	2	19	1	51		3		10	19	8	57
		1		10	19	6	53		4		20	19	6	56
		1		43	19	7	53		5		35	19	4	54½
		5		55	19	1	50		6		20	19	2	53
		7		50	18	59	46		9		22	18	44	49
10			0	18	57	44	14	0	M	57	18	53	44	
11		0	M	55	18	57	42		9		0	18	52	48
		9		20	18	58	49	10		3	19	0	49	
	10		8	19	0	51½	11		4	19	4	50		
	11		15	19	4	51½		0	A	12	19	7	51	
		0	A	10	19	6	51½		1		5	19	5	51½
		1		1	19	8	53		1		35	19	9	51½
		1		40	19	8	54		2		0	19	8	52
		2		10	19	7	54		3		0	19	2	51
		3		1	19	5	53		8		0	18	57	49
	11		40	19	0	47	15	0	M	14	18	57	45	
	12	8	M	10	18	55	47½		9		10	18	56	47
9			10	18	56	49	10		11	18	56	47½		
10			3	18	58	50½	11		10	18	58	50		
11			2	19	3	51		0	A	3	19	1	50	
		0	A	11	19	6	52½		1		25	19	5	52
		1		25	19	7	54		2		0	19	6	51½

April.						April.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
15	5 A	12	19	1	50	19	1 A	40	19	7	51
	7	8	18	58	49		9	20	19	0	48
	9	55	18	58	44	20	0 M	17	19	0	47½
16	0 M	48	18	57	41		9	15	18	56	54
	9	5	18	58	41½		11	5	19	0	56
	10	0	19	0	42½		0 A	54	19	3	59
	11	10	19	5	44		1	38	19	4	59½
	0 A	5	19	6	45½		2	5	19	2	60½
	1	6	19	6	48		8	6	18	58	52
	2	0	19	6	48½		11	45	18	57	50½
	2	59	19	5	47	21	8 M	20	18	52	54
	4	0	19	2	47		9	10	18	54	55½
	5	5	19	2	46		10	5	18	56	56½
	10	2	18	32	42		11	20	18	59	59
17	1 M	20	18	55	40		0 A	10	19	4	62
	9	50	18	58	50		1	2	19	6	62
	11	1	19	2	50		1	42	19	7	63
	0 A	10	19	5	53		9	3	18	59	53
	1	30	19	8	53		11	50	18	58	49½
	6	0	19	2	49	22	8 M	35	18	55	55½
	9	8	18	58	43		9	15	18	55	56
18	0 M	35	18	59	41		11	5	18	56	60½
	8	30	18	56	46		0 A	2	19	1	60
	10	10	18	58	48½		1	16	19	4	63
	11	17	19	3	50½		2	10	19	4	62½
	1 A	0	19	7	50½		9	25	19	0	54
	1	40	19	8	50½	23	0 M	26	18	59	51
	2	15	19	7	50½		8	10	18	51	52
	3	10	19	5	49½		9	4	18	53	53½
	9	35	19	1	41		10	55	18	58	57
19	0 M	25	19	0	38		1 A	12	19	4	59½
	8	50	18	54	44½		1	40	19	4	60
	11	5	19	1	49		3	5	19	3	61
	1 A	0	19	7	50½		7	8	18	59	51

April.

April.						April.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
24	0	M	4	18 59	42	27	7	A	12	18 58	53
	7		45	18 55	45	28	1	M	10	18 57	49
	9		10	18 57	47		8		0	18 50	50½
	10		55	19 2	49		9		15	18 53	51½
	1	A	25	19 6	52		10		56	19 2	53
	3		15	19 5	51		0	A	2	19 6	55
	7		8	18 55	44		1		8	19 6	55
	9		3	18 52	41		1		40	19 7	55½
25	0	M	8	18 46	40		2		20	19 5	56
	8		45	18 57	48		3		20	19 3	55
	9		20	19 3	52		9		15	18 59	52
	11		8	19 6	55	29	1	M	2	18 59	51
	0	A	55	19 8	56		9		0	18 54	54½
	1		40	19 9	56		11		2	18 58	58½
	2		15	19 8	56		0	A	55	19 4	60
	3		20	19 5	55		1		32	19 3	60½
	5		12	18 59	54		5		4	18 59	57
	8		54	18 58	48½		9		26	18 59	47
26	0	M	10	18 57	46		11		42	19 1	44
	8		0	18 54	50	30	8	M	0	18 55	51½
	9		20	19 0	53		8		58	18 56	54
	11		10	19 6	56		11		6	19 3	61
	0	A	45	19 9	57½		1	A	2	19 6	63½
	1		25	19 10	58		1		50	19 6	63½
	2		0	19 8	56		2		52	19 4	62
	4		55	19 0	57		4		7	19 2	60½
	8		55	18 59	52		5		15	19 0	58
	11		42	18 58	50		7		55	19 0	51
27	8	M	5	18 50	55	May.					
	9		7	18 52	56						
	11		4	19 0	60						
	1	A	6	19 5	60						
	2		8	19 4	59						
	3		12	19 2	58						
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
1	8	M	40	18 56	51						
	10		56	19 0	57½						

May.

May.						May.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
1	1	A	30	19	5 60	5	2	A	50	19	7 56
	4		3	19	2 57½		5		0	19	2 54
	9		2	18	59 48½	6	0	M	25	19	1 46
	11		55	18	58 46		9		18	18	56 54
2	7	M	48	18	54 51	11		1	19	1 56	
	9		7	18	54 55		0	A	10	19	3 58
	11		7	18	59 58		0		55	19	4 58½
	1	A	28	19	3 59		1		35	19	4 60
	2		13	19	2 58		7		15	18	59 55
	5		1	18	59 54	7	1	M	5	19	2 48
	8		0	18	58 48		8		10	18	49 54½
3	0	M	15	18	58 46		9		10	18	54 57
	8		7	18	52 53	11		5	19	3 60	
	9		30	18	53 54½		0	A	15	19	6 63
	0	A	59	19	0 55½		1		2	19	8 63
	1		47	19	3 55½		1		35	19	7 64
	2		45	19	2 55½		3		4	19	4 62½
	4		10	19	0 56		5		0	19	0 61
	11		58	18	59 51½		7		14	18	58 58½
4	8	M	15	18	51 56	10		0	18	58 56	
	9		16	18	52 58	8	0	M	20	19	1 54
	11		2	19	4 64		8		15	18	54 56
	0	A	20	19	6 64		9		8	18	57 57
	1		5	19	7 64½	11		2	19	2 60½	
	1		55	19	7 63		1	A	4	19	4 61½
	3		0	19	8 61½		3		10	19	1 63½
	4		58	19	3 57		9		20	18	59 57
	9		30	18	39 53	9	0	M	2	18	58 55
5	0	M	21	18	46 53		8		30	18	58 59
	8		25	18	56 52		9		20	18	54 60½
	9		35	18	59 53	10		18	18	58 63	
	11		0	19	2 55	11		35	19	3 64½	
	0	A	55	19	8 54		0	A	18	19	8 63½
	1		40	19	9 55½		1		30	19	7 65

May.

May.							May.						
D.	H.	M.	°	'	Th.		D.	H.	M.	°	'	Th.	
9	3 A	8	19	3	64		12	5 A	0	18	59	64	
	5	2	18	58	61			9	40	18	58	58	
	9	5	18	58	55		13	0 M	3	18	58	57	
10	0 M	25	18	56	53			8	30	18	53	60½	
	8	5	19	3	55		11		2	18	59	64	
	9	20	18	59	59			0 A	45	19	3	64½	
	11	15	19	2	59			1	30	19	12	64	
	0 A	50	19	4	61½			2	13	19	8	64½	
	1	15	19	6	62			5	12	19	1	62	
	1	40	19	6	62			9	58	18	55	57	
	3	20	19	4	61½		14	0 M	52	18	56	55½	
	9	25	18	56	52½			8	10	18	54	58	
	0 M	15	18	52	51			9	12	18	56	58½	
11	8	5	18	52	55		11		13	19	0	62	
	9	25	18	53	57			1 A	15	19	4	65	
	11	20	18	55	58½			2	7	19	5	64	
	1 A	10	18	54	58			3	12	19	3	63	
An Aurora Bor.	1	27	19	0	57½			7	13	19	0	57½	
	1	37	19	2	57½			9	10	18	59	55	
	2	15	18	47	57½		15	11	45	19	0	54	
	3	0	18	58	59½			8 M	0	18	55	57½	
	6	3	18	56	58			9	5	18	54	58½	
	9	7	19	8	55		11		10	19	2	62	
	9	8	18	58	55			0 A	30	19	8	65	
	9	9½	18	48	55			1	20	19	9	66	
	9	28½	18	53	55			3	15	19	7	66	
	9	32½	18	46	55			7	10	19	0	61	
12	0 M	50	18	51	52		16	0 M	30	19	1	54	
	7	55	18	51	57			8	10	18	53	60	
	9	20	18	53	59			9	15	18	53	64	
	11	15	19	1	62			11	28	18	59	69½	
	0 A	40	19	2	66			1 A	15	19	6	72	
	1	12	19	3	65			2	0	19	5	72½	
	3	0	19	3	65½			3	20	19	0	72½	

May.						May.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
16	7	A 10	18	58	65	21	9	M 15	18	57	56
	8	40	18	58	62		11	0	19	1	61½
17	0	M 50	18	57	56		0	A 40	19	5	65
	8	20	18	53	56		1	24	19	7	66
	11	5	19	2	61		1	55	19	6	66
	0	A 40	19	8	62		6	3	19	1	65
	2	35	19	6	63		9	15	19	1	58
	8	45	18	59	52	22	0	M 5	18	56	54
18	0	M 5	18	57	49		8	15	18	52	56
	8	13	18	56	52½		9	45	18	56	59
	9	15	18	57	53		11	2	19	2	59
	11	0	19	3	56		1	A 0	19	7	62
	1	A 20	19	7	57		1	30	19	6	61½
	2	10	19	6	57½		3	25	19	2	62
	6	50	19	0	52		5	35	18	58	61
	9	0	19	2	47		9	20	19	0	54½
19	1	M 0	19	1	41½	23	0	M 25	19	0	52
	8	0	18	58	50		8	10	18	52	57½
	9	10	19	0	52		11	15	19	2	66
	11	10	19	6	55		0	A 5	19	6	67
	0	A 50	19	4	58		0	55	19	7	68
	1	40	19	7	58½		1	30	19	7	68
	2	20	19	6	59		2	5	19	8	67½
	3	2	19	4	60		6	55	18	57	58½
	5	20	19	1	54		9	15	18	58	54
20	0	M 10	19	0	44		11	50	18	56	54½
	9	22	18	58	55	24	8	M 48	18	55	56
	10	26	19	2	57		11	5	19	7	57½
	0	A 30	19	5	61½		0	A 13	19	9	60
	1	40	19	6	61½		1	7	19	11	63
	2	35	19	6	62		1	48	19	9	64½
	9	15	19	2	48½		3	6	19	7	66
21	1	M 20	19	3	43½		9	2	19	0	60½
	8	15	18	56	53	25	0	M 40	18	58	54

May.

May.						May.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
25	8 M	20	18	56	58	29	9 A	30	18	56	47
	9	32	19	0	63		11	58	18	55	41
	11	15	19	8	70	30	8 M	20	18	56	49
	0 A	27	19	10	72		11	7	18	59	53
	1	20	19	9	72½		3 A	5	19	3	56
	3	10	19	6	73½		9	15	19	1	49½
26	0 M	15	18	59	56		11	50	18	57	46
	8	5	18	54	60	31	8 M	45	18	54	54
	9	10	18	58	61½		9	30	18	53	59
	10	15	19	2	63		3 A	55	19	0	63½
	12	0	19	8	64		9	5	18	55	56
	0 A	25	19	9	64½	June.					
	5	15	19	4	57	D.	H.	M.	°	'	Th.
	6	50	19	1	53	1	0 M	23	18	56	55
	9	40	19	0	46		9	5	18	51	59½
27	0 M	40	19	2	43		11	0	19	0	61½
	7	55	18	53	50		0 A	20	19	1	62½
	11 A	58	19	3	51		1	10	19	1	63
28	8 M	55	18	54	57½		2	15	19	0	64
	11	10	19	1	61		9	30	18	59	54
	0 A	35	19	6	63½	2	0 M	15	18	56	52
	1	17	19	7	63		8	35	18	52	57
	4	25	19	3	63		11	12	19	0	63
	9	12	19	1	55		11	45	19	3	63½
29	0 M	15	19	0	52		9 A	20	18	55	55
	8	28	18	56	57½	3	0 M	40	18	56	54½
	9	30	18	58	60½		9	0	18	53	57
	10	25	19	0	60		11	14	18	58	56
	11	0	19	3	59		0 A	58	19	2	59½
	0 A	15	19	7	59		1	30	19	3	59
	1	15	19	9	57		3	2	19	1	60
	2	15	19	7	53		5	30	18	58	58
	3	10	19	5	53						
	5	0	19	3	53½						

June.						June.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
3	10	A 20	18	55	54	7	1	A 15	19	10	63½
4	0	M 50	18	54	53	11		50	18	59	53½
	9	15	18	51	57½	8	7	M 6	18	53	53
	11	15	18	56	58½		9	10	18	57	60
	1	A 30	19	1	58½	11		30	19	3	63
	2	20	18	57	58	9	0	M 15	19	0	54
	3	12	19	0	57½		8	50	18	54	60½
	4	15	19	2	58½	11		48	19	6	65
	4	45	19	4	58		1	A 0	19	8	66
	7	30	19	0	54		1	35	19	9	66½
	9	30	19	1	50		3	10	19	6	66½
5	0	M 13	19	0	48½		5	0	19	3	64
	8	50	18	54	58		9	10	19	1	56½
	0	A 15	19	4	57	10	0	M 30	19	1	52½
	1	0	19	7	57		9	0	18	54	68
	1	47	19	8	58½	11		1	19	0	71½
	9	0	19	2	54½		1	A 12	19	6	72½
6	0	M 15	19	1	53		1	37	19	8	73½
	8	50	18	56	57		2	1	19	7	73½
	10	12	18	59	56		5	30	19	1	66
	11	15	19	2	57		7	15	19	0	63
	0	A 10	19	4	57	10		0	19	0	58
	1	12	19	7	58	11	0	M 52	19	0	57
	1	35	19	8	58		8	5	18	53	59
	3	0	19	4	60		9	4	18	53	61
	5	20	19	1	60	10		2	18	56	62
	7	15	18	58	57½	11		20	18	59	65
	8	30	19	0	56		1	A 2	19	6	65
7	0	M 2	19	0	53		1	32	19	7	65½
	8	30	18	52	58		3	30	19	5	59
	9	0	18	53	59		9	2	19	1	53
	10	1	18	58	60½	12	0	M 25	19	1	53
	11	12	19	5	62		7	48	18	50	56
	0	A 45	19	10	63		9	5	18	54	57

June.

June.							June.						
D.	H.	M.	°	'	Th.		D.	H.	M.	°	'	Th.	
12	11	M	10	19	3	60½	16	11	M	8	19	0	66½
	1	A	2	19	8	62½		4	A	55	19	0	67
	5		15	19	2	60		9		2	18	59	59
13	9		7	19	0	54½	17	0	M	40	18	57	55
	8	M	6	18	57	59½		8		9	18	55	62
	9		10	18	57	61		9		0	18	56	62
14	11		35	19	6	62½	18	10		24	18	58	67
	1	A	15	19	8	61½		11		15	19	2	68½
	1		50	19	7	62		0	A	13	19	3	69
15	3		0	19	6	62½	19	1		0	19	5	69½
	9		33	19	2	53½		1		30	19	7	70½
	0	M	15	19	3	52		5		3	19	3	71½
16	8		7	18	56	59	20	7		0	18	57	68
	11		20	19	2	65½		9		27	18	59	64½
	1	A	0	19	6	67		0	M	45	19	0	62
17	1		33	19	7	66	21	7		42	18	50	65½
	3		10	19	5	67		8		52	18	51	70
	9		20	18	58	56½		10		7	18	56	73
18	0	M	1	18	59	54	22	11		0	19	1	75
	7		45	18	58	59		12		0	19	4	75½
	8		56	18	56	62½		1	A	2	19	4	77
19	10		15	18	59	64	23	1		40	19	5	76
	11		20	19	4	67		2		55	19	4	76½
	0	A	25	19	6	65		4		7	19	1	75
20	1		0	19	7	65	24	5		35	19	0	74
	1		30	19	8	63½		7		20	18	59	71
	2		3	19	8	64		9		35	18	55	68
21	3		7	19	5	62	25	0	M	15	18	56	64
	5		10	19	2	60		7		47	18	58	68
	7		30	18	59	59		9		5	18	58	72½
22	9		28	18	56	58½	26	10		4	18	56	75
	0	M	44	18	57	58½		11		20	19	0	77
	7		40	18	55	61½		0	A	20	19	5	79
23	8		50	18	58	63½	27	1		14	19	4	78

June.						June.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
19	3	A 20	19	3	78½	22	9	A 12	19	2	67
	5	10	19	0	76	23	8	M 0	18	56	65
	6	8	18	57	74		9	15	18	58	68½
	7	10	18	57	71½		11	10	19	3	68
	9	38	18	58	64		1	A 3	19	8	67½
20	0	M 18	18	58	60		1	40	19	7	67½
	8	20	18	57	68½		3	16	19	5	67
	9	10	18	57	70		5	35	19	0	66
	11	5	19	1	75½		9	14	19	1	62
	0	A 40	19	6	76½	24	0	M 32	19	1	58
	4	2	19	4	74		8	0	18	56	63
	7	1	18	57	69½		9	20	18	57	65½
	9	3	18	57	64		11	6	19	3	69
21	0	M 25	18	56	61		1	A 5	19	7	71
	8	0	18	56	71		1	48	19	8	70
	9	10	19	2	73		5	20	19	3	68
	10	6	19	4	73		9	0	19	1	61½
	10	45	19	5	74	25	0	M 50	19	1	56
	11	16	19	6	75½		8	0	18	56	62
	0	A 2	19	5	77		8	55	19	1	63
	0	32	19	6	77½		11	20	19	11	68
	1	7	19	7	78½		0	A 40	19	14	68½
	1	31	19	8	78½		1	15	19	13	70
	2	5	19	7	78		2	56	19	9	70½
	2	32	19	6	79		5	0	19	1	68
	3	5	19	5	77		7	16	19	1	64
	3	35	19	4	76½		9	30	19	2	63
	4	21	19	1	75	26	0	M 1	19	2	61
22	0	M 31	19	1	61½		8	0	18	53	65
	8	0	18	56	64½		8	45	18	55	65½
	8	50	19	0	65½		10	57	19	5	69
	10	10	19	3	70		11	50	19	9	72
	11	5	19	5	71		0	A 31	19	11	72½
	1	A 25	19	8	74		1	10	19	11	72

June.					
D.	H.	M.	°	'	Th.
26	7	A	0	19	1 68
27	0	M	18	19	2 62
	6		4	18	58 62
	8		30	18	55 65
	9		2	18	54 67
10			20	18	57 69
11			40	19	4 68½
	0	A	50	19	9 70
	1		38	19	8 70
	3		10	19	8 68
	7		20	18	59 61
	9		12	19	6 59
11			40	18	51 57½
28	0	M	10	18	50 57
	8		14	18	56 61
	9		1	18	57 63
	11		1	19	1 67
	0	A	35	19	7 68
	1		15	19	10 67½
	2		15	19	10 68½
29	0	M	14	19	0 57
	7		55	19	1 60
	8		58	18	59 63
11			0	19	5 67
	0	A	35	19	9 69½
	1		15	19	11 67
	2		12	19	12 67½
	5		4	19	4 64½
	7		10	19	0 61
30	0	M	20	19	0 56
	8		3	18	56 58
	9		30	18	55 62
11			5	19	0 64
	3	A	55	19	4 62½

June.					
D.	H.	M.	°	'	Th.
30	9	A	0	19	0 58
	9		45	19	0 58

July.					
D.	H.	M.	°	'	Th.
1	0	M	25	19	0 57½
	9		5	18	52 60½
11			4	18	57 60
	0	A	12	19	0 61
	1		0	19	3 61
	1		35	19	3 60½
	3		0	19	2 60
	5		5	19	1 58
	7		0	19	0 56½
2	7	M	58	18	54 57
	8		50	18	53 59
11			15	18	57 63
	1	A	15	19	1 66
	1		52	19	2 67
	3		5	19	3 65½
	5		4	19	1 63
	9		15	19	0 59
3	0	M	8	18	49 57
	8		20	18	45 60
	9		15	18	53 62
11			0	19	1 67
	1	A	3	19	5 71
	3		0	19	4 75
	7		30	18	59 67
4	2	M	0	18	56 56
	8		25	18	54 63
	9		10	18	57 64
11			0	19	0 66

July.

July.						July.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
4	1 A	25	19	4	69½	9	9 M	15	18	59	73
	2	20	19	6	71	11	20	19	1	76½	
	3	0	19	6	70½	0 A	40	19	7	78	
	5	5	18	52	68	1	20	19	6	78	
	7	45	19	0	63	2	10	19	12	79	
5	9	10	19	0	59	6	50	19	0	73	
	1 M	3	19	2	54	9	20	18	49	68	
	8	0	18	54	62	9	40	18	53	67	
	10	57	19	1	68	10	8 M	0	18	53	72
	0 A	58	19	6	71	9	15	18	54	78½	
6	2	10	19	5	72	11	5	18	59	82½	
	4	7	18	57	72	7 A	3	19	1	73	
	11	30	18	59	62	9	25	19	0	68	
	8 M	20	18	56	68	11	8 M	12	18	54	68
	9	25	18	59	71½	11	20	19	2	72	
7	11	20	19	4	75½	1 A	0	19	7	72	
	1 A	15	19	2	78	1	45	19	8	72½	
	2	5	19	2	78½	3	20	19	7	71½	
	3	20	19	3	78½	9	22	19	2	61	
	5	15	19	0	77	12	0 M	15	19	3	58
8	9	12	18	58	70	7	55	19	0	66	
	0 M	32	18	58	67	9	10	19	1	69	
	8	17	18	50	73	0 A	20	19	11	70	
	9	18	18	52	76	9	5	19	3	65	
	11	20	18	57	79	13	8 M	20	18	53	68½
9	1 A	30	19	2	81	11	12	19	2	73	
	3	0	19	0	80	1 A	23	19	9	74½	
	0 M	5	18	57	64	2	0	19	10	76½	
	9	10	18	54	77	9	10	18	58	66	
	0 A	58	19	4	81	14	0 M	30	19	0	60½
9	1	54	19	5	80½	8	25	18	55	67	
	5	0	19	4	74	9	10	18	58	68½	
	9	53	19	0	67	11	30	19	7	72	
	8 M	0	18	58	69	1 A	20	19	8	74	

July.

July.						July.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
14	2	A	30	19	7 74		11	A	40	19	1 63
	5		0	19	4 73		8	M	0	18 57	67½
	9		5	19	2 67		9		18	19	0 70
15	0	M	15	18	57 61		11		15	19	3 74
	9		5	18	58 70		1	A	35	19	7 73
	11		12	19	4 73		3		30	19	4 72
	1	A	3	19	9 74½		7		0	19	1 68½
	1		45	19	8 75		11		50	19	3 61½
	5		0	19	3 71	21	8	M	5	18 57	66
	7		15	19	2 67		11		20	19	5 72½
16	0	M	30	19	2 62		1	A	20	19	8 73½
	7		53	18	57 68		2		15	19	9 74
	9		55	19	0 67	22	0	M	20	19	2 59½
	11		30	19	4 73		9		0	18 57	69
	1	A	4	19	7 75		10		58	19	2 74
	2		5	19	8 75½		5	A	0	19	3 75
	6		50	19	3 68	23	8	M	0	18 59	70
	9		15	19	5 65		9		5	19	0 72½
17	0	M	8	19	4 63½		11		5	19	4 77
	8		20	19	1 66		1	A	5	19	8 78
	11		18	19	8 71		1		53	19	9 78½
	4	A	10	19	9 72		3		15	19	4 78½
	7		0	19	1 66		5		16	19	0 78½
18	0	M	10	19	0 60		9		30	19	1 65
	8		0	18	58 64	24	0	M	10	19	1 61½
	9		7	18	59 66		7		46	18 57	66
	11		15	19	4 72		9		15	19	0 69½
	1	A	35	19	7 73		11		44	19	7 72
	2		15	19	6 73½		1	A	15	19	9 75
	9		35	19	0 65		3		0	19	7 74½
19	7	M	45	18	57 65½		6		12	19	2 71½
	9		25	19	2 71	25	0	M	2	18 57	61
	11		30	19	8 74½		8		20	18 54	68½
	5	A	2	19	2 75		9		35	18 57	70

July.

July.							July.						
D.	H.	M.	°	'	Th.		D.	H.	M.	°	'	Th.	
25	11	M 10	19	4	74		29	4	A 40	19	11	72½	
	1	A 20	19	11	77½			7	10	19	7	69	
	1	50	19	12	78			10	0	19	5	66	
	3	7	19	10	77		30	0	M 30	19	2	65	
	9	30	19	1	67			8	0	19	4	65½	
26	11	50	19	2	62			8	50	19	1	68	
	8	M 0	18	58	66½			9	25	19	0	67½	
	9	17	19	1	71½			11	24	19	6	73	
	11	43	19	8	77½			1	A 15	19	9	74	
	1	A 17	19	11	78½			2	5	19	12	74½	
27	2	7	19	11	79			3	16	19	12	73	
	11	40	19	1	63			5	25	19	9	71½	
	8	M 15	18	55	66			6	54	19	6	68	
	9	12	18	57	66½			9	5	19	4	64	
	11	5	19	4	72			11	45	19	3	62	
28	1	A 2	19	12	72		31	7	M 58	18	57	63	
	1	30	19	12	72			9	15	19	0	67	
	2	56	19	11	71			11	5	19	9	63	
	5	10	19	6	69½			1	A 12	19	15	62	
	3	M 20	18	59	55			1	35	19	16	62	
29	8	30	19	1	66			3	2	19	11	61½	
	9	25	19	1	67			4	45	19	8	60	
	11	3	19	6	70½			7	2	19	5	60½	
	1	A 2	19	12	73			9	23	19	5	58	
	2	5	19	14	72		August.						
29	3	40	19	12	74		D.	H.	M.	°	'	Th.	
	5	12	19	12	70½		1	0	M 7	19	4	57	
	9	20	19	4	62			8	30	18	58	62	
	11	57	18	57	59½			11	12	19	6	66	
	8	M 25	18	57	66			2	A 7	19	12	68	
29	9	20	18	57	69		2	0	M 10	19	1	57	
	11	10	19	1	72			8	25	19	0	60	
	1	A 35	19	11	73								
	2	40	19	13	74½								

August.						August.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
2	11	M	35	19	6	65	7	0	M	10	18 55 59
	1	A	26	19	11	68	7	40	18	58	60½
	9		38	19	4	56½	9	7	18	59	63
3	8	M	0	18	59	58½	11	20	19	4	66
	11		15	19	2	66	1	A	12	19	9 67½
	1	A	9	19	8	68	9	15	18	56	68
	2		10	19	9	68½	8	0	M	4	18 58 65
	5		20	19	0	67	8	15	18	58	68½
	7		15	18	59	63½	9	20	18	59	69½
	9		45	19	0	59	11	35	19	4	73
4	0	M	10	18	59	56	1	A	2	19	7 73½
	7		45	18	56	58½	2	55	19	2	77
	8		48	18	56	61	6	45	18	58	72
	11		2	19	3	61	9	0	M	32	18 57 63
	1	A	22	19	9	61	8	25	18	58	64
	2		40	19	6	61	11	12	19	6	75
	5		5	19	1	61	1	A	30	19	8 76
	7		6	19	1	61½	9	47	18	58	65
	9		30	19	1	62	10	8	M	12	18 57 70
5	0	M	12	19	2	61	9	15	18	57	74
	9		8	19	0	66½	11	0	19	2	79
	11		10	19	4	63	0	A	50	19	4 80½
	0	A	58	19	6	69	1	51	19	5	81
	4		37	19	3	68	3	32	19	2	79
	7		0	18	58	65	9	2	18	58	67
	9		2	18	59	63	11	0	M	30	18 57 63
6	7	M	32	18	55	58	8	15	18	53	68½
	9		11	18	56	62	9	13	18	56	73
	11		15	19	4	65½	11	2	19	0	77
	0	A	44	19	8	69½	1	A	17	19	4 81
	1		31	19	8	67	3	10	19	4	80½
	3		18	19	4	66½	6	15	18	58	77
	5		25	19	0	65½	12	0	M	12	18 59 67
	9		20	18	58	60½	8	25	18	58	62

August.						August.							
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.		
12	10	M	46	19	4	65	16	9	A	40	18	51	63
	0	A	7	19	8	65	10		12	18	49	62½	
	1		0	19	9	66	17	0	M	10	18	54	60
	2		30	19	7	67	8		30	18	56	64	
	7		0	19	0	64	11		28	19	7	68½	
13	0	M	28	19	1	60	1	A	20	19	9	71	
	7		55	18	58	62	4		0	19	6	69½	
	9		20	19	1	65	6		0	19	9	67	
	11		21	19	9	70	7		2	18	58	65	
	1	A	25	19	9	71	8		45	19	5	61	
14	3		10	19	7	71	18	0	M	23	18	58	55
	7		13	19	2	64	8		15	18	58	58	
	9		25	19	2	59	9		32	19	0	63	
	0	M	30	19	2	55	10		58	19	5	67	
	8		10	18	58	61	1	A	4	19	7	69	
15	9		20	18	59	62	3		20	19	4	68	
	1	A	0	19	8	67	5		4	19	3	66½	
	7		2	19	2	64	6		52	18	59	65	
	0	M	38	19	1	61	19	0	M	40	18	59	59
	7		50	18	57	62½	9		15	18	58	63½	
16	9		30	18	59	66	10		58	19	3	67	
	11		15	19	3	69	1	A	5	19	4	69	
	1	A	17	19	6	70	1		52	19	4	68½	
	2		0	19	5	67	5		55	18	59	67	
	5		30	19	2	64½	7		15	19	0	65	
17	9		10	19	3	63	20	0	M	42	19	1	60
	0	M	2	19	2	60	8		16	18	54	60½	
	8		4	18	56	60½	9		25	18	57	64	
	9		47	18	59	65	11		7	19	4	65½	
	11		10	19	4	67	0	A	40	19	7	67	
18	1	A	4	19	11	69½	2		0	19	6	67	
	1		32	19	10	70	5		10	19	0	65	
	3		0	19	10	71	9		12	18	59	61	
	5		12	19	4	69	21	8	M	20	18	53	59½

August.

August.						August.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
21	9	M 22	18	56	62	25	3	A 2	19	10	71½
	11	3	19	8	66½		9	30	19	3	60
	0	A 40	19	11	62	26	0	M 10	19	4	58
	3	32	19	2	65½		9	5	19	1	65
	5	20	18	59	63		11	10	19	5	70
	6	2	18	58	62		1	A 0	19	12	72
	9	12	18	59	59		2	15	19	14	72
22	0	M 15	19	1	54		5	7	19	5	68½
	8	3	18	55	57½		7	16	19	4	64
	11	10	19	7	62½		8	55	18	54	61
	0	A 54	19	9	63	27	9	M 15	19	1	63
	3	15	19	5	64		11	12	19	8	68
	6	53	18	59	60		0	A 40	19	13	69½
	9	20	19	0	56		1	30	19	14	70½
23	8	M 7	18	54	55		3	13	19	8	70½
	9	15	18	58	58		5	8	19	9	68½
	11	43	19	11	62		5	43	19	4	68
	1	A 0	19	14	66		7	15	19	4	64
	3	2	19	9	63		9	0	19	2	59½
	4	23	19	4	63½	28	0	M 5	19	7	56½
	5	54	19	3	62½		9	44	19	3	63
	9	15	19	4	58½		10	43	19	7	65
24	0	M 6	19	6	56		1	A 0	19	14	68
	8	20	19	3	59½		9	10	19	4	61
	10	8	19	9	63	29	10	M 25	19	6	65
	11	35	19	14	66½		1	A 30	19	13	67½
	1	A 9	19	24	67		0	M 25	19	4	51
	2	0	19	19	63	30	8	30	19	1	54
	4	55	19	8	62		1	A 15	19	15	62
	7	12	19	4	60		9	12	19	6	55
25	0	M 5	19	2	58	31	8	M 58	18	59	55½
	9	10	18	59	66		11	55	19	14	55
	11	20	19	9	70		1	A 14	19	16	55½
	1	A 15	19	12	72		5	15	19	5	57

August.						September.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
31	8	A 32	19	5	52½	7	3	A 2	19	10	65
September.						8	1	M 46	19	4	57
D.	H.	M.	°	'	Th.	9		15	19	1	60
1	9	M 33	18	59	55	11		6	19	6	64
	0	A 59	19	12	59	9	0	A 32	19	10	66
	9	5	19	3	57½	9	0	M 46	19	4	58
2	10	M 0	19	0	59½	9	9	42	19	5	66
	1	A 4	19	9	63	11		35	19	11	72
	2	50	19	12	62	9	0	A 56	19	10	73
	5	35	19	8	59	6	6	51	19	4	69
	6	43	19	1	58	9	9	7	19	4	68
	9	44	19	3	60	10	0	M 40	18	37	66
3	9	M 35	19	1	64	8	8	32	19	1	68½
	1	A 58	19	12	68	10		58	19	7	75
	3	15	19	8	69	9	0	A 56	19	18	77½
4	0	M 20	19	3	58	1	1	15	19	20	78
	9	3	19	4	59	3	3	40	19	13	77½
	11	15	19	7	63	9	9	2	19	4	67
	1	A 14	19	11	65	11	0	M 20	19	4	63½
	5	34	18	57	61	8	8	22	19	4	62
	8	40	19	1	56	11		4	19	11	63½
5	0	M 13	19	6	54	1	1	A 20	19	14	64½
	8	42	19	7	55	2	2	50	19	16	64
	11	2	19	9	59	5	5	25	19	7	62½
	1	A 15	19	12	59½	12	0	M 23	18	54	55½
	2	5	19	13	60½	8	8	30	19	8	59
6	8	M 45	18	59	60½	9	9	30	19	1	61½
	11	56	19	9	65½	11		20	19	9	66
	1	A 15	19	10	67	1	1	A 25	19	13	67
7	0	M 30	19	5	58	7	7	10	19	5	62
	9	10	19	3	61½	13	0	M 54	19	4	61
	1	A 5	19	16	66	9	9	20	19	2	67
						11		45	19	11	69
						1	1	A 30	19	12	70

September.

September.							September.						
D.	H.	M.	°	'	Th.		D.	H.	M.	°	'	Th.	
13	4	A 32	19	6	67		17	11	A 55	19	5	56	
14	0	M 20	19	3	61		18	8	M 16	19	4	55	
	8	15	19	1	58			11	25	19	15	61½	
	9	25	19	3	60			6	A 0	19	5	57	
	11	20	19	9	63			11	42	19	4	50½	
	1	A 30	19	11	66		19	8	M 35	19	5	53	
	3	40	19	10	63½			9	40	19	16	55	
	5	32	19	7	61½			11	30	19	15	59	
	11	55	19	2	54			1	A 32	19	19	60½	
15	8	M 25	19	0	54½			3	2	19	12	60	
	11	12	19	14	60			8	55	19	8	53	
	1	A 30	19	13	61		20	0	M 20	19	2	48½	
	8	55	18	53	54			8	40	19	1	50½	
	11	58	18	53	53			11	20	19	9	58	
16	9	M 30	19	9	58			1	A 40	19	1	60	
	11	7	19	10	63			3	32	19	11	58½	
	1	A 55	19	7	64½		21	0	M 2	19	2	48	
	1	58	18	53	64½			8	45	19	1	56	
	2	10	19	15	64½			11	10	19	9	60	
	7	51	20	14	56			1	A 15	19	13	62	
	7	52½	19	30	56			5	28	19	6	58½	
	7	54½	19	14	56			9	16	19	1	54½	
	7	57½	17	56	56			11	57	19	3	53	
	7	59	17	44	56		22	8	M 28	19	0	56½	
	8	5	18	34	56			11	4	19	5	63	
	8	11	18	43	56			1	A 30	19	13	63½	
	8	18	19	22	55½			3	18	19	12	63	
	8	29	19	5	55			6	17	19	10	57	
	9	25	18	55	53			9	5	19	4	52	
17	8	M 15	19	1	56		23	9	M 55	19	5	59	
	11	6	19	9	63			0	A 50	19	13	64	
	1	A 17	19	13	64			7	22	19	6	67	
	3	10	19	9	65		24	8	M 17	18	58	53	
	7	0	19	4	61			11	30	19	9	62	

A strong Aurora Borealis

September.

September.						September.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
24	1 A	35	19	16	65	29	9 A	7	19	4	51
	3	14	19	13	63	30	9 M	46	19	1	55
	8	54	18	53	56½		0 A	5	19	14	59
	9	18	18	54	56		1	40	19	12	61
	11	52	19	18	53½	11	44	19	4	48	
25	8 M	25	18	59	53						
	10	2	19	3	54½						
	11	15	19	8	56½						
	1 A	18	19	13	58						
	5	16	19	8	58½						
	9	24	18	58	57						
26	0 M	16	19	1	55						
	8	46	19	0	57						
	11	30	19	11	57						
	1 A	7	19	12	59						
	2	15	19	14	60						
	3	12	19	15	58						
	5	40	19	11	55						
	11	45	19	14	49						
27	8 M	43	19	1	53						
	9	30	19	4	55						
	1 A	0	19	12	59						
	1	52	19	12	59½						
	9	16	19	5	53						
28	8 M	17	19	18	60						
	11	40	19	14	62						
	1 A	27	19	15	63½						
	2	50	19	10	63						
	5	20	19	5	59						
	7	0	19	4	58						
An Aur. Bor.	0 M	5	19	5	55						
29	9	15	19	1	59						
	11	44	19	11	62						
	1 A	35	19	11	63						

October.					
D.	H.	M.	°	'	Th.
1	8 M	6	18	58	47
	9	7	19	1	48
	2 A	0	19	14	62
	8	52	19	2	52
	11	50	19	3	49½
	8 M	20	19	14	54
	11	10	19	10	59½
	1 A	12	19	14	60
	8	10	19	4	52
	9	21	18	49	49½
	0 M	12	18	44	48
	8	41	19	9	48
	10	2	19	8	50½
	11	44	19	14	53
	1 A	35	19	15	54
	4	8	19	9	52½
	8 M	35	19	0	54
	11	14	19	9	58½
	1 A	25	19	12	59
	9	11	19	3	53½
	8 M	25	18	58	50½
	9	46	19	0	56
	11	15	19	6	59½
	1 A	12	19	10	62
	2	30	19	8	62

October.

October.						October.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
5	9	A 18	19	6	58½	12	11	M 22	19	7	59
	11	16	19	4	58		1	A 20	19	12	62
6	9	M 0	19	1	60		3	2	19	8	60
	11	32	19	8	63		5	38	19	5	58
	1	A 33	19	12	65		9	7	19	4	54
	3	7	19	9	65½		11	46	19	3	51
	9	15	19	4	60	13	8	M 32	18	59	52
7	0	M 22	19	5	56		11	30	19	7	57
	10	1	19	1	63		1	A 28	19	14	58
	1	A 23	19	9	67		9	44	19	3	50
	9	10	19	4	57	14	10	M 7	19	3	56
8	8	M 12	18	55	52		11	45	19	9	55
	10	58	19	4	63		0	A 57	19	10	54
	1	A 30	19	24	70		5	28	19	4	53½
	3	2	19	17	69½		9	34	19	4	51
	4	24	19	23	67½	15	9	M 0	18	59	49
9	0	M 28	18	26	56		10	52	19	7	53½
	8	26	19	23	54		1	A 13	19	10	57
	11	15	19	14	67½		3	15	19	8	57
	4	A 21	19	7	68		9	18	19	4	56
	9	40	18	54	60	16	0	M 32	19	5	55
10	8	M 30	19	8	60½		8	31	18	59	56
	9	51	19	7	64		11	20	19	10	59
	11	5	19	11	65		1	A 26	19	11	61
	1	A 12	19	12	66		5	24	19	4	58
	3	35	19	7	65		9	16	19	5	59
	7	20	18	57	62	17	9	M 8	19	2	61
11	8	M 7	19	3	58		11	16	19	11	61
	11	13	19	7	60		1	A 28	19	10	59
	1	A 32	19	10	61		3	27	19	6	57
	3	15	19	9	59½		6	24	19	5	53
	5	30	19	5	58½	18	10	M 13	19	4	50
12	0	M 2	18	57	56		1	A 0	19	10	52
	8	31	18	58	58½		8	3	19	5	47½

October.

October.						October.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
19	8 M	41	19	1	42½	26	11 A	55	19	9	51½
	1 A	8	19	14	50	27	8 M	32	19	1	50
	3	12	19	13	49		1 A	17	19	14	47
	9	10	19	5	43		3	46	19	13	45½
20	9 M	32	19	2	39		9	2	19	7	41
	11	9	19	9	41½	28	9 M	46	19	4	49
	0 A	50	19	12	43		11	12	19	10	49½
	9	24	19	5	39½		1 A	3	19	12	52
21	3 A	7	19	9	53		5	10	19	9	49
	10	54	19	5	52		9	12	19	7	48
22	10 M	9	19	6	57	29	8 M	55	19	2	49
	0 A	44	19	11	59		11	0	19	8	52
	6	26	19	7	57		1 A	22	19	14	55
23	0 M	14	19	4	51½		3	35	19	12	54
	8	31	19	2	47		8	46	19	2	52
	11	32	19	9	55	30	8 M	40	19	6	50½
	1 A	4	19	10	56		11	8	19	15	52½
	5	8	19	8	52		1 A	6	19	17	53
	7	4	19	7	50		4	18	19	10	50
	11	41	19	7	45		9	32	19	4	44½
24	8 M	36	19	2	43	31	8 M	36	19	9	42
	1 A	8	19	14	53		9	22	19	7	44
	3	10	19	12	51		1 A	22	19	18	50
	11	55	19	8	43		3	40	19	16	49
25	8 M	46	19	2	49		5	45	19	13	46
	11	9	19	9	53		9	32	18	54	42
	1 A	28	19	13	55	November.					
	2	57	19	11	54½	D.	H.	M.	°	'	Th.
	7	52	19	8	50	1	0 M	21	18	39	39
26	8 M	32	19	2	45		9	58	19	14	43
	11	20	19	10	48½		1 A	38	19	11	46½
	1 A	13	19	11	50		11	52	19	7	38
	3	0	19	9	51½						
	8	56	19	7	50½						

November.

November.						November.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
2	8	M	54	19	44	9	9	M	48	19	14
	1	A	26	19	50		1	A	37	19	18
	3		50	19	8		9		35	19	3
	9		28	19	7	10	8	M	35	19	7
3	8	M	40	19	4		1	A	6	19	15
	10		1	19	6		8		46	19	3
	11		24	19	10	11	10	M	7	19	7
	1	A	36	19	11		11		21	19	11
4	9		12	19	3		1	A	4	19	14
	0	M	46	19	6	12	2		25	19	14
	10		2	19	6		7		28	19	10
	11		10	19	10	13	8	M	44	19	8
5	1	A	17	19	13		11		16	19	14
	5		17	19	9		1	A	6	19	15
	0	M	25	19	6	14	3		20	19	12
	9		36	19	3		6		49	19	9
6	1	A	28	19	17		8	M	36	19	8
	6		54	19	4	15	11		29	19	15
	8	M	37	19	4		1	A	7	19	16
	11		4	19	10	16	3		57	19	13
7	1	A	7	19	15		9		58	19	9
	3		1	19	16	17	9	M	2	19	10
	5		16	19	12		1	A	48	19	15
	9		17	19	10	18	3		4	19	14
8	8	M	14	19	9		7		46	19	9
	11		5	19	11	19	8	M	37	19	8
	1	A	26	19	14		10		55	19	12
	3		20	19	14	20	1	A	33	19	14
9	7		17	19	10		4		36	19	10
	0	M	46	19	11	21	11		30	19	9
	8		52	19	11		8	M	47	19	5
	11		6	19	15	22	11		47	19	14
10	1	A	22	19	18		1	A	34	19	16
	0	M	31	19	12		3		36	19	14
						23					

November.						November.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.
16	5	A 45	19	9	37½	23	8	A 52	19	6	31
17	9	M 16	19	7	32	24	0	M 14	19	3	31
	11	9	19	13	37		9	4	19	14	33½
	1	A 42	19	14	40		11	0	19	18	37
	3	26	19	13	38½		1	A 16	19	20	38
	9	5	19	7	33		4	22	19	9	39
19	9	M 7	19	7	32		7	23	19	6	39½
	11	46	19	15	38		9	57	19	5	39½
	1	A 15	19	15	38	25	10	M 2	19	7	42
	2	57	19	14	38		11	40	19	10	46
	6	3	19	10	35½		1	A 5	19	12	48
	9	38	19	7	34		4	22	19	9	49
20	0	M 13	19	9	35	26	8	M 58	19	8	53
	9	4	19	6	35½		10	56	19	13	54
	10	14	19	8	37		1	A 23	19	16	54
	11	35	19	10	38		3	2	19	14	53½
	2	A 53	19	14	36		7	46	18	57	49
	5	2	19	12	35		9	25	18	44	48
21	0	M 7	19	9	34½	27	8	M 42	19	2	42½
	9	5	19	5	37		11	12	19	26	46½
	11	15	19	10	37		1	A 0	19	19	48
	1	A 12	19	14	37		3	2	19	14	48
	3	11	19	14	36½		5	33	19	14	47
	8	20	19	8	35½		9	45	18	44	49
22	0	M 10	19	6	34	28	8	M 32	19	5	53
	9	4	19	8	29		0	A 7	19	13	53
	11	28	19	12	34		1	26	19	14	53
	1	A 7	19	13	37		2	52	19	11	51½
	3	12	19	13	36		6	0	19	7	47
	9	36	19	9	30		9	10	19	4	43
23	9	M 5	19	11	24	29	9	M 14	19	7	38½
	11	12	19	16	26		10	46	19	9	41
	1	A 30	19	18	33		1	A 20	19	10	44
	3	37	19	15	33		5	16	19	6	39

November.

November.						December.					
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Ph.
30	0	M 25	19	4	33	7	1	A 35	19	8	37
	11	16	19	10	36		4	54	19	6	37
	8	A 53	19	4	32½		9	32	19	4	36
December.						8	0	M 25	19	5	35
							9	17	19	4	37½
						11		5	19	7	40
							1	A 4	19	11	42
							3	0	19	11	41
							5	37	19	9	37
							9	45	19	4	40
						9	0	M 16	19	5	39
							10	37	19	8	38
							1	A 21	19	10	41
							3	40	19	9	40
						11		48	19	7	39
						10	8	M 20	19	7	36
							10	24	19	9	38
							1	A 25	19	10	41
							3	48	19	9	40
							9	16	19	3	38½
						11	0	M 15	19	4	37½
							9	2	19	5	35
						11		10	19	9	36½
							0	A 47	19	10	37½
							3	28	19	12	37
							9	40	19	6	34
						12	9	M 14	19	7	30½
							11	3	19	9	34
							1	A 12	19	13	34½
							3	30	19	8	33
							9	5	19	6	30
						13	9	M 2	19	7	28½
							10	10	19	12	30
							2	A 1	19	14	31

December.						December.							
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.		
13	8	A	58	19	4	30½	20	10	M	32	19	9	37
14	9	M	5	19	7	31		1	A	58	19	12	40
	11		7	19	9	33		4		10	19	11	41
	0	A	55	19	14	33	21	9	M	5	19	8	37
	3		20	19	12	32		11		26	19	9	39
	6		17	19	1	31		1	A	0	19	11	39
	9		8	19	5	30		4		0	19	11	40
15	9	M	25	19	7	31		6		16	19	10	40
	11		24	19	13	35		9		15	19	9	39
	1	A	30	19	17	36	22	10	M	5	19	10	38
	3		20	19	8	33½		11		56	19	12	39½
16	0	M	15	19	7	29		1	A	49	19	16	40
	10		22	19	8	33		5		6	19	10	39
	1	A	16	19	13	36		8		50	19	9	38
	5		37	19	13	31½	23	0	M	48	19	8	37
	9		15	19	7	33½		10		30	19	16	38
17	9	M	0	19	6	26½		5	A	2	19	9	39½
	11		12	19	10	32½		5		10	19	4	39½
	1	A	40	19	11	34½		5		17	19	14	39
	3		8	19	12	33½		5		22	19	14	39
	9		25	19	8	26½		6		30	19	1	39½
	11		56	19	7	25		7		53	19	2	37
18	9	M	7	19	7	25	24	0	M	40	19	6	37
	11		10	19	11	31		10		25	19	10	36
	1	A	12	19	14	33		1	A	40	19	11	36
	5		23	19	12	32½		3		25	19	9	36
	9		10	19	8	32		6		41	19	6	36
19	9	M	5	19	7	32½		9		18	19	5	36
	11		30	19	13	33½	25	9	M	34	19	6	40
	1	A	25	19	16	34		11		30	19	9	42
	5		37	19	9	34		2	A	0	19	10	43½
	9		10	19	8	32		3		25	19	11	43
20	0	M	5	19	8	32½		5		56	19	10	43
	9		7	19	8	36		8		30	19	6	43

December.

December.						December.								
D.	H.	M.	°	'	Th.	D.	H.	M.	°	'	Th.			
26	9	M	40	19	6	42½	29	3	A	15	19	14	45	
	11		0	19	7	46		5		42	19	14	44½	
	1	A	30	19	13	47		9		5	19	5	46	
	3		0	19	12	46½		30	0	M	12	19	8	46
	7		22	19	10	42½			10		25	19	10	47
9		4	19	8	42½	11			35	19	11	47		
27	0	M	2	19	7	43	31	1	A	3	19	12	47	
	10		24	19	17	38		2		0	19	13	46½	
	1	A	28	19	18	42		5		43	19	11	46½	
	3		2	19	13	41		9		32	19	9	47	
	4		47	19	9	39½		0	M	33	19	9	46	
28	11	M	23	19	14	45½	11	9		18	19	8	43	
	1	A	15	19	18	47		1	A	14	19	14	47	
	6		30	19	9	46		2		57	19	13	46	
	9		11	19	8	44		5		30	19	10	44	
	10	M	0	19	17	46		9		2	19	8	42½	
29	0	A	47	19	14	46	11	57		19	8	42		
	1		43	19	17	45½								

The mean diurnal Variation for each Month in the Year 1759.		
	/	//
January - - -	7	8
February - - -	8	58
March - - -	11	17
April - - -	12	26
May - - -	13	0
June - - -	13	21
July - - -	13	14
August - - -	12	19
September - -	11	43
October - - -	10	36
November - -	8	9
December - -	6	58