SMITH'S
PLANETARY ALMANAC
AND
WEATHER GUIDE.

1889.  1889.

CONTAINING IN A GENERAL FORECAST FOR THE YEAR, AN OUTLINE SKETCH OF THE WEATHER BY MONTHS; THE

WEATHER FOR EACH WEEK;

A PLANETARY EPHEMERIS CALCULATED TO MONTREAL MEAN TIME;

LUNAR INFLUENCE ON VEGETATION,

WITH TABLES FOR SOWING ACCORDING TO IT IN ALL LATITUDES; A LIST OF MOONLIGHT EVENINGS; COPIOUS ASTRONOMICAL NOTES; ESSAYS BY OTHER SCIENTISTS; THE ANNUAL REPORT OF THE ASTRO-METEOROLOGICAL ASSOCIATION, ETC.

BY

WALTER H. SMITH,

PRESIDENT OF THE ASTRO-METEOROLOGICAL ASSOCIATION; AUTHOR OF *Seybold Melvin, or the World of Mars; Vennor's Almanac*, 1885; FORMERLY ASSOCIATE EDITOR OF THE *Weather Bulletin*, ETC.

MONTREAL,
1888.

TWELFTH ANNUAL ADDRESS.

Again have my forecasts proved most successful. Again they have been spoken of, in public and in private; amidst the noise of gathered multitudes and in the quiet of the home circle—with unqualified approval. Hardly a day has passed that I have not received some recognition of their correctness, either by word spoken or by letter; I have received some attestation of the fact that SMITH'S PLANETARY ALMANAC contained forecasts that were of more than ordinary worth to those who were not too prejudiced to peruse them.

Such words of kindly praise as those I allude to could have but one effect, and that to stimulate to yet more careful calculation, yet more earnest study. In presenting the result of this calculation and study for the year 1889, I wish to thank all who have aided me in extending the sale of this book. The increase in circulation last year, I am sorry to say, was not as great as I anticipated, and I trust that my friends—everything depends upon them—will make a *double effort* this year. I am sure that they will, when I tell them that, thus far, the work does not pay. I am also sure that they feel that it should be made to pay.

That the weather can be foretold, despite all that sceptics say to the contrary, my readers have proved. That there is yet much to be done in the science of Planetary, or Astro-Meteorology, I admit. For this purpose I founded the Astro-Meteorological Association,—now in a most prosperous condition—for this purpose I ask my readers to place copies of this manual in the hands of persons who delight in observing weather changes, in studying the orbs of heaven, or, better still, who delight in both sciences, and combine them for the common benefit of man.

The "Weather forecasts" will, I think, be found even more extended this year than in previous years. With regard to the Astronomical matter, it also is fuller, besides my having added a table of the "Southing of the Planets," for the benefit of amateur Astronomers.

The Annual Report of the Astro-Meteorological Association will also be read with interest.

WALTER H. SMITH.

31 Arcade Street, Montreal.

ASTRONOMICAL AND OTHER NOTES.

Fixed and Movable Festivals, 1889.

New Year's Day—Circumcision	Jan.	1
Epiphany	"	6
Septuagesima Sunday	Feb.	17
Washington's Birthday	"	22
St. David	Mar.	1
Quinquagesima Shrove Sunday	"	3
Ash Wednesday	"	6
First Sunday in Lent	"	10
St. Patrick	"	17
Annunciation-Lady Day	"	25
Palm Sunday	Apr.	14
Good Friday	"	19
Easter Sunday	"	21
St. George	"	23
Low Sunday	"	28
Birth of Queen Victoria	May	24
Rogation Sunday	"	26
Ascension Day—Holy Thursday	"	30
Pentecost—Whit-Sunday	June	9
Trinity Sunday	"	16
Corpus Christi	"	20
Accession of Queen Victoria	"	20
St. John Baptist—Midsummer Day	"	24
St. Peter and St. Paul	"	29
Dominion Day	July	1
Independence Day	"	4
Michaelmas	Sept.	29
All Saints Day	Nov.	1
Birth of Prince of Wales	"	9
St. Andrew	"	30
First Sunday in Advent	Dec.	1
Conception B.V.M.	"	8
St. Thomas	"	21
Christmas Day	"	25

Principal Articles of the Calendar.

Golden Number	9	Dominical Letter	F.
Epact	28	Roman Indiction	2
Solar Cycle	22	Julian Period	6602

Chronological Eras.

The first day of January of the year 1889 is the 2,411,004th day since the commencement of, and the 6602nd year of the Julian Period.

The year 1889 is the 7397-98 of the Byzantine Era, the year 7398 commencing on September 1st.

The year 5649-50 of the Jewish Era, the year 5650 commencing on September 26th, 1889, or, more exactly, at sunset on September 25th.

The year 2642 since the Foundation of Rome, according to Varro.

The year 2636 since the beginning of the Era of Nabonassar, which has been assigned to Wednesday, the 26th of February of the 3967th year of the Julian Period; corresponding, in the notation of chronologists, to the 747th; and

in the notation of astronomers, to the 746th year before the birth of CHRIST.

The year 2665 of the Olympiads, or the first year of the 667th Olympiad, commencing in July, 1889, if we fix the Era of the Olympiads at 775½ years before CHRIST, or near the beginning of July of the year 3938 of the Julian Period.

The year 2201 of the Grecian Era, or the Era of the Seleucidæ.

The year 1605 of the Era of Diocletian, and the year 2549 of the Japanese Era.

The year 1307 of the Mohammedan Era, or the Era of the Hegira, commences on August 28th, 1889.

Ramadân (Month of Abstinence observed by the Turks) commences on May 1st, 1889.

The 114th year of the Independence of the United States of America begins on July 4th, 1889.

The 23rd year of the Confederation of the Provinces of the Dominion of Canada begins on July 1st, 1889.

COMMENCEMENT OF THE SEASONS.

Montreal Mean Time.

The Sun enters ♈ and SPRING begins March 20th, at 4h. 56m. morning.

The Sun enters ♋ and SUMMER begins June 21st at 6h. 24m. morning.

The Sun enters ♎ and AUTUMN begins September 22nd, at 4h. 14m. evening.

The Sun enters ♑ and WINTER begins December 21st, at 10h. 6m. morning.

SIGNS OF THE ZODIAC.

These are twelve, and given for mean noon at Montreal, in "the Moon" column of each calendar page. They are as follows: ♈ Aries, (Head and Face) the Ram; ♉ Taurus, (Neck) the Bull; ♊ Gemini, (Arms and Shoulders) the Twins; ♋ Cancer, (Breast) the Crab; ♌ Leo, (Heart) the Lion; ♍ Virgo, (Bowels) the Virgin; ♎ Libra, (Kidneys and Back) the Balance; ♏ Scorpio, (Secrets,) the Scorpion; ♐ Sagittarius, (Thighs) the Archer; ♑ Capricornus, (Knees) the Goat; ♒ Aquarius, (Legs) the Water Bearer, and ♓ Pisces, (Feet) the Fishes.

ECLIPSES.

In the year 1889 there will be five eclipses, three of the Sun (☉) and two of the Moon (☽).

1.—A total eclipse of the Sun (☉) January 1, invisible at Montreal, but partly visible in Eastern Ontario, over the Lake Region, Washington, etc., where the Sun will set eclipsed. Visible as a total eclipse from a point in the Canadian North-West, North of the 50th parallel in 95° West Longitude, and from thence South-Westward to California, where the line of totality leaves this Continent at Point Arena. Totality begins at Point Arena, at 1h. 30m. 33s. local time. At Pilot Peak, totality begins at 1h. 45m. 54s. At Mendocino, totality begins at 1h. 29m. 47s. Length of total phase about 2m. The eclipse is generally visible from Honduras to Alaska, as well as over the North Pacific, from Christmas Island on the South to Behring Strait on the North. Greenwich mean time of conjunction, 9h. 16m. 05s.

2.—A partial eclipse of the Moon (☽) January 16-17, visible at Montreal, and generally in Europe, Africa, North and South America, the Atlantic and Pacific Oceans. Moon enters penumbra, Montreal mean time, 9h. 43m. eve.; enters shadow (beginning of eclipse) 11h. 04m.; middle of eclipse, 0h. 35m. morn.; moon leaves shadow (end of eclipse), 2h. 07m. Moon leaves penumbra, 3h. 27m. Magnitude of the eclipse = 0.702, (Moon's diameter = 1).

3.—An annular eclipse of the Sun, (☉) June 28, invisible at Montreal. This eclipse will be visible over the Indian Ocean, South Africa, and parts of the South Atlantic. Greenwich mean time of the conjunction, 8h. 56m. 53s. morn.

4.—A partial eclipse of the Moon (☽) July 12, invisible at Montreal, but visible in Europe, Asia, Africa, Australia, the Atlantic Ocean, and the Easterly portion of South America. Greenwich mean time of ☌ in R. A., 8h. 49m. 39s. eve. Magnitude of Eclipse = 0.486, (Moon's diameter = 1).

5.—A total eclipse of the Sun (☉) December 21-22, invisible at Montreal, but visible from Arabia and the Mauritius, over Africa, the Atlantic Ocean and South America to Honduras, Cuba, Florida and Nova Scotia, where the sun will rise partially eclipsed. Greenwich mean time of the conjunction in Right Ascension, 0h. 52m. 30s. aft.

GENERAL FORECAST.

"Is it difficult to correctly forecast future weather?" The U. S. Chief Signal officer in his last annual report, says that it is, and declares, moreover, that he has men under him who can never be of marked value as predicting officers, notwithstanding their having gone through the ordinary course of instruction in meteorological science. In fact, Greeley appears to have come to a conclusion that the writer long ago arrived at, viz: that the true weather forecaster is born as well as made. A difficult science is usually known by few pursuing it. If so, meteorological prediction is difficult, because the successful predictors in this country, especially at "long range," are to be counted on one's fingers. A man may understand Meteorology, be familiar with Astronomy; have acquired the general rules laid down by Astro-Meteorologists, and still prove a failure when he attempts to forecast coming weather. Strange, doubtless, hard to believe also, but true nevertheless. Yet Astro-Meteorologists have no secrets; it is our expressed desire to extend our sphere by instructing others, and for this end the Astro-Meteorological Association was founded, with its special section for the study of Planetary Meteorology. Greeley is certainly correct when he reports that "the basis on which rests their (Meteorologists') judgment is known to all scientific men, but the skill of correct judgment is in no manner communicable to others. It is no more possible for an indications officer of high standing to make another person a good indications officer, than it is for a successful doctor to communicate to others his own great skill of diagnosing hidden diseases."

There is no hocus-pocus about weather forecasting. Those who read in my Almanac last year "How I forecast the weather," must have already come to this conclusion. The positions of all the bodies composing the Solar System are known. Meteorological records show what has already happened; therefore, if certain planetary positions resulted in certain conditions of the atmosphere in the past, it must be

the same in the future. I could print any amount of written testimonials as to my accuracy, which have reached me unsolicited, to say nothing of the requests that are made for special forecasts, which would never be asked if my success was less than it is. While the percentages of the Washington office have been going down, mine have gone on improving to such an extent that people now expect Smith "to be right, straight along," and when a "miss" happens in their locality, look upon it with greater astonishment than they would look upon a correct forecast in some Almanacs. Yet I have never pretended to be correct straight along from year's end to year's end. In fact I believe to be thus accurate is not within the possibilities of what must be still considered an imperfect science; this especially so far as North American weather is concerned. Over in Europe they have been keeping records and making calculations for centuries. We are infants in comparison; but we have a climate worth studying, and we are studying it. The writer's special study of past climatic conditions leads him to the following conclusions so far as the year 1889 is concerned:—

JANUARY:—A month of low average temperature, and some specially low thermometer readings. Considerable downfall, nearly all of it in the form of snow. Some sudden and peculiar changes of an abrupt nature during the first winter month of 1889.

FEBRUARY:—This is usually supposed to bear the character of a dry, cold month, especially in Canada and the Northern United States. I expect a departure this year, in the shape of deep snows and moderate temperatures.

MARCH:—More "lamb" than "lion" this year. An average March, with but few severe storms.

APRIL:—Another month of mean temperature. The first part cold and stormy, and the latter part with temperature above the average.

MAY:—A rainy month. The heavy precipitation will conduce to cool periods, with local frosts in Northern sections. Mean temperature below the average.

JUNE:—A dry, hot, summer-like month, with some severe electrical storms and dangerous winds. Mean temperature generally above the average.

JULY :—Some "three figure" weather this month in spots, but I do not anticipate a general mean temperature above the average, rather the contrary. I expect a heavy rainfall, and an average July temperature.

AUGUST :—A dry month, temperature not much, if any, above the average. A few very hot spells, with more "three figure" weather, and some severe tornadoes.

SEPTEMBER :—A dry month on the whole, warm and summer like. Storms below the average in number.

OCTOBER :—Cool and rainy generally, with less than the average of pleasant October weather. Severe and damaging storms are probable.

NOVEMBER :—This looks like a month of opposites. The first half promises to be warm for the season, while the last half promises more than the usual amount of stormy, wet, inclement weather, with considerable snow in Northern sections.

DECEMBER :—A cold, winter month, low temperatures, waters generally ice-locked. Precipitation more than the average. Some severe storm periods and cold "dips."

MONTREAL, *September* 17, 1888.

MOONLIGHT EVENINGS OF 1889.

January.—From the 9th to the 18th inclusive.
February.—Beginning with the 7th and lasting to the 17th.
March.—Between the 9th and the 18th.
April.—From the 8th up to and including the 17th.
May.—From the 8th to the 16th.
June.—Between the 6th and the 15th.
July.—From the 6th to the 14th.
August.—From the 4th to the 12th.
September.—Between the 2nd and 11th.
October.—From the 1st to the 11th, and on the 30th and 31st.
November.—From the 1st to the 9th, and on the 29th and 30th.
December.—Beginning on the 1st and continuing to the 8th, and from the 28th to the end of the month.

1st Month. # JANUARY. 31 Days.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
● N.M.	1	4.26 ev.	4.12 ev.	3.59 ev.	3.17 ev.	2.42 ev.
☽ F.Q.	8	7.59 ev.	7.45 ev.	7.32 ev.	6.50 ev.	6.15 ev.
○ F.M.	16-17	0.55 mo.	0.41 mo.	0.28 mo.	11.46 ev.	11.11 ev.
☾ L.Q.	24	11.15 mo.	11.01 mo.	10.49 mo.	10.06 mo.	9.31 mo.
● N.M.	31	4.28 mo.	4.14 mo.	4.01 mo.	3.19 mo.	2.44 mo.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. Slow	THE SUN— Rises. H. M.	Sets. H. M.	THE MOON Zod.	Souths. H. M.
1	Tu.	**NEW YEAR'S DAY.** 1889 enters "on the wings of the storm," with snow, high winds and drifts—Well snowed up in N. and N.W. sections, rain, sleet and snow S.—A cold "dip" low ther. readings—Windy with snow falls.	4	7 41	4 27	♍	Eve.
2	We.		4	41	28	♍	0 56
3	Th.		5	41	29	♒	1 56
4	Fri.		5	41	30	♒	2 53
5	Sat.		6	40	31	♓	3 44
		(1) Epiphany.		Neptune in Taurus.			
6	Su.	Milder, with snow N. and W. sleet and rain S., snowfalls general—Another cold "dip," very cold zero weather, extreme temp. probable—Moderating with high winds, snows and drifts, gales on the coast—Very cold in W. and N.W.	6	7 40	4 32	♓	4 32
7	Mo.		7	40	33	♈	5 17
8	Tu.		7	40	34	♈	6 01
9	We.		7	39	35	♈	6 43
10	Th.		8	39	36	♉	7 25
11	Fri.		8	39	37	♉	8 09
12	Sat.		9	38	38	♊	8 55
		(2) 1st Sunday after Epiphany.		Mercury in Capricornus.			
13	Su.	Generally cold everywhere on 13th and 14th—Heavy snows, especially in W. and N.W. sections—Drifts, bluster and snow blockades around Chicago and Westward—Snows and drifts East—Very cold weather—Cloudy and snowy, rains in the South.	9	7 37	4 40	♊	9 41
14	Mo.		10	37	41	♊	10 30
15	Tu.		10	36	42	♋	11 20
16	We.		10	36	43	♋	Morn
17	Th.		11	35	44	♌	0 10
18	Fri.		11	35	46	♌	1 01
19	Sat.		11	34	48	♍	1 50
		(3) 2nd Sunday after Epiphany.		Venus in Aquarius.			
20	Su.	A milder period, with general rains, sleet, snow and wind—Colder, cloudy and squally—Snowy and unsettled—A "dip" in many sections, with local snowfalls and high winds.	11	7 33	4 49	♍	2 38
21	Mo.		12	32	51	♍	3 27
22	Tu.		12	31	52	♎	4 14
23	We.		12	30	54	♎	5 02
24	Th.		12	29	55	♏	5 51
25	Fri.	**Conversion of St. Paul.**	13	28	56	♏	6 42
26	Sat.		13	27	57	♐	7 36
		(4) 3rd Sunday after Epiphany.		Mars in Aquarius.			
27	Su.	Opens cold—Milder, with thaws, snow, sleet and rain—High winds and heavy rains in W., S.W. and S.—Stormy, unsettled and cold at the close.	13	7 26	4 58	♐	8 34
28	Mo.		13	25	59	♑	9 35
29	Tu.		13	24	5 01	♑	10 36
30	We.		14	23	03	♒	11 37
31	Th.		14	22	05	♒	Eve.

PLANETS IN JANUARY, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	Jan 1st.	Jan. 8th.	Jan. 16th.	Jan. 24th.
Mercury..... ☿	0 14 ev.	0 37 ev.	1 01 ev.	1 20 ev.
Venus..... ♀	2 59 ev.	3 02 ev.	3 05 ev.	3 07 ev.
Mars..... ♂	3 00 ev.	2 53 ev.	2 45 ev.	2 37 ev.
Jupiter..... ♃	10 37 mo.	10 22 mo.	9 58 mo.	9 33 mo.
Saturn..... ♄	2 44 mo.	2 16 mo.	1 43 mo.	1 09 mo.
Uranus..... ♅	6 39 mo.	6 09 mo.	5 38 mo.	5 06 mo.
Neptune..... ♆	9 10 ev.	8 39 ev.	8 09 ev.	7 36 ev.

On the first day of the New Year, the Sun is eclipsed (see page 6), and at 9.18 ev. Mercury is 2° 34′ S. of the Moon. Venus and Mars are but 40′ apart on the 2nd at 7.53 mo. Both planets are "evening stars," at the time, and the Moon is near Mars at 5.14 ev. on the 4th (Mars 2° 4′ N.) and passes 1° 28′ S. of Venus at 6.50 ev., the three planets forming a beautiful group in the evening sky. Uranus on the 11th at 4 p.m. is 90° from the Sun (quadrature) and overhead at 6 mo. On the 12th, at 4 mo., Luna is close to the invisible Neptune, the latter being 2° 33′ N. At noon on the 12th, the Moon is farthest from the Earth (Apogee). Luna suffers eclipse on the 16th (see page 6). Steady glowing Saturn is 1° 21′ S. of the Moon on the 18th at 4.14 ev.; Uranus near the Moon on the 23rd at 9 mo., and "Stationary" on the 25th at 7 ev. Jupiter is 1° 42′ S. of Luna on the 28th at 4.18 mo. The Moon is nearest the Earth (Perigee) on the 28th at 2 aft., and Mercury is visible as an "evening star," (greatest elong. East 18° 22′) on the 30th.

2nd Month. # FEBRUARY. 28 Days.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
☽ F.Q.	7	4.16 ev.	4.02 ev.	3.49 ev.	3.07 ev.	2.32 ev.
☉ F.M.	15	5.37 ev.	5.23 ev.	5.10 ev.	4.28 ev.	3.53 ev.
☾ L.Q.	22	7.14 ev.	7.00 ev.	6.47 ev.	6.05 ev.	5.30 ev.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. THE SUN—Slow.	Rises.	Sets.	THE MOON Zod.	Souths.
			M.	H. M.	H. M.		H. M.
1	Fri.	February is likely to open cold and	14	7 21	5 06	♓	Eve.
2	Sat.	**CANDLEMAS.** stormy.	14	20	08	♓	2 21
		(5) 4th Sunday after Epiphany. Jupiter in Sagittarius.					
3	Su.	High winds and snows general—Storms	14	7 19	5 09	♈	3 08
4	Mo.	in Eastern sections, snow blockades in	14	18	11	♈	3 53
5	Tu.	the Mar. Prov. and rough weather along	14	17	12	♈	4 37
6	We.	Atlantic seaboard—Windy, rains S., snow	14	16	14	♉	5 20
7	Th.	falls N.—A period of moderate weather,	14	14	15	♉	6 04
8	Fri.	perhaps thaws and rains—Snowy and cold	14	13	17	♉	6 48
9	Sat.	at the close.	14	12	18	♊	7 35
		(6) 5th Sunday after Epiphany. Saturn in Leo.					
10	Su.	Cold continues with heavy snowfalls	14	7 10	5 19	♊	8 22
11	Mo.	and drifts in N., N. W. and W.—Cold	14	09	21	♋	9 12
12	Tu.	"brilliant" winter weather about 12th,	14	07	22	♋	10 02
13	We.	13th and 14th—High winds and gales,	14	06	24	♌	10 53
14	Th.	**St. Valentine.** heavy rains S., snows	14	04	25	♌	11 44
15	Fri.	N., Stormy in Mar. Prov. and along New	14	02	27	♌	Morn
16	Sat.	England coast—Cold in N. sections.	14	01	28	♍	0 33
		(7) Septuagesima Sunday. Uranus in Virgo.					
17	Su.	Cloudy and milder, thaws W. generally	14	6 59	5 30	♍	1 22
18	Mo.	snowy, rainy and misty—Cloudy and	14	58	31	♎	2 11
19	Tu.	squally, with rapid changes of tempera-	14	56	33	♎	2 59
20	We.	ture, rains and snow falls especially W.—	14	54	34	♏	3 48
21	Th.	A brief cold period.	14	53	36	♏	4 39
22	Fri.	**Washington born 1731.**	14	51	37	♏	5 32
23	Sat.	Moderating.	13	50	39	♐	6 27
		(8) Sexagesima Sunday. Mercury in Capricornus.					
24	Su.	Mild, with thaws and rains, a general	13	6 48	5 40	♐	7 25
25	Mo.	break up in S.—Stormy, snowy and unset-	13	47	41	♑	8 25
26	Tu.	tled N. with high winds and gales along	13	45	43	♑	9 24
27	We.	Atlantic coast—Rains in S.	13	44	45	♒	10 22
28	Th.		13	43	46	♒	11 17

PLANETS IN FEBRUARY, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	Feb. 1st.	Feb. 8th.	Feb. 16th.	Feb. 24th.
Mercury .... ☿	1 23 ev.	0 58 ev.	11 59 mo.	11 02 mo.
Venus ..... ♀	3 07 ev.	3 06 ev.	3 05 ev.	3 01 ev.
Mars..... ♂	2 29 ev.	2 21 ev.	2 11 ev.	2 02 ev.
Jupiter ..... ♃	9 09 mo.	8 47 mo.	8 22 mo.	7 56 mo.
Saturn..... ♄	0 35 mo.	0 05 mo.	11 27 ev.	10 53 ev.
Uranus..... ♅	4 36 mo.	4 08 mo.	3 36 mo.	3 04 mo.
Neptune .... ♆	7 10 ev.	6 34 ev.	6 03 ev.	5 32 ev.

Mercury at greatest brilliancy is 4° 14′ N. of the Moon at 11.44 mo. on the 1st, the swift-footed planet being at Perihelion (nearest the Sun) on the 2nd at 4.05 ev. Mars and the Moon are in conjunction 2 hours later, the fiery planet passing 3° 51′ N. Venus is near Luna at 2.46 ev. on the 3rd (Moon 5° 37′ S.). Saturn gives the most favorable view of his belts, satellites and rings to observers on the night of the 5th, being at opposition (overhead at midnight) on that date. Opposition 7.19 mo. Mercury is stationary at the same time and Neptune stationary on the 8th at 11 mo., when the Moon is close beside him (Moon 2° 31′ S.). Luna is at Apogee at 7 mo. on the 9th, and 1° 5′ N. of Saturn on the 14th at 7.42 ev., Mercury being at Inferior Conjunction (between the Sun and Earth) at 8.04 that evening. Neptune is 90° from the Sun on the 17th at 6 ev. (then overhead), and Venus reaches the limit of her course out from the Sun of 46° 36′ E. at 2.24 mo. on the 18th. Luna passes Uranus at 2.32 ev. on the 19th, is at Perigee on the 24th at 8 mo., and 1° 11′ N. of Jupiter at 8 ev. the same day. Mercury is stationary on the 26th at 11 ev. and 4° 19′ N. of the Moon on the 27th at 9 ev.

3rd MONTH. # MARCH. 31 DAYS.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
● N.M.	1	5.19 ev.	5.05 ev.	4.52 ev.	4.10 ev.	3.35 ev.
☽ F.Q.	9	1.28 ev.	1.14 ev.	0.51 ev.	0.09 ev.	11.34 mo.
○ F.M.	17	7.06 mo.	6.52 mo.	6.39 mo.	5.57 mo.	5.22 mo.
☾ L.Q.	24	2.13 mo.	1.59 mo.	1.46 mo.	1.04 mo.	0.29 mo.
● N.M.	31	6.46 mo.	6.32 mo.	6.29 mo.	5.47 mo.	5.12 mo.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. —THE SUN— Slow. Rises.	Sets.	THE MOON Zod.	Souths.
			M. H. M.	H. M.		H. M.
1	Fri.	**ST. DAVID.** Enters generally fine	12 6 41	5 48	♓	Eve.
2	Sat.	and cold, changing to storms and bluster.	12 39	49	♓	0 58
		(9) Quinquage-ima (Shr ve) Sunday. Venus in Pisces.				
3	Su.	Snows N. and rains S.—Fine, cold wea-	12 6 37	5 50	♈	1 44
4	Mo.	ther—Snows and drifts in N. and N.W.—	12 35	51	♈	2 29
5	Tu.	**SHROVE TUESDAY.**	12 33	53	♉	3 13
6	We.	**A-H WEDNESDAY.**	11 31	54	♉	3 57
7	Th.	Rainy, foggy and misty in S. and along	11 29	55	♉	4 42
8	Fri.	Atlantic coast—Windy, wet weather (sleet	11 27	57	♊	5 27
9	Sat.	and rain)—Cold at end of week.	11 25	58	♊	6 14
		(10) Quadragesima Sunday. Mars in Pisces.				
10	Su.	Cold and generally fine weather—High	10 6 23	6 00	♋	7 03
11	Mo.	winds (drifts) snows N. and rains S. —	10 21	01	♋	7 53
12	Tu.	Dull, dark and threatening, with snow—	10 19	02	♋	8 43
13	We.	Winter loath to give up his reign in	9 17	03	♌	9 33
14	Th.	Southern and South-Western sections;	9 15	05	♌	10 24
15	Fri.	Generally cold, with cold rains and sleet	9 13	06	♍	11 13
16	Sat.	in Southern states.	9 11	07	♍	Morn
		(11) 2nd Sunday in Lent. Jupiter in Sagittarius.				
17	Su.	**ST. PATRICK.** Opens fine—	8 6 09	6 08	♎	0 03
18	Mo.	High winds, snows N. and rains S.—	8 07	10	♎	0 52
19	Tu.	March storms everywhere; very cold and	8 06	11	♎	1 42
20	We.	stormy along the Atlantic coast, in Mar.	7 04	13	♏	2 33
21	Th.	Prov. and New England—Milder, a rapid	7 02	14	♏	3 27
22	Fri.	change—Spring-like with rains, especially	7 00	15	♐	4 23
23	Sat.	W. and S. and on Atlantic seaboard.	7 5 58	16	♐	5 21
		(12) 3rd Sunday in Lent. Saturn in Cancer.				
24	Su.	Colder, fine windy with snows N.	6 5 56	6 18	♑	6 19
25	Mo.	**ANNUNCIATION.** and rains	6 54	19	♑	7 18
26	Tu.	S.—Milder, windy with snow or rain, ac-	6 52	20	♒	8 16
27	We.	cording to latitude—General precipitation	5 50	21	♒	9 10
28	Th.	over the Western States, Manitoba and	5 48	23	♓	10 02
29	Fri	Ontario—Gales in Quebec, Mar. Provinces	5 47	24	♓	10 51
30	Sat.	and along Atlantic seaboard, with snow.	4 45	26	♈	11 37
		(13) 4th Sunday in Lent. Uranus in Virgo.				
31	Su.	Ends stormy and cold. (No "Lamb.")	4 5 43	6 27	♈	Eve.

PLANETS IN MARCH, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	Mar. 1st.	Mar. 8th.	Mar. 16th.	Mar. 24th.
Mercury..... ☿	10 41 mo.	10 28 mo.	10 28 mo.	10 36 mo.
Venus..... ♀	2 59 ev.	2 53 ev.	2 45 ev.	2 32 ev.
Mars..... ♂	1 56 ev.	1 48 ev.	1 39 ev.	1 29 ev.
Jupiter..... ♃	7 40 mo.	7 16 mo.	6 49 mo.	6 21 mo.
Saturn..... ♄	10 32 ev.	10 02 ev.	9 29 ev.	8 56 ev.
Uranus..... ♅	2 44 mo.	2 15 mo.	1 43 mo.	1 10 mo.
Neptune..... ♆	5 16 ev.	4 45 ev.	4 14 ev.	3 44 ev.

Mars is 5° 2′ N. of Luna on the 3rd at 6.58 ev., and Venus 8° 58′ N. of her on the 5th at 5.46 mo.; Venus being at Perihelion on the same day at 3 ev. The Moon is 2° 20′ S. of Neptune on the 7th at 8.14 ev., and at Apogee on the 9th at 4 mo. Mercury is well seen in the morning sky about the 13th, reaching greatest elongation W. of 27° 53′ at 6 mo. On the 14th, Saturn is 1° S. of the Moon at 1.16 mo. Mercury is in Aphelion (farthest from the Sun) at 4.03 ev. on the 18th, and Uranus is 4° 44′ S. of the Moon at 8.24 that evening. On the 21st, at 7 mo., the Moon is at Perigee; on the 24th, at 7.14 mo., the Moon is 41′ N. of Jupiter; on the 25th, at 1.14 ev., Venus is at greatest brilliancy, a glorious object in the evening sky, shining like a small moon and casting a shadow; on the 27th, at 7 mo., Jupiter is at Quadrature (90° from the Sun) and overhead at 6 mo., and on the 29th, at 7.09 mo., Mercury is 2° 2′ N. of the Moon.

4th Month. **APRIL.** 30 Days.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
☽ F.Q.	8	9.00 mo.	8.46 mo.	8.39 mo.	7.51 mo.	7.16 mo.
☺ F.M.	15	5.37 ev.	5.23 ev.	5.10 ev.	4.28 ev.	3.53 ev.
☾ L.Q.	22	9.14 mo.	9.00 mo.	8.47 mo.	8.05 mo.	7.30 mo.
● N.M.	29	9.23 ev.	9.09 ev.	8.56 ev.	8.14 ev.	7.39 ev.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. THE SUN—Slow	THE SUN—Rises. H.	THE SUN—Rises. M.	THE SUN—Sets. H.	THE SUN—Sets. M.	THE MOON Zod.	THE MOON Souths. H.	THE MOON Souths. M.
			M.							
1	Mo.	Cold, snowfalls N., rain and hail S. and	4	5	41	6	28	♈	Eve.	
2	Tu.	S.W.—Showers (snow flurries N.)—Cold,	3		40		29	♉	1	51
3	We.	winter-like weather, with bleak winds	3		38		31	♉	2	35
4	Th.	(black frost) and snow flurries.	3		36		32	♊	3	21
5	Fri.		3		34		33	♊	4	07
6	Sat.		2		32		34	♊	4	55
(14)		**5th Sunday in Lent.**						Neptune in Taurus.		
7	Su.	A fine, spring-like change—A general	2	5	30	6	35	♋	5	44
8	Mo.	break-up in middle sections; very fine	2		28		37	♋	6	33
9	Tu.	and mild generally—Vegetation rapidly	1		26		38	♌	7	23
10	We.	advancing in S.W.—Rainy and cold again,	1		24		39	♌	8	13
11	Th.	bleak winds, storms and snows in Low.	1		22		40	♍	9	02
12	Fri.	St. Lawrence and Mar. Prov., wind and	1		20		42	♍	9	51
13	Sat.	rain general—Warm and seasonable.	0		19		43	♍	10	40
(15)		**Palm Sunday.**						Mercury in Pisces.		
14	Su.	Colder, windy and unsettled — Hail	0	5	17	6	45	♎	11	30
15	Mo.	showers and snow squalls — A warm	fast		15		46	♎	Morn	
16	Tu.	change, showery, quite a sultry spell for	0		13		47	♏	0	22
17	We.	the time of year — Storms in the W.—	1		11		48	♏	1	16
18	Th.	Favorable spring weather — Dull and	1		10		50	♐	2	13
19	Fri.	cloudy at the close.	1		08		51	♐	3	11
20	Sat.		1		07		52	♑	4	12
(16)		**Easter Sunday.**						Venus in Aries.		
21	Su.		1	5	05	6	53	♑	5	13
22	Mo.	Cloudy and cool, with showers—Fine	2		03		54	♒	6	12
23	Tu.	**ST. GEORGE.** and frosty N.	2		02		56	♒	7	07
24	We.	and N.W.—Windy and unsettled, cold	2		00		57	♓	7	59
25	Th.	**ST. MARK.** weather for the	2	4	59		58	♓	8	48
26	Fri.	season—Windy and showery — Sleet and	2		57		59	♈	9	35
27	Sat.	snow flurries N. and N.W.	3		56	7	01	♈	10	19
(17)		**Low Sunday.**						Mars in Taurus.		
28	Su.	Warmer, with April showers—Rainy	3	4	54	7	02	♈	11	03
29	Mo.	and cool (Dangerous hail storms proba-	3		52		04	♉	11	47
30	Tu.	ble.)	3		50		05	♉	Eve.	

PLANETS IN APRIL, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	April 1st.	April 8th.	April 16th.	April 24th.
Mercury .... ☿	10 49 mo.	11 04 mo.	11 26 mo.	11 55 mo.
Venus ..... ♀	2 13 ev.	1 50 ev.	1 15 ev.	0 30 ev.
Mars..... ♂	1 20 ev.	1 13 ev.	1 04 ev.	0 55 ev.
Jupiter ..... ♃	5 53 mo.	5 27 mo.	4 57 mo.	4 26 mo.
Saturn..... ♄	8 24 ev.	7 56 ev.	7 24 ev.	6 53 ev.
Uranus..... ♅	0 37 mo.	0 09 mo.	11 32 ev.	10 59 ev.
Neptune .... ♆	3 13 ev.	2 46 ev.	2 16 ev.	1 46 ev.

The month opens with a Conjunction of Mars and the Moon on the 1st at 9.24 ev. On the 3rd, at 0.17 mo., Venus is near the Moon; Luna passing 2° 5′ S. of Neptune on the 4th at 5.38 mo. On the 5th, at 11 ev., the Moon is at Apogee, and on the 9th, at 8.35 mo., Venus is stationary. Uranus reaches Opposition at noon on the 9th, and becomes an "evening star," being then overhead at midnight. At 8 mo. on the 9th, Saturn is 1° 10′ S. of the Moon, and on the 14th, at 9 mo., he is stationary. At 3.55 mo., on the 15th, the Full Moon is 4° 42′ N. of Uranus; Luna reaching Perigee at 8 mo. on the 17th. She is 19′ N. of Jupiter on the 20th at 3.16 ev., the giant planet being stationary on the 24th at 6 ev. Mercury passes behind the Sun (Superior Conjunction) at 1.47 mo. on the 25th; Venus is near the Moon at 6 ev. on the 29th, and Mercury 5° 3′ N. of Luna on the 30th at 7.16 mo. On the last day of the month Venus makes her Inferior passage (between the Earth and Sun) at 9 ev., and Mars is 4° 12′ N. of the Moon one hour later.

5th MONTH. **MAY.** 31 DAYS.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
☽ F.Q.	8	2.01 mo.	1.47 mo.	1.34 mo.	0.52 mo.	0.17 mo.
☺ F.M.	14	2.01 mo.	1.47 mo.	1.34 mo.	0.52 mo.	0.17 mo.
☾ L.Q.	21	5.11 ev.	4.57 ev.	4.44 ev.	4.02 ev.	3.27 ev.
● N.M.	29	0.38 ev.	0.24 ev.	0.11 ev.	11.29 mo.	10.54 mo.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. THE SUN Fast	THE SUN Rises. H.	THE SUN Rises. M.	THE SUN Sets. H.	THE SUN Sets. M.	THE MOON Zod.	THE MOON Souths. H.	THE MOON Souths. M.
			M.							
1	We.	**MAY DAY.** Mild weather—Generally stormy and unsettled (tornadoes in May tornado sections probable)—A cold term with cold rains, perhaps snow flurries N.—Sharp frosts.	3	4	49	7	06	♉	Eve.	
2	Th.		3		47		07	♊	2	02
3	Fri.		3		46		09	♊	2	49
4	Sat.		3		44		10	♋	3	38
		(18) 2nd Sunday after Easter. Jupiter in Sagittarius.								
5	Su.	Warmer—Windy and showery—Cooler with rains, possibly snow in Gulf—Fine, warm to hot, advanced spring (perhaps summer-like) weather—sultry, with bush fires.	3	4	43	7	11	♋	4	27
6	Mo.		4		42		12	♌	5	16
7	Tu.		4		40		13	♌	6	05
8	We.		4		39		14	♌	6	53
9	Th.		4		37		16	♍	7	41
10	Fri.		4		36		17	♍	8	29
11	Sat.		4		35		18	♎	9	17
		(19) 3rd Sunday after Easter. Saturn in Leo.								
12	Su.	Cooler, with wind and rain squalls—Scattered showers—Hot and decidedly summer-like, with thunder and wind storms—Vegetation rapidly advancing.	4	4	34	7	19	♎	10	07
13	Mo.		4		33		21	♏	11	00
14	Tu.		4		31		22	♏	11	56
15	We.		4		30		23	♐	Morn	
16	Th.		4		29		24	♐	0	56
17	Fri.		4		28		25	♑	1	58
18	Sat.		4		27		26	♑	3	01
		(20) 4th Sunday after Easter. Uranus in Virgo.								
19	Su.	Opens fine, changing to rainy, cool and unsettled—Cool weather (quite cold evenings and nights)—Windy and rainy, dark and threatening—A backward week generally.	4	4	26	7	27	♒	4	03
20	Mo.		4		25		28	♒	5	01
21	Tu.		4		24		29	♓	5	56
22	We.		4		23		30	♓	6	47
23	Th.		3		22		31	♓	7	34
24	Fri.	**Queen Victoria born 1819.**	3		21		32	♈	8	19
25	Sat.		3		20		33	♈	9	02
		(21) Rogation Sunday. Mercury in Gemini.								
26	Su.	Showery, warm, favorable growing weather, with occasional rain (and hail) showers—End of month cool and showery.	3	4	19	7	34	♉	9	45
27	Mo.		3		19		35	♉	10	29
28	Tu.		3		18		36	♉	11	13
29	We.		3		18		37	♊	11	59
30	Th.	**ASCENSION—Decoration Day.**	3		17		38	♊	Eve.	
31	Fri.		2		16		39	♋	1	34

PLANETS IN MAY, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	May 1st.	May 8th.	May 16th.	May 24th.
Mercury..... ☿	0 25 ev.	0 55 ev.	1 22 ev.	1 34 ev.
Venus..... ♀	11 48 mo.	11 06 mo.	10 25 mo.	9 53 mo.
Mars..... ♂	0 48 ev.	0 41 ev.	0 33 ev.	0 24 ev.
Jupiter..... ♃	3 58 mo.	3 30 mo.	2 57 mo.	2 22 mo.
Saturn..... ♄	6 26 ev.	6 00 ev.	5 30 ev.	5 00 ev.
Uranus..... ♅	10 31 ev.	10 02 ev.	9 30 ev.	8 58 ev.
Neptune..... ♆	1 19 ev.	0 52 ev.	0 22 ev.	11 52 mo.

Neptune is 1° 54′ N. of the Moon at 2.45 ev. on the 1st, Mercury being in Perihelion 15 min. later. The Moon is at Apogee at 3 ev. on the 3rd, and Saturn at Quadrature (90° from the Sun) and overhead at 9 ev. On the 5th, Mercury is in Conjunction with Mars the former passing 1° 9′ N. at noon. The Moon is 1° 28′ N. of Saturn on the 7th at 5.15 ev., and 4° 51′ N. of Uranus on the 12th at 0.19 noon; two hours later, Mars is in Conjunction with Neptune, passing 2° 2′ N. On the 16th, the Moon is at Perigee at 1 mo., and on the 17th, at 10 ev., she is 0° 15′ N. of Jupiter. At 7 mo. of the 20th, Venus is stationary. Neptune reaches Conjunction and passes behind the Sun at 10 ev. on the 22nd, and on the 24th, at 2 ev., Mercury is at greatest elongation East of 22° 49′ and well seen in the evening sky. The 26th, at 10.36 mo., sees the Moon 4° 29′ S. of Venus; Luna being 1° 49′ S. of Neptune on the 28th at 11.08 ev., and 3° 3′ S. of Mars at 11 ev. on the 29th. She is at Apogee at 1 mo. on the 31st, and passes 1° 53′ S. of Mercury at 11.18 the same morning.

6th Month. **JUNE.** 30 Days.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
☽ F.Q.	6	3.20 ev.	3.06 ev.	2.53 ev.	2.11 ev.	1.36 ev.
☺ F.M.	13	9.17 mo.	9.03 mo.	8.50 mo.	8.08 mo.	7.33 mo.
☾ L.Q.	20	2.55 mo.	2.41 mo.	2.28 mo.	1.46 mo.	1.11 mo.
● N.M.	28	4.12 mo.	3.58 mo.	3.45 mo.	3.03 mo.	2.28 mo.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. THE SUN Fast.	THE SUN Rises.	THE SUN Sets.	THE MOON Zod.	THE MOON Souths.
			M.	H. M.	H. M.		H. M.
1	Sat.	Opens cool and showery.	2	4 16	7 40	♋	Eve.
		(22) Sunday after Ascension.				Venus in Aries.	
2	Su.		2	4 15	7 41	♋	3 12
3	Mo.	A warm period, thunder storms W.—	2	14	42	♌	4 00
4	Tu.	Cooler, rainy and windy, wet in Man. and	2	14	43	♌	4 48
5	We.	N.W.— Fine, warm weather—Sultry and	2	13	44	♍	5 35
6	Th.	showery, with wind and thunder storms.	2	13	45	♍	6 21
7	Fri.		1	12	45	♎	7 08
8	Sat.	Henry G. Vennor died 1884.	1	12	46	♎	7 56
		(23) Whit Sunday (Pentecost).				Mars in Taurus.	
9	Su.	Fine summer weather with cool nights	1	4 12	7 46	♎	8 45
10	Mo.	—Hot and sultry, a hot time everywhere,	1	11	47	♏	9 39
11	Tu.	**ST. BARNABAS.** with d mag-	1	11	47	♏	10 36
12	We.	ing thunder, rain and wind storms—Fine	0	11	48	♐	11 36
13	Th.	and cool (Frosts probable) at close of	sl'w	11	48	♐	Morn
14	Fri.	week.	0	11	49	♑	0 41
15	Sat.		0	11	49	♑	1 45
		(24) Trinity Sunday.				Jupiter in Sagittarius.	
16	Su.		0	4 11	7 50	♒	2 48
17	Mo.	Fine and cool—Warmer with thunder	1	11	50	♒	3 47
18	Tu.	storms—Fine, warm, summer weather—	1	11	51	♓	4 41
19	We.	Windy, rainy and unsettled.—Another cool	1	11	51	♓	5 30
20	Th.	**Corpus Christi.—Acc. Q. Victoria.**	1	11	51	♈	6 17
21	Fri.	change — Unfavorable, with rains —	2	11	51	♈	7 01
22	Sat.	Warmer.	2	12	52	♈	7 44
		(25) 1st Sunday after Trinity.				Saturn in Leo.	
23	Su.	Warm weather, hot with thunder storms	2	4 12	7 52	♉	8 28
24	Mo.	**ST. JOHN BAPTIST.**—Mid-	2	12	52	♉	9 11
25	Tu	summer Day. (Tornadoes probable in	2	13	52	♊	9 56
26	We.	June tornado sections)—Cooler, wind,	3	13	52	♊	10 43
27	Th.	hail, heavy showers and damaging thunder	3	14	52	♊	11 30
28	Fri.	storms — Another unfavorable period —	3	14	52	♋	Eve.
29	Sat.	Fine and cool. **ST. PETER and ST. PAUL.**	3	15	52	♋	1 09
		(26) 2nd Sunday after Trinity.				Uranus in Virgo.	
30	Su.	Cool, windy, changeable.	3	4 15	7 51	♌	1 58

PLANETS IN JUNE, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	June 1st.	June 8th.	June 16th.	June 24th.
Mercury .... ☿	1 27 ev.	1 04 ev.	0 20 ev.	11 30 mo.
Venus ..... ♀	9 30 mo.	9 16 mo.	9 04 mo.	8 57 mo.
Mars..... ♂	0 17 ev.	0 10 ev.	0 02 ev.	11 54 mo.
Jupiter ..... ♃	1 48 mo.	1 17 mo.	0 41 mo.	0 06 mo.
Saturn..... ♄	4 31 ev.	4 06 ev.	3 37 ev.	3 09 ev.
Uranus..... ♅	8 29 ev.	8 02 ev.	7 26 ev.	6 54 ev.
Neptune .... ♆	11 22 mo.	10 55 mo.	10 25 mo.	9 55 mo.

Saturn is 1° 46′ S. of Luna on the 4th at 3.15 mo. Venus, now the brightest morning star, is at greatest brilliancy on the 5th. Mercury is stationary on the 6th at 3.42 ev., and Uranus is 4° 59′ S. of the Moon at 8.37 ev. on the 8th. On the 13th, at 11 mo., Luna is at Perigee, passing 29′ N. of Jupiter at 4 mo. on the 14th. Mercury is in Aphelion at 3 the same afternoon. Mars reaches Conjunction with the Sun on the 17th at 9.34 ev. Mercury reaches Inferior Conjunction on the 19th at 6 mo., and Venus is 1° 1′ N. of the Moon on the 24th at 1.16 mo. Jupiter is at his brightest (Opposition) on the night of the 24th, when he is overhead at midnight and becomes an evening star (Opposition 2.00 ev.) The Moon is 1° 46′ S. of Neptune on the 25th at 7.03 mo.; Uranus stationary the same day at 2.00 ev.; Venus in Aphelion at 2.00 mo. on the 26th, and the Moon in Apogee one hour later. On the 27th, at 3.31 mo., Mercury is 3° 5′ S. of the Moon, and Mars 1° 33′ N. of Luna the same evening at 9.48. The Sun is eclipsed on the 27th (see page 6) and Mercury stationary on the 30th at 7.54 ev.

7th Month. **JULY.** 31 Days.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
☽ F.Q.	5-6	1.17 mo.	1.03 mo.	0.50 mo.	0.08 mo.	11.33 ev.
○ F.M.	12	4.20 ev.	4.06 ev.	3.53 ev.	3.11 ev.	2.36 ev.
☾ L.Q.	19	3.03 ev.	2.49 ev.	2.36 ev.	1.54 ev.	1.19 ev.
● N.M.	27	7.19 ev.	7.05 ev.	6.52 ev.	6.10 ev.	5.35 ev.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. THE SUN Slow.	Rises. H. M.	Sets. H. M.	THE MOON Zod.	Souths. H. M.
1	Mo.	**DOMINION DAY.** Cool	M. 4	4 16	7 51	♌	Eve.
2	Tu.	weather for July, with cool rains—Warmer	4	16	51	♍	3 33
3	We.	—Hot to sultry; high temp. generally	4	17	51	♍	4 19
4	Th.	**INDEPENDENCE DAY.**	4	17	50	♍	5 04
5	Fri.	("three figure weather") great heat,	4	18	50	♎	5 50
6	Sat.	with heavy and damaging thunder storms.	5	19	49	♎	6 37
		(27) 3rd Sunday after Trinity.		Neptune in Taurus.			
7	Su.		5	4 20	7 49	♏	7 27
8	Mo.	Heat continues, a torrid wave—Sudden	5	21	48	♏	8 20
9	Tu.	changes, especially in N. sections, with	5	22	48	♐	9 17
10	We.	thunder showers — Showery, generally	5	23	48	♐	10 19
11	Th.	heavy rains in S., S.W. and W.—Hot,	5	23	47	♑	11 23
12	Fri.	dull and oppressive, with local storms.	5	24	46	♑	Morn
13	Sat.		6	24	45	♒	0 28
		(28) 4th Sunday after Trinity.		Mercury in Gemini.			
14	Su.		6	4 25	7 44	♒	1 30
15	Mo.	**ST. SWITHIN.** Hot weather	6	26	44	♓	2 27
16	Tu.	generally, with thunder and hail storms—	6	27	43	♓	3 21
17	We.	Fine, hot and favorable weather for the	6	28	42	♈	4 10
18	Th.	crops. (A summer-like week.)	6	29	41	♈	4 57
19	Fri.		6	30	40	♈	5 41
20	Sat.		6	31	39	♉	6 25
		(29) 5th Sunday after Trinity.		Venus in Taurus.			
21	Su.	Opens fine and hot—Windy and rainy,	6	4 32	7 38	♉	7 09
22	Mo.	a cool change—Cool weather in N. and	6	33	37	♊	7 54
23	Tu.	N.W.. and storms in W. and S.—Frequent	6	34	36	♊	8 39
24	We.	**Canada visited by Cartier, 1534.**	6	35	35	♊	9 27
25	Th.	**ST. JAMES.** thunder showers	6	36	34	♋	10 16
26	Fri.	and electrical storms.	6	37	33	♋	11 05
27	Sat.		6	38	32	♌	11 54
		(30) 6th Sunday after Trinity.		Mars in Gemini.			
28	Su.		6	4 39	7 31	♌	Eve.
29	Mo.	Thunder and hail storms continue	6	40	30	♌	1 31
30	Tu.	(Tornadoes probable)—Rains general—	6	41	29	♍	2 17
31	We.	Cool at the end of month.	6	42	29	♍	3 03

PLANETS IN JULY, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	July 1st.	July 8th.	July 16th.	July 24th.
Mercury..... ☿	10 56 mo.	10 38 mo.	10 39 mo.	11 02 mo.
Venus..... ♀	8 53 mo.	8 51 mo.	8 51 mo.	8 54 mo.
Mars..... ♂	11 47 mo.	11 40 mo.	11 31 mo.	11 22 mo.
Jupiter..... ♃	11 30 ev.	10 58 ev.	10 23 ev.	9 48 ev.
Saturn..... ♄	2 45 ev.	2 20 ev.	1 52 ev.	1 25 ev.
Uranus..... ♅	6 27 ev.	6 00 ev.	5 29 ev.	4 57 ev.
Neptune..... ♆	9 23 mo.	8 57 mo.	8 26 mo.	7 56 mo.

The Sun is at Apogee (farthest away from the Earth) on the 1st at 1.35 ev. Saturn is 2° 3′ S. of Luna the same day at 2.15 ev. Uranus is 5° 3′ S. of the Moon on the 6th at 4.06 mo., and 90° from the Sun (Quadrature) on the 9th at 8 ev., when he is overhead at 6 p.m. Brilliant Venus halts on her Western course as morning star on the 10th, being at greatest elongation W. of 45° 44′ that morning. She is in Conjunction with Neptune (1° 48′ S. of him) at 10.56 ev. on the 10th. The next morning Jupiter is but 52′ S. of Luna at 9 mo., and the Moon reaches Perigee at 8 the same evening. Mercury is at greatest elongation W. of 20° 47′ and visible in the morning sky on the 12th at 5 a.m., the Moon being eclipsed the same day (see page 6). After this date Conjunctions are in order as follows: Moon 1° 39′ S. of Neptune at 3.16 ev. on the 22nd; Luna 41′ N. of Venus at 4.15 ev. on the 23rd; (Moon at Apogee on the 24th at 10 mo.) Mercury 19′ S. of Luna on the 26th at 2.35 ev.; Mars 1′ S. of the Moon at 6 ev. the same day, and Mercury 14′ S. of Mars at 0.25 morn. on the 28th. Mercury reaches Perihelion at 2.30 ev. that day, and Saturn is 2° 16′ S. of Luna at 2.16 mo. on the 29th.

8th MONTH. # AUGUST. 31 DAYS.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
☽ F.Q.	4	8.45 mo.	8.31 mo.	8.18 mo.	7.36 mo.	7.01 mo.
☻ F.M.	10-11	0.01 mo.	11.47 ev.	11.34 ev.	10.52 ev.	10.17 ev.
☾ L.Q.	18	6.10 mo.	5.56 mo.	5.43 mo.	5.01 mo.	4.26 mo.
● N.M.	26	9.19 mo.	9.05 mo.	8.52 mo.	8.10 mo.	7.35 mo.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. THE SUN Slow	THE SUN Rises. H. M.	THE SUN Sets. H. M.	THE MOON Zod.	THE MOON Souths. H. M.
1	Th.	**LAMMAS DAY.** Cool and	6	4 43	7 28	♎	Eve.
2	Fri.	cloudy, with wind and rain storms—Fine	6	45	26	♎	4 34
3	Sat.	weather.	6	46	25	♏	5 22
(31)		**7th Sunday after Trinity.**		Jupiter in Sagittarius.			
4	Su.	Warm to hot and sultry—high temp.	6	4 47	7 24	♏	6 12
5	Mo.	("three figure weather")—Disastrous	6	48	23	♏	7 06
6	Tu.	thunder storms, especially W. and S.—	6	50	21	♐	8 04
7	We.	Windy and unsettled, heavy rains in sec-	5	51	19	♐	9 05
8	Th.	tions—A cool term; Auroral displays and	5	52	18	♑	10 08
9	Fri.	frosts possible—Hot at close (meteors	5	53	16	♑	11 10
10	Sat.	**ST. LAWRENCE.** (prevalent.	5	54	14	♒	Morn
(32)		**8th Sunday after Trinity.**		Saturn in Leo.			
11	Su.		5	4 56	7 13	♒	0 10
12	Mo.	Thunder and wind storms—Another	5	57	11	♓	1 06
13	Tu.	sultry, hot spell; smoky weather, with	5	58	09	♓	1 59
14	We.	bush fires—Thunder and hail storms—	4	59	08	♈	2 47
15	Th.	**ASSUMPTION B.V.M.**	4	5 00	07	♈	3 34
16	Fri.	Cooler at end of week.	4	02	06	♉	4 19
17	Sat.		4	03	04	♉	5 04
(33)		**9th Sunday after Trinity.**		Uranus in Virgo.			
18	Su.		4	4 04	7 02	♉	5 49
19	Mo.	Fine, hot weather—Thunder, with wind	3	05	00	♊	6 35
20	Tu.	storms—Hot and stormy—Cooler again,	3	06	6 58	♊	7 22
21	We.	with strong winds—Hot and stormy with	3	08	56	♋	8 10
22	Th.	thunder showers at the close.	3	09	54	♋	9 00
23	Fri.		2	10	52	♌	9 49
24	Sat.	**ST. BARTHOLOMEW.**	2	11	51	♌	10 38
(34)		**10th Sunday after Trinity.**		Mercury in Leo.			
25	Su.		2	5 12	6 49	♌	11 26
26	Mo.	Intense heat, oppressively hot, with	1	14	48	♍	Eve.
27	Tu	damaging storms and heavy rains—Cooler,	1	15	46	♍	1 00
28	We.	cloudy and squally generally, (local frosts	1	16	44	♎	1 46
29	Th.	probable in Northern and N.W. sections.)	1	17	42	♎	2 33
30	Fri.		0	18	41	♎	3 20
31	Sat.		0	20	40	♏	4 09

PLANETS IN AUGUST, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	Aug 1st.	Aug. 8th.	Aug. 16th.	Aug. 24th.
Mercury..... ☿	11 38 mo.	0 10 ev.	0 40 ev.	1 00 ev.
Venus..... ♀	8 58 mo.	9 02 mo.	9 09 mo.	9 16 mo.
Mars..... ♂	11 13 mo.	11 04 mo.	10 54 mo.	10 44 mo.
Jupiter..... ♃	9 14 ev.	8 45 ev.	8 12 ev.	7 40 ev.
Saturn..... ♄	0 57 ev.	0 33 ev.	0 06 ev.	11 38 mo.
Uranus..... ♅	4 27 ev.	4 00 ev.	3 30 ev.	2 59 ev.
Neptune..... ♆	7 10 mo.	7 02 mo.	6 31 mo.	6 00 mo.

Uranus is 4° 59′ S. of the Moon on the 2nd at 11.03 mo. On the 7th, at 2.53 ev., Mercury is at Superior Conjunction (behind) the Sun. Jupiter is 1° 6′ S. of the Moon on the 7th at 3.21 ev., and on the 9th at 2 ev. Luna is at Perigee. Saturn and Mercury are but 38′ asunder on the 11th at 9.10 mo., Saturn reaching Conjunction with the Sun and becoming a morning star for the rest of the year at 9 mo. on the 16th. Neptune is 1° 30′ N. of the Moon at 11 ev. on the 18th; Luna at Apogee at 1 mo. on the 21st: Venus 1° 59′ S. of the Moon on the 22nd at 5.17 ev.; Mars 1° 28′ S. of Luna on the 24th at 1.16 ev,; Jupiter stationary among the stars on the 24th at midnight; Saturn in Conjunction with the Moon at 3 ev. on the 25th; Neptune 90° from the Sun (Quadrature, and overhead at 6 mo.) on the 27th; Mercury in Conjunction with the Moon at 5.18 ev. on the 27th, and Uranus 4° 52′ S. of Luna on the 29th at 6.30 ev. on the 29th.

9th Month. # SEPTEMBER. 30 Days.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
☽ F.Q.	2	2.53 ev.	2.39 ev.	2.26 ev.	1.44 ev.	1.09 ev.
☺ F.M.	9	9.11 mo.	8.57 mo.	8.44 mo.	8.02 mo.	7.27 mo.
☾ L.Q.	16-17	0.07 mo.	11.53 ev.	11.40 ev.	10.58 ev.	10.23 ev.
● N.M.	24	10.00 ev.	9.46 ev.	9.33 ev.	8.51 ev.	8.16 ev.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. THE SUN Fast.	THE SUN Rises.	THE SUN Sets.	THE MOON Zod.	THE MOON Souths.
		(35) 11th Sunday after Trinity.				Venus in Cancer.	
1	Su	**ST. GILES.** Fine, pleasant, summer-like weather, very favorable for September—Cloudy, cooler, showery, nights quite cool—Another warm spell, high temp. for September, hot and smoky—Occasional showers at the close.	M. 0	H. M. 5 21	H. M. 6 39	♏	H. M. Eve.
2	Mo.		1	22	37	♐	5 56
3	Tu.		1	23	35	♐	6 55
4	We.		1	24	33	♑	7 55
5	Th.		2	26	31	♑	8 56
6	Fri.		2	27	29	♒	9 56
7	Sat.		2	28	27	♒	10 53
		(36) 12th Sunday after Trinity.				Mars in Leo.	
8	Su.		3	5 29	6 25	♓	11 46
9	Mo.	Cooler—High winds and rains, a cool, fall-like change—Showery and windy, nights quite cool (Altogether an unfavorable week)—Warmer at close.	3	30	23	♓	Morn
10	Tu.		3	32	22	♈	0 36
11	We.		4	33	20	♈	1 24
12	Th.		4	34	18	♈	2 10
13	Fri.		4	35	16	♉	2 56
14	Sat.	**HOLY CROSS.**	4	36	14	♉	3 41
		(37) 13th Sunday after Trinity.				Jupiter in Sagittarius.	
15	Su.		5	5 38	6 12	♊	4 28
16	Mo.	Fine, warm and favorable—A cooler term, with local frosts—Rains and high winds, stormy and unsettled, damage by hail probable—Week ends cool and windy.	5	39	10	♊	5 15
17	Tu.		6	40	08	♋	6 03
18	We.		6	41	06	♋	6 52
19	Th.		6	42	04	♋	7 41
20	Fri.		7	44	02	♌	8 31
21	Sat.	**ST. MATTHEW.**	7	45	00	♌	9 19
		(38) 14th Sunday after Trinity.				Saturn in Leo.	
22	Su.		8	5 46	5 58	♍	10 07
23	Mo.	Heavy rains and cool weather, fogs on Lakes, in Gulf, and along Atlantic coast—Equinoctial gales, cold rains and cloudy weather. (A disagreeable week.)	8	47	56	♍	10 54
24	Tu.		8	48	54	♍	11 41
25	We.		9	50	53	♎	Eve.
26	Th.		9	51	51	♎	1 15
27	Fri.		9	52	49	♏	2 05
28	Sat.		10	53	47	♏	2 57
		(39) 15th Sunday after Trinity.				Uranus in Virgo.	
29	Su.	**MICHAELMAS.** Dull and foggy, with rains—Warmer.	10	5 55	5 45	♐	3 52
30	Mo.		10	56	43	♐	4 49

PLANETS IN SEPTEMBER, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	Sept. 1st.	Sept. 8th.	Sept. 16th.	Sept. 24th.
Mercury .... ☿	1 14 ev.	1 22 ev.	1 26 ev.	1 23 ev.
Venus ..... ♀	9 23 mo.	9 29 mo.	9 36 mo.	9 43 mo.
Mars..... ♂	10 33 mo.	10 21 mo.	10 10 mo.	9 57 mo.
Jupiter ..... ♃	7 09 ev.	6 42 ev.	6 13 ev.	5 44 ev.
Saturn..... ♄	11 11 mo.	10 43 mo.	10 15 mo.	9 47 mo.
Uranus..... ♅	2 30 ev.	2 04 ev.	1 34 ev.	1 04 ev.
Neptune .... ♆	5 29 mo.	5 02 mo.	4 30 mo.	3 51 mo.

On the 3rd, at 9 ev., Jupiter is 1° 2′ S. of the Moon, the latter being at Perigee on the 5th at 8 ev. Neptune is stationary on the 7th at 4.30 mo., and Mercury in Aphelion at 2.31 ev. on the 10th. The Moon is 1° 15′ S. of Neptune on the 15th at 7.23 mo., Luna being at Apogee on the 17th at 7 ev. Saturn and Mars are in close Conjunction (1′ apart) in the morning sky on the 20th, the closest approach occurring at 3.04 mo. On the 20th, at 6 ev., Mercury is well placed for viewing in the evening sky, when he is at greatest elongation E. of the Sun of 26° 19′. The Moon passes 3° 12′ N. of Venus on the 21st at 8.41 ev; runs 2° 44′ N. of Saturn at 5 mo. on the 22nd, and 2° 47′ N. of Mars at 8 the same morning, when Jupiter is 90° from the Sun (Quadrature) at 7 mo. Venus and Saturn are but 34′ apart at 3.24 mo. on the 26th, Uranus being 4° 41′ S. of the Moon the same morning at 4.15. On the 26th, at 4.17 ev., Mercury is near the Moon.

The increasing length of the nights now admit of additional astronomical study. Those rising before daybreak about the Equinox, when the morning happens to be fine, will catch a glimpse of the Zodiacal Light.

10th Month. **OCTOBER.** 31 Days.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
☽ F.Q.	1	8.52 ev.	8.38 ev.	8.25 ev.	7.43 ev.	7.08 ev.
☺ F.M.	8	8.44 ev.	8.30 ev.	8.17 ev.	7.35 ev.	7.00 ev.
☾ L.Q.	16	7.56 ev.	7.42 ev.	7.29 ev.	6.47 ev.	6.12 ev.
● N.M.	24	9.44 mo.	9.30 mo.	9.17 mo.	8.35 mo.	8.00 mo.
☽ F.Q.	31	3.49 mo.	3.35 mo.	3.22 mo.	2.40 mo.	2.05 mo.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. THE SUN Fast.	THE SUN Rises. H. M.	THE SUN Sets. H. M.	THE MOON Zod.	THE MOON Souths. H. M.
			M.				
1	Tu.		10	5 57	5 41	♍	Eve.
2	We.	Opens dull, warm and showery—Windy	11	59	39	♍	6 49
3	Th.	and rainy—Cool, fine weather (frosts in	11	6 00	37	♒	7 48
4	Fri.	Northern and middle sections.)	11	01	35	♒	8 44
5	Sat.		12	03	34	♓	9 37
		(40) 16th Sunday after Trinity.				Mercury in Virgo.	
6	Su.		12	6 04	4 32	♓	10 27
7	Mo.	Fine, cool weather, with occasional	12	05	30	♈	11 15
8	Tu.	rains—Fine and frosty in Northern sec-	13	06	28	♈	Morn
9	We.	**ST. DENIS.** tions—Cool weather	13	08	26	♈	0 02
10	Th.	in W. and S.—Fine and generally warm at	13	09	25	♉	0 47
11	Fri.	the close.	13	11	23	♉	1 33
12	Sat.	**Columbus discov'd America, 1492.**	14	12	21	♊	2 19
		(41) 17th Sunday after Trinity.				Venus in Leo.	
13	Su.	Opens fine and warm—Colder, high	14	6 13	5 19	♊	3 07
14	Mo.	winds and rains (Snows in N. sections)—	14	15	17	♊	3 55
15	Tu.	Stormy and unsettled 15th to 17th—A	14	16	16	♋	4 44
16	We.	general cold storm period with damage	14	18	14	♋	5 33
17	Th.	on Lakes and Atlantic coast (A storm to	15	19	12	♌	6 22
18	Fri.	**ST. LUKE.** remember)—Cloudy	15	20	10	♌	7 11
19	Sat.	and cool at close.	15	21	08	♍	7 58
		(42) 18th Sunday after Trinity.				Mars in Leo.	
20	Su.		15	6 23	5 07	♍	8 45
21	Mo.	Rain and wind—Warmer, a favorable	15	24	05	♍	9 31
22	Tu.	Indian summer-like period—Stormy again	16	25	03	♎	10 18
23	We.	—High winds and rains; cold weather	16	26	01	♎	11 06
24	Th.	for the season—Warmer.	16	28	00	♏	11 55
25	Fri.		16	29	4 58	♏	Eve.
26	Sat.		16	31	57	♐	1 43
		(43) 19th Sunday after Trinity.				Jupiter in Sagittarius.	
27	Su.	Fine, warm and pleasant (More Indian	16	6 32	4 55	♐	2 42
28	Mo.	summer weather)—Windy and rainy	16	33	53	♍	3 42
29	Tu.	Astro-Meteorological Association founded, 1884.	16	35	52	♍	4 44
30	We.	(Snow flurries N.) at close.	16	36	50	♒	5 43
31	Th.	**All Hallow's Eve.**	16	38	49	♒	6 40

PLANETS IN OCTOBER, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	Oct. 1st.	Oct. 8th.	Oct. 16th.	Oct. 24th.
Mercury .... ☿	1 10 ev.	0 39 ev.	11 40 mo.	10 45 mo.
Venus ..... ♀	9 48 mo.	9 52 mo.	9 57 mo.	10 02 mo.
Mars..... ♂	9 48 mo.	9 37 mo.	9 24 mo.	9 11 mo.
Jupiter ..... ♃	5 20 ev.	4 56 ev.	4 29 ev.	4 03 ev.
Saturn..... ♄	9 23 mo.	9 02 mo.	8 33 mo.	8 04 mo.
Uranus..... ♅	0 38 ev.	0 12 ev.	11 43 mo.	11 14 mo.
Neptune .... ♆	3 30 mo.	3 02 mo.	2 31 mo.	1 58 mo.

On the 1st, Jupiter is 39′ S. of the Moon at 6 mo., and Mars 22′ N. of Venus at 8 10 mo., Luna being at Perigee at 11 mo. On the 3rd, at 7.19 ev., Mercury is stationary. On the 12th, at 3.16 ev., the Moon is 1° 1′ S. of Neptune, and on the 15th, at 9 mo., Uranus is in Conjunction with the Sun, becoming a morning star for the rest of the year. Mercury is 2° 15′ S. of Uranus on the 15th at 0.27 noon. The Moon passes Apogee at 3 ev. on the 15th, and Mercury is at Inferior Conjunction with the Sun at 8.16 that evening. Venus reaches Perihelion the next morning at 9 o'clock. Saturn is 3° 1′ S. of Luna on the 19th at 7.23 ev., and on the 21st at 1 mo. Mars is 3° 43′ S. of the Moon. Luna passes 3° 48′ N. of Venus on the 22nd at 1.28 mo., and is 4° 22′ N. of Mercury on the 23rd at 5.16 mo. The same day, at 4 ev., Luna passes 4° 37′ N. of Uranus. Mercury on the 24th is stationary at 6 mo., and in Perihelion at 2.20 ev. The 27th sees Luna at Perigee at noon; the 28th, Jupiter is but 7′ S. of the Moon at 6 ev., and on the 31st, at 11 mo., Mercury is at greatest elongation W. of 18° 43′.

11th Month. # NOVEMBER. 30 Days.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
☺ F.M.	7	11.24 mo.	11.10 mo.	10.57 mo.	10.15 mo.	9.40 mo.
☾ L.Q.	15	3.54 ev.	3.40 ev.	3.27 ev.	2.45 ev.	2.10 ev.
● N.M.	22	9.02 ev.	8.48 ev.	8.35 ev.	7.53 ev.	7.18 ev.
☽ F.Q.	29	0.47 ev.	0.33 ev.	0.20 ev.	11.38 mo.	11.03 mo.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. THE SUN Fast	THE SUN Rises.	THE SUN Sets.	THE MOON Zod.	THE MOON Souths.
			M.	H. M.	H. M.		H. M.
1	Fri.	**ALL SAINTS.** Sharp frosts—	16	6 39	4 47	♓	Eve.
2	Sat.	Dull and milder.	16	41	46	♓	8 23
		(44) 20th Sunday after Trinity. Saturn in Leo.					
3	Su.		16	6 42	4 44	♓	9 11
4	Mo.	Dull, windy and unsettled, with rain,	16	44	43	♈	9 57
5	Tu.	sleet or snow, according to latitude —	16	45	41	♈	10 42
6	We.	Fine and milder, a fairly pleasant period	16	47	40	♉	11 27
7	Th.	—Heavy rains S., snows N.	16	48	39	♉	Morn
8	Fri.		16	50	38	♉	0 13
9	Sat.	**Prince of Wales born 1841.**	16	51	37	♊	1 00
		(45) 21st Sunday after Trinity. Uranus in Virgo.					
10	Su.		16	6 53	4 35	♊	1 48
11	Mo.	**MARTINMAS.** Rainy and snowy	16	54	34	♋	2 37
12	Tu.	generally — Cold and wintry, with low	16	55	33	♋	3 26
13	We.	temperature for Nov. piercing cold winds	15	57	31	♌	4 15
14	Th.	—A brief interval of fine, milder weather	15	58	30	♌	5 03
15	Fri.	—Cloudy, with light rains and snows.	15	7 00	29	♌	5 51
16	Sat.		15	01	28	♍	6 37
		(46) 22nd Sunday after Trinity. Neptune in Taurus.					
17	Su.		15	7 02	4 27	♍	7 23
18	Mo.	Cool—Changing to warmer—Inclement	15	03	26	♎	8 08
19	Tu.	weather, high winds and snow scuds N.,	14	04	25	♎	8 54
20	We.	rain S.—Cloudy, snowy (or rainy) and	14	06	24	♎	9 41
21	Th.	windy—Stormy and milder at close.	14	08	23	♏	10 33
22	Fri.		14	09	22	♏	11 28
23	Sat.		13	10	22	♐	Eve
		(47) 23rd Sunday after Trinity. Mercury in Libra.					
24	Su.		13	7 12	4 21	♐	1 28
25	Mo.	**ST. CATHERINE.** Mild to	13	13	21	♑	2 32
26	Tu	warm for season—Colder, snows N., rains	12	14	20	♑	3 35
27	We.	S.—A general drop in temperature, below	12	15	20	♒	4 35
28	Th.	zero in N.W.—Cloudy and cold with rain,	12	16	19	♒	5 30
29	Fri.	sleet and snow—Cold, fine weather.	11	18	19	♓	6 22
30	Sat.	**ST. ANDREW.**	11	19	18	♓	7 10

PLANETS IN NOVEMBER, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	Nov. 1st.	Nov. 8th.	Nov. 16th.	Nov. 24th.
Mercury .... ☿	10 36 mo.	10 42 mo.	10 57 mo.	11 16 mo.
Venus ..... ♀	10 07 mo.	10 12 mo.	10 18 mo.	10 25 mo.
Mars..... ♂	8 57 mo.	8 45 mo.	8 31 mo.	8 18 mo.
Jupiter ..... ♃	3 37 ev.	3 15 ev.	2 51 ev.	2 26 ev.
Saturn..... ♄	7 35 mo.	7 10 mo.	6 40 mo.	6 10 mo.
Uranus..... ♅	10 44 mo.	10 18 mo.	9 48 mo.	9 18 mo.
Neptune .... ♆	1 26 mo.	0 58 mo.	0 26 mo.	11 49 ev.

At 4.47 mo. on the 3rd, Mercury is 1° 45′ N. of Uranus. On the 8th, at 10 ev., the Moon is 55′ S. of Neptune, and at 2 ev. on the 9th, Venus is 1° 8′ N. of Uranus. At midnight on the 11-12 Mars is in Aphelion. The Moon is at Apogee on the 12th at 11 mo., passes 3° 14′ N. of Saturn on the 16th at 8 mo.; approaches Mars and passes 4° 8′ S. of him on the 18th at 6 ev.; runs 4° 39′ S. of Uranus on the 20th at 5.32 mo.; sweeps 3° 2′ N. of Venus on the 21st at 5.22 mo.; is 3° 2′ N. of Mercury on the 22nd at 4.16 mo. and reaches Perigee on the 24th at 10 mo. Neptune is at Opposition to the Sun on the 25th at 1 mo., and the Moon 27′ S. of Jupiter the same morning at 11, when Saturn is 90° (Quadrature) from the Sun.

November is the "Meteor month." The stream radiating from the Constellation Leo should be looked for during the nights, but more especially the early mornings, of Nov. 13th, 14th and 15th. Those radiating from *Andromeda* appear during the evenings of Nov. 26th and 27th, and are believed to be closely related to the disruption of Biela's Comet.

12th Month. # DECEMBER. 31 Days.

Moon's Phases	Day.	BOSTON.	MONTREAL.	WASHINGTON	CHICAGO.	OMAHA.
☉ F.M.	7	5.11 mo.	4.57 mo.	4.44 mo.	4.02 mo.	3.27 mo.
☾ L.Q.	15	10.17 mo.	10.03 mo.	9.50 mo.	9.08 mo.	8.33 mo.
● N.M.	22	8.11 mo.	7.57 mo.	7.44 mo.	7.02 mo.	6.27 mo.
☽ F.Q.	28-29	0.35 mo.	0.21 mo.	0.08 mo.	11.26 ev.	10.51 ev.

DAYS. M.	DAYS. W.	WEATHER FORECAST.	MONTREAL. THE SUN Fast.	THE SUN Rises.	THE SUN Sets.	THE MOON Zod.	THE MOON Souths.
		(48) 1st Sunday in Advent.				Venus in Libra.	
1	Su.	Enters cold, with light snowfalls — Changing to considerably milder weather, with thaws, rain and sleet and thick atmosphere—A general winter storm period — High winds, heavy snows and gales (Damage along Atlantic coast.)	M. 11	H. M. 7 20	H. M. 4 18	♈	H. M. Eve.
2	Mo.		10	21	18	♈	8 40
3	Tu.		10	22	17	♉	9 24
4	We.		9	23	17	♉	10 09
5	Th.		9	24	16	♉	10 55
6	Fri.		9	25	16	♊	11 42
7	Sat.		8	26	16	♊	Morn
		(49) 2nd Sunday in Advent.				Mars in Virgo.	
8	Su.	**Conception B.V. M.**	8	7 27	4 16	♌	0 31
9	Mo.	Windy, fine and cold, very cold in N.W., a "dip," below zero in Northern sections —Winter everywhere, with low therm. readings—Cold weather in Eastern sections—Moderating to mild, with snows N. and rains S.	7	28	16	♌	1 20
10	Tu.		7	29	16	♌	2 10
11	We.		6	30	16	♋	2 59
12	Th.		6	31	16	♋	3 46
13	Fri.		5	32	17	♍	4 32
14	Sat.		5	33	17	♍	5 17
		(50) 3rd Sunday in Advent.				Jupiter in Sagittarius.	
15	Su.	Colder, a storm period, with wind and snow—Cloudy, with high winds—Clear, fine weather—Mild for the season, with wind, snow and sleet N., and rain S.	4	7 34	4 17	♍	6 01
16	Mo.		4	35	17	♎	6 45
17	Tu.		3	36	18	♎	7 31
18	We.		3	37	18	♏	8 19
19	Th.		2	38	19	♏	9 10
20	Fri.		2	38	19	♐	10 06
21	Sat.	**ST. THOMAS.**	1	39	20	♐	11 06
		(51) 4th Sunday in Advent.				Saturn in Leo.	
22	Su.	Mild and open, with fogs and rains E.— Stormy and unsettled, cold with drifts in N.W. and W.— Gales on Lakes—Windy and snowy E.— Cold rains in S.	1	7 39	4 20	♑	Eve.
23	Mo.		0	40	21	♑	1 16
24	Tu.		sl'w	40	21	♒	2 19
25	We.	**CHRISTMAS.**	1	40	22	♒	3 20
26	Th.	**ST. STEPHEN.**	1	40	23	♓	4 15
27	Fri.	**ST. JOHN EVANGELIST.**	2	41	23	♓	5 06
28	Sat.	Generally cold, winter weather.	2	41	24	♈	5 53
		(52) Sunday after Christmas.				Uranus in Virgo.	
29	Su.	The year ends cold and wintry.	3	7 41	4 25	♈	6 39
30	Mo.	**Henry G. Vennor born, 1840.**	3	41	25	♉	7 23
31	Tu.		4	41	26	♉	8 08

PLANETS IN DECEMBER, 1889.

MONTREAL MEAN TIME.

ON MERIDIAN (SOUTH).	Dec. 1st.	Dec. 8th.	Dec. 16th.	Dec. 24th.
Mercury..... ☿	11 33 mo.	11 53 mo.	0 16 ev.	0 41 ev.
Venus..... ♀	10 32 mo.	10 40 mo.	10 50 mo.	11 01 mo.
Mars..... ♂	8 05 mo.	7 53 mo.	7 39 mo.	7 25 mo.
Jupiter..... ♃	2 05 ev.	1 44 ev.	1 20 ev.	0 57 ev.
Saturn..... ♄	5 43 mo.	5 16 mo.	4 45 mo.	4 13 mo.
Uranus..... ♅	8 52 mo.	8 25 mo.	7 55 mo.	7 24 mo.
Neptune..... ♆	11 21 ev.	10 52 ev.	10 20 ev.	9 47 ev.

On the 6th, at 3.40 mo., the Moon passes 59′ S. of Neptune. Mercury is in Aphelion at 1.48 ev. on the 7th, and at Conjunction with the Sun (Superior) at 7 the same evening. On the 10th, at 3 mo., Luna is at Apogee. She is 3° 18′ N. of Saturn at 5 ev. on the 13th. Saturn is stationary on the 15th at 2.04 mo. The Moon is 3° 54′ N. of Mars at 11 mo. on the 17th, and 4° 41′ N. of Uranus at 5.34 the same evening. Venus is 1° 6′ S. of Luna on the 21st at 7.41 mo., and on the 22nd the Sun is eclipsed (see page 6). At 8.00 that evening the Moon is at Perigee, and at 10.42 passes 1° 27′ N. of Mercury. On the 23rd, at 7 mo., Jupiter is 1° N. of the Moon. Mars is 55′ N. of Uranus at 7.30 mo. on the 24th, and Jupiter 2° N. of Mercury at 8.40 ev. on the 26th.

Jupiter's satellites are not visible in a telescope from Dec. 17th to the end of the year, the planet being too near the Sun.

The semi-diameter of the Sun is now 16′ 18″, as compared with 15′ 46″ in June. From this it is proved that the Sun is nearer to the Earth in Winter than in Summer.

LUNAR INFLUENCE ON VEGETATION.*

Imitation has been declared to be the sincerest form of flattery. Two years ago, a copy of SMITH'S PLANETARY ALMANAC was sent to the compiler of an English Annual. Prior to that date, there was nothing concerning "Lunar Influence on Vegetation" in the book in question. Last year when I received a copy, I found it contained calculations suitable for England, and instructions on seed sowing somewhat similar to my own. I do not wonder at the imitation, but rather at the failure to copy more generally, since any person who has tried gardening under the old hap-hazard plan, and then under the plan which takes into account the effect of Lunar Influence, must, in the course of a very short time, become thoroughly convinced of the efficacy of my system.

From a number of Testimonials recently received, I cull the following :—

A good many in this district have been experimenting on your times for planting. All make favorable reports. One man tells me that he could never raise good potatoes until he followed your directions, since when he has never failed.

G. W. R.

Illinois.

I do a good deal of planting by your dates, but have never tried any large crops. In my rose cutting beds there are now some labels marked "Smith," and I now cannot do my gardening without your dates.

K. R.

Georgia.

I cannot do without your Almanac. I planted by its dates last year and was very successful. I planted Primula seed by your dates last spring, and have now (Dec.) fifteen very fine plants in full blossom ; they are the wonder of everybody.

E. M. S.

Mass.

As far as possible, I observed the signs and times for planting and sowing, and had a very fine garden in spite of drouth, which was complained of by others.

W. S. W.

Wisconsin.

I find your Almanac very useful. In following it with regard to transplanting and clipping of plants, I find great improvement in growth and a multiplicity of flowers.

F. O.

Mass.

* For additional facts and experiments concerning the correctness of this theory of natural science, see VENNOR'S ALMANAC for 1884 (price 50c.) and 1885 (price 25c.) and SMITH'S PLANETARY ALMANAC for 1886, 1887 and 1888, price 25 cents each, post paid.

A large stock always on hand for jobbing trade in all grades of goods.

Brogans and Plow Shoes from $9.60 per dozen upwards, all solid leather.

Women's Pebble or Grain in Polish, Polkas or Button at very low figures, all goods being bought direct from the Manufacturer at lowest figures for cash.

BOYS' AND YOUTHS'.

Boys'	Eng.	Balmorals,	solid	1	to 5	$1.25
"	"	"	"	"		$1.50
"	"	"	"	"		$2.00
Youths'	"	"	"	11	to 2	$1.25
"	"	"	"	"		$1.50

Made also in Button and Congress. All strictly first-class goods that will give good satisfaction, and cannot be beat for the price, quality considered.

Also, a good Boys' and Youths' Shoe made in same style and finish (sold by others for a higher price.) I will sell these at $1.00 per pair, and they are very good for the price.

I keep a line of finer goods for Boys, of which I have not space to mention, but will be very much pleased to show to any one.

LADIES' DEPARTMENT.

Ladies' fine Kid Button all styles. Sizes, from 2 to 6, price $1.25 to $2.00. Ladies' fine Pebble Goat, all styles. Sizes from 2 to 6, price $1.25 to $2.00. Ladies' fine Dongola Kid, hand sewed, all sizes and styles, from $2.50 upwards, good reliable goods, unsurpassed for fit, durability and comfort. Also in stock, large line of cheaper grades of goods in either Lace or Button, from 75 cents to $1.00.

I keep a large assortment of fine Shoes for Ladies of the best makes, comprising Baltimore, Philadelphia and Rochester; goods which are first-class goods and warranted by the Manufacturers.

Also, a cheap line of Ladies' and Misses' for the jobbing trade, ranging from 60 cents upwards, all styles.

I have Children's Shoes in great variety in heels, spring heels, either tipped or Plain Toes, prices ranging from 50 cents to $1.00. Also a finer line of Philadelphia goods, different colors.

Agent for the Childs' Patent Ankle Supporter Shoes, price $1.25, also Philadelphia made.

*SEED SOWING.—1889.

Latitude 35°.

Favorable times for sowing and transplanting in Virginia, West Virginia, North and South Carolina, Georgia, Kentucky, Tennessee, Arkansas, Southern Missouri, Northern Texas, Arizona, Indian Territory, New Mexico, California, and all places in North America at or near Latitude 35° N.

January.—For roots and crops of downward growth, choose the 5th from 9.50 to 11.05 a.m., when ☾ is in ♓ rising. For everything else, the same day is good between 12.35 and 2.10 p.m., when ♉ is rising. The 10th and 11th for roots, from 9.35 to 10.50 a.m., when ☾ is rising in ♉. The same days from 12.10 noon to 1.35 aft. are also excellent for everything except root crops, potatoes, etc. For roots and potatoes, the 15th and 16th, from 9.15 to 10.30 a.m., when ♓ is rising and the ☾ below the horizon in ♋. The same days are also good for roots between 11.40 a.m. and 1.05 p.m.

February.—On the 1st and 2nd, Luna is in ♓, and root crops should be sown from 7.55 to 9.10 a.m. with ♓ rising. Other crops from 10.35 a.m. to 11.55 noon, with ♉ rising; and 1.50 to 4.00 p.m. with ♋ rising. The 6th, 7th and 8th, for roots from 7.30 to 8.40 a.m., ♓ rising; other things the same days from 10.05 to 11.25 a.m. and 1.40 to 3.50 p.m. ♉ and ♋ rising. For roots and early potatoes, the 11th and 12th from 7.20 to 8.35 a.m. ♓ rising, 9.55 to 11.20 a.m., ♉ rising; other things, 1.20 to 3.30 p.m., ☾ in ♋ rising.

March.—The 2nd is good for roots from 5.00 to 7.15 a.m., ☾ in ♓ rising; for other crops, 8.40 to 10.05 a.m., and 12.00 noon to 2.10 aft. The 5th, 6th and 7th see ☾ in ♉ and are good for roots from 8.25 to 9.50 a.m., and other things from 11.45 a.m. to 1.55 p.m. The 11th and 12th have ☾ in ♋ and are good for roots between 8.10 and 9.35 a.m., and for things requiring top growth from 11.50 a.m. to 2.00 p.m. For roots, the 18th and 19th, from 5.00 to 6.10 a.m., ☾ in ♎ with ♓ rising; also 7.35 to 9.00 a.m., (♉ rising), and for grain, vines etc., when ♆ rises between 11.15 a.m. and 1.20 p.m.

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* The local time at the places mentioned is meant in every case.

APRIL.—The 2nd and 3rd for roots, 6.55 to 8.25 a.m., ♉ rising, and 10.40 to 12.55 noon for grain and other things, as well as from 5.20 to 7.45 p.m. The 8th is good for roots from 6.20 to 7.45 and 9.45 to 11.55 a.m.; and other things from 5.00 to 7.25 p.m. The Moon is in ♎ with ♎ rising on the 15th, from 4.30 to 6.45 p.m., good for spring wheat and other grain; other favorable times for vegetables, etc., are from 5.45 to 7.10 a.m., and from 9.15 to 11.25 a.m. The 30th has ☾ in ♉ rising from 5.00 to 6.25 a.m.; ♋ rises from 8.30 to 10.40 a.m., and ♎ from 3.40 to 6.05 p.m., all of which times are good for spring wheat, grain, vines and other things of top growth.

MAY.—As April 30th on 1st. The 4th for roots from 4.45 to 6.10 a.m.; other things, grain, squash, vines, etc., 8.05 to 10.15 a.m. and 3.15 to 5.40 p.m. when ☾ is in ♋. The 11th has ☾ in ♎ and is good for roots from 7.40 to 9.45 a.m., when ♋ rises, also for grain and all vegetables requiring top growth, squash, vines, etc., from 2.50 to 5.15 p.m.

JUNE.—The 2nd from 6.15 to 8.25 a.m., ☾ in ♋ rising, or 1.30 to 3.55 p.m. when ♎ rises. The 7th and 8th from 5.50 to 8.00 a.m., ♋ rising, (roots), and 1.05 to 3.30 p.m., (☾ in ♎ rising) for top growth. The 28th and 29th have ☾ in ♋ and are good from 11.30 a.m. to 1.55 p.m.

JULY.—The ☾ is in ♎, rising, from 11.05 a.m. to 1.30 p.m. on the 5th and 6th.

AUGUST.—The 1st and 2nd sees ☾ in ♎, rising from 9 25 to 11.50 a.m. A similar position obtains again on the 28th and 30th, between 7.40 and 10.05 a.m.

SEPTEMBER.—The 9th has ♎ rising from 7.10 to 9.35 a.m., and the same day ♓ rises from 5.45 to 7.00 p.m. These times are good for sowing fall grain, especially the latter. Another good time is on the 13th and 14th when ☾ is in ♉. The best hours are from 6.40 to 9.05 a.m. and 5.20 to 6.30 p.m. The 25th and 26th have ☾ in ♎, and a good time for sowing is from 4.45 to 6.00 p.m. on those dates.

OCTOBER.—The 5th has ☾ in ♓ rising between 4.00 and 5.15 p.m., and ☾ in ♉ on the 10th and 11th, with ♓ rising from 3.35 to 4.50 p.m.

NOVEMBER.—The 1st and 2nd has ☾ in ♓ rising from 2.15 to 3.30 p.m. The ☾ is in ♉ with ♓ rising on the 6th, 7th and 8th from 1.50 to 3.05 p.m. The 29th and 30th see ☾ in ♓ rising from 12.30 noon to 1.45 p.m.

DECEMBER.—The 3rd, 4th and 5th from 12.00 noon to 1.15 p.m. (☾ in ♉) when ♓ is rising. The 26th and 27th from 10.25 to 11.40 a.m., (☾ in ♓ rising,) and the 31st, from 10.55 a.m. to 12.10 noon.

LATITUDE 40°.

Favorable times for sowing in Maryland, District of Columbia, Pennsylvania, Delaware, New Jersey, Southern New York, Rhode Island, Connecticut, Ohio, Indiana, Southern Illinois, Northern Missouri, Iowa, Kansas, Nebraska, Utah Territory, Nevada, Colorado, and all places at or near latitude 40° North. (For Moon's place in Zodiac at these times see Calendar pages or table for Latitude 35° N.)

MARCH.—The 2nd from 6.10 to 7.15 a.m. is good for roots; other things, 8.35 to 10.00 a.m., and 11.50 a.m. to 2.00 aft. The 5th, 6th and 7th for roots, from 8.20 to 9.45 a.m., and other things, 11.35 a.m. to 1.45 p.m. The 11th and 12th from 11.40 a.m. to 1.50 p.m., also from 8.05 to 9.25 a.m. The latter for roots. The 18th and 19th from 5.00 to 6.00 a.m. for roots, and from 7.40 to 9.00 am; other things, grain, vines, etc., 11.20 a.m. to 1.20 p.m.

APRIL.—The 2nd and 3rd for roots, 6.30 to 8.00 a.m.; grain, vines, etc., 10.00 a.m. to 12.05 noon, and 5.20 to 7.50 p.m. The 8th, from 6.15 to 7.35, and 9.30 to 11.50 a.m. for roots; and other things, from 5.00 to 7.30 p.m. The 15th from 5.40 to 7.00 a.m. is good for roots; another good time for roots is from 9.00 to 11.15 a.m., and for spring wheat and other grain, from 4.30 to 6.50 p.m. The 30th for spring wheat, grain, vines and other things of top growth, from 4.55 to 6.15, and 8.20 to 10.35 a.m. and 3.40 to 6.10 p.m.

MAY.—As April 30th or 1st. The 4th for roots, 4.40 to 5.55 a.m.; and other things, grain, squash, vines, etc., 8.00 to 10.10 a.m.; and 3.15 to 5.50 p.m. The 11th is good for roots from 7.30 to 9.35 a.m.; grain, vines, etc., from 2.50 to 5.20 p.m.

JUNE.—The 1st, from 6.05 to 8.20 a.m., and from 1.30 to 4.00 p.m. The 7th and 8th, from 5.35 to 7.50 a.m., and 1.00 to 3.30 p.m. The 28th and 29th from 11.30 a.m. to 2.00 p.m. (good for roots).

JULY.—The 5th and 6th, from 11.10 a.m. to 1.40 p.m.

AUGUST.—The 1st and 2nd, from 9.25 to 11.55 a.m., and the 28th, 29th and 30th, from 7.35 to 10.05 a.m.

SEPTEMBER.—The 9th, from 7.10 to 9.40 a.m., and 5.50 to 7.00 aft., is especially good for sowing fall grain. The next dates this month are the 13th and 14th, from 6.40 to 9.10 a.m. and 5.25 to 6.35 p.m. ; also the 25th and 26th, from 4.50 to 5.55 p.m.

OCTOBER.—The 5th, from 4.00 to 5.10 p.m., also the 10th and 11th, from 3.30 to 4.40 p.m.

NOVEMBER.—The 1st and 2nd, from 2.10 to 3.20 p.m.; the 6th, 7th and 8th, from 1.50 to 3.00 p.m., and the 29th and 30th, from 12.40 noon to 1.50 p.m.

LATITUDE 45°.

Favorable times for sowing in Massachusetts, New Hampshire, Vermont, Maine, Nova Scotia, New Brunswick, Prince Edward Island, Quebec, Ontario, Northern New York, Michigan, Northern Illinois, Wisconsin, Southern Minnesota, Southern Dakota, Southern Idaho, Wyoming, Southern Montana, Oregon, Southern Washington Territory and all places in North America at or near Latitude 45° North. (For Moon's place in Zodiac at these times, see Calendar pages, or table for Latitude 35° N.)

APRIL.—The 2nd and 3rd for roots, early potatoes, etc., from 6.30 to 7.40 a.m., and 9.40 a.m. to 12.00 noon ; for grain, vines, spring salads, etc., 5.20 to 7.55 p.m. The 8th, from 6.10 to 7.20, and 9.20 to 11.40 a.m., good for crops needing downward growth, and 5.00 to 7.35 p.m. for grain, vines, spring salads, etc. The 15th, 5.35 to 6.45 a.m., and 8.45 to 11.00 a.m. for roots, and 4.30 to 7.00 p.m. for grain, vines and things of growth above ground. The 30th, from 7.30 to 9.00 a.m. for roots, and 3.00 to 4.00 p.m. for spring wheat, vines, barley, oats and garden truck.

MAY.—As April 30th on 1st. The 4th for roots, from 4.30 to 5.40 a.m. ; and all other things from 7.50 to 10.10 a.m., and 3.15 to 5.55 p.m. The only other favorable date this month is the 11th, between 7.25 and 9.25 a.m., good for roots ; and 2.50 to 5.30 p.m. for grain, corn, vines, squash, etc.

JUNE.—The 1st, 5.50 to 8.10 a.m., and from 1.30 to 4.05 p.m. The 7th and 8th from 5.20 to 7.35 a.m, and 1.00 to 3.40 aft. The 28th and 29th from 11.30 to 2.05 are also good.

JULY.—The 5th and 6th, from 11.10 a.m. to 1.55 p.m.

AUGUST.—The 1st and 2nd, from 9.25 to 12.00 noon ; also, the 28th, 29th and 30th from 7.40 to 10.20 a.m.

SEPTEMBER.—The 9th, from 6.50 to 9.30 morn., and 5.55 to 6.55 eve., are good, the latter especially, for grain. The 13th and 14th, from 6.40 to 9.15 a.m. are good, as well as (same dates) from 5.35 to 6.35 p.m., the latter time being good for fall grain. Other good dates are the 25th and 26th, between 5.50 and 8.10 a.m. and 5.00 to 6.00 p.m.

OCTOBER.—The 5th, from 4.20 to 5.20 p.m. is excellent for fall grain, as well as the 10th and 11th, from 3.50 to 4.50 p.m.

LATITUDE 50°.

Favorable times for sowing in Newfoundland, Manitoba and the North-West Territories, Northern Dakota, Northern Montana, Northern Minnesota, Northern Washington Territory, Northern Idaho, British Columbia, and all places in North America, at or near Latitude 50° North. (For Moon's place in Zodiac at these times, see Calendar pages, or table for Lat. 35° N.)

MAY.—The 1st, for roots from 4.30 to 5.35 a.m. Other things, 7.20 to 9.50 a.m., and 3.30 to 6.20 p.m. The 4th for roots, from 4.15 to 5.20 and 7.05 to 9.35 a.m. ; and 3.15 to 6.05 p.m. The 11th, from 6.55 to 9.05 a.m. for roots, and 2.50 to 5.40 p.m. for grain, vines and similar things.

JUNE.—The 1st, 5.20 to 7.50 a.m., and 1.30 to 4.20 p.m. The 7th and 8th from 5.00 to 7.20 a.m., and (same dates,) 1.00 to 3.50 p.m. The 28th and 29th from 11.30 a.m. to 1.50 p.m. are also good.

JULY.—The 5th and 6th, 11.10 a.m. to 2.00 p.m.

AUGUST.—The 1st and 2nd, from 9.25 a.m. to 12.15 noon; also the 28th, 29th and 30th, from 7.20 to 10.10 a.m.

SEPTEMBER.—For fall grain, the 9th is best, from 7.05 to to 9.55 a.m., and 6.05 to 6.55 aft. Other good times are the 13th and 14th, from 6.40 to 9.30 a.m., and 5.45 to 6.35 aft. Also, the 25th and 26th, from 4.30 to 5.55 aft.

THE ASTEROIDS.

CERES arrives at opposition on January 18, 1889. Her Right Ascension is then 8h. 16m. 40s.; Declination North, 30° 46′ 11″, a spot in the Constellation *Cancer*, just East of *Castor* and *Pollux* in *Gemini*.

PALLAS was at opposition on November 23, 1888. On January 1, 1889, her Right Ascension is 4h. 13m. 24s. Declination South, 30° 39′ 59″. (In the Constellation *Eridanus*.)

JUNO reaches opposition on March 20, 1889. Her Right Ascension is then 12h. 8m. 51s.; Declination North, 2° 52′ 5″, a spot in the Constellation *Virgo*, two-and-a-half degrees equi-distant from the Autumnal Equinox and the third magnitude star *Eta Virginis*.

VESTA was at opposition on September 29, 1888. Her Right Ascension on January 4, 1889, is 0h. 41m.; Declination South, 3° 16′, a spot in the Constellation *Cetus*.

GLIMPSES OF JUPITER.*

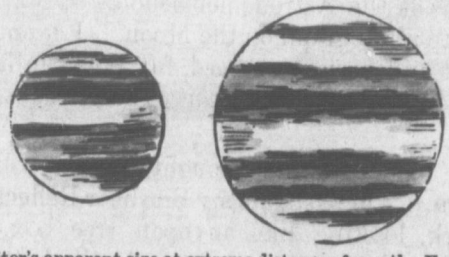
BY WALTER H. SMITH,
President of the Astro-Meteorological Association.

DURING the Spring and Summer months of every year a constellation that attracts almost as much attention as *Orion* does during mid-Winter, passes the meridian in the evening. I allude to the Southern constellation of the *Scorpion*, or as the Egyptians named it, the Beetle. This, with its three preceding stars of almost equal magnitude forming a brilliant row, to the uppermost of which—a double sun—the name

* Specially prepared for SMITH'S PLANETARY ALMANAC, and read before the Astro-Meteorological Association, Oct. 5th, 1888.

of *Graffias* has been given—its magnificent fiery heart, consisting of a great first magnitude star named *Antares*, and its numerous other stars in clusters and groups;—this constellation became of greater interest during the Spring and Summer of 1888 by the addition to its gleaming ranks of a magnificent brilliant of a silvery hue, which outshone all its companions. It was in fact the brightest object in the heavens when Luna hid her face.

For it was naturally on moonless evenings that the giant planet Jupiter—for so this star is named—appeared in all his glory. About the end of May he was brightest, becoming so bright that persons usually taking no interest in things of this nature, felt constrained to ask the planet's name and the reason why it appeared so bright. They were told that it was owing to Jupiter being near "Opposition," or nearest the Earth, and that, bright as he seemed, he must become brighter and brighter for several years to come, be-



Jupiter's apparent size at extreme distances from the Earth.

cause, at each successive opposition, he would be nearer to the Earth; his Aphelion—farthest from the Sun and Earth—having occurred in 1886. That year, Jupiter swung away on his gigantic orbit—in which he helps to hold the destinies of a system of satellites, many asteroids, several comets, and is believed to exercise a considerable influence on his neighbors, Mars and the Earth: on that year he swung away from the Sun to an extreme limit of 503,000,000 miles, but constrained to return, he is now moving towards the other end of the pendulum-like swing called "perihelion" where he is but 457,000,000 miles distant from the Sun's centre. If we deduct the 92 millions of miles which lie between the Sun and Earth from this figure, we find the distance—365,000,000 miles—which must always separate us from Jupiter.

This change in distance causes Jupiter to vary in brightness from an apparent size of 50″ to about 30″ when near conjunction with the Sun. Opposition—brightest—occurs on June 24th, 1889. In 1888 it happened on May 22nd; in 1887, on April 21st; in 1886 on March 21st, and in 1885 on Feb. 19th. It will thus be seen that Jupiter returns to opposition at intervals of about one year and one month, or speaking astronomically, his synodical period is 398 days.

But if Jupiter is interesting to the unaided eye, what shall I say of him in the telescope? A description of his appearance in my 8¼ inch silver-on-glass reflector of 6 feet focal length is what I am now attempting; but however vividly I may describe, or the engraver assist me to limn the planet's features, my descriptions must perforce fall wofully short of what is actually seen. For who can paint the colors of the morning, who correctly catch the hues of fleeting clouds, who reproduce "the light that *is* on sea *and* land": I am talking of such seas as the Astronomer beholds on Mars, such land as he is able to photograph on the Moon. Let one dip his brush in sunlight and he may succeed, for it is sunlight on Jupiter as well as on the Earth that causes such beautiful gradations of color.

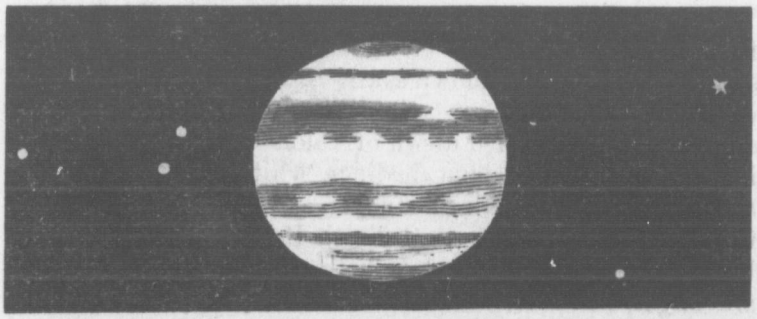
Let the reader step in thought into my observatory—an upper room. There stands my Brashear Reflector, the tube of lattice-work, looking like an open tree box,—swung on a pivot, with an iron counterpoise. At the bottom of the tube is the glass reflector itself, its silvered surface carefully covered except when in use. At the top is the opening for the eye-pieces, which are of various magnifying powers, ranging from 45 up to 360, the latter only possible on exceptionally fine nights. Opposite the eye-piece tube is the "diagonal" or flat, also of silvered glass, suspended in the centre of the tube, some 5 feet 6 inches above the reflector at the bottom. It is placed at an angle in order to reflect the image from the reflector into the eye-piece.

The window is wide open—nothing can be seen through window glass,—and there, above the tree tops, in serenest glory, hangs the planet we long to see at a less distance. "Focussing" comes first. To get the planet within the field of view, a small telescope called a "finder" is attached to the

large instrument, and it is consequently through this tiny instrument that the first view of Jupiter is obtained. But it is he. None can mistake him. White and round as a small full moon, with twinkling stars along side. Those stars are his satellites. We will discuss them farther on. Let us begin with Jupiter himself.

How brilliant he is in the great reflector! Rosse might well say that his light is equal to that of a coach lamp, and it is no wonder that the keen eyes of Bond could pick up the planet in high sunshine without aid. All the satellites are visible—Io, Europa, Ganymede and Calisto. But what is

SOUTH.



NORTH.

* Jupiter, August 5th, 1888, at 8h. 45 m.

that other body, is it a fifth satellite or a "ghost" due to faulty action of the telescope? It is certainly not the latter, as this telescope is noted for good definition. We look up Jupiter's position and we find that his Right Ascension is

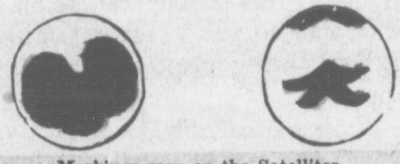
* The following is an extract from my observation book for the night in question: JUPITER, 1888, Aug. 5, 8h. 45m. POWER.—175. DEFINITION.—Good. EQUATOR.—No markings. GREAT SOUTH BELT.—What appeared at first like white spots on this belt seemed with steady watching and reduction of aperture to 4 inches for greater distinctness to be openings in belt allowing the white central belt to show. South belt itself a well defined rose-pink in color, with blue gray shadings on south margin. SOUTH POLAR REGIONS.—One patchy, undulatory belt between S. Central belt and S. Pole. Pole itself hardly colored at all. GREAT NORTH BELT.—Much less ruddy than S. Belt, and running in places to steel gray. Three ill defined whitish patches near central portion. Belt tapering on W. and increasing on S. side towards E. limb: Belt undulatory. NORTH POLAR REGIONS.—Two narrow steel gray belts between the great North belt and pole. North Pole (as usual) gray. SATELLITES.—III., I. and II. West (in order named). IV. East. A star of the seventh magnitude in field E.

(August 5th, 1888), 15h. 38m., Declination 18° 43′ S. The Star catalogue tells us that a 7th magnitude star exists at or near this spot. But the great disc of Jupiter rivets attention, and we forget the star. The high power, (175) shows the planet's disc to be flattened north and south about one sixteenth of the equatorial diameter, and after looking at it we feel, as Webb says, that we cannot any more tolerate the perfectly rounded discs of the text books. Here, too, are the much talked of belts and spots recorded in the imperfect telescopes of Toricelli and Zucchi as far back as 1630 as grey streaks. They are no longer grey streaks in the reflector, which is preferable to a refractor so far as defining color goes. The luminous equator is without spot to-night, but is often flecked with patches of cloud-like formation. The broad streaks on each side, known as the great Southern and Northern belts, are seen at once, the former being especially conspicuous for its marked depth of color. Deep rose-carmine in parts, with purple blue shadings, white spots and rifts, it alone is worth an evening's study. I have devoted many to it. Its companion, the great North Belt, is hardly as grand, being less in width and not as distinct. Its three white spots are larger, however, and its brown-red surface much more undulatory. Pale blue belts and spots, merging into a steel grey, traverse the rest of the disc.

We are now ready to examine the Satellites. Unable to perceive them with the unaided eye, we are unlike Schon, of Breslau, who could always see I. and III. when elongated. Many persons saw two at Devizes, England, August 20, 1859, just before a grand crimson aurora appeared. A proof that telescopic "seeing" is usually at its best during an auroral display. High powers will turn them into miniature full moons of different sizes, with diameters of:—Satellite I., 2,500 miles; II., 2,100; III., 3,550, and IV., 2,960 miles. Their synodic periods are respectively:—I., 1d. 18h. 28m. 35s.; II., 3d. 13h. 17m. 53s.; III., 7d. 3h. 59m. 35s., and IV., 16d. 18h. 5m. 6s. No. IV. consequently goes much farther from the primary than the rest. Herschel and Schroeter have supposed that, like our Moon, these Jovian satellites always turn the same side to their primary, and consequently change their faces to us. This idea was put

forth to account for their varying in brightness (which all do) the idea being that they are in places darkened by spots.

Are they equally bright? I find that they are not. On August 19, I gave special attention to this question and found the relative brightness as follows:—III., I., II., IV. This agrees with Denning. To test this, focus the planet —when the *Nautical Almanac* states that all four are to be visible—do this just as soon after sunset as possible, and watch for the satellites to blink out. They will appear in the order named, III. considerably before I., I. a little before II., and II. some time prior to IV. Denning reports III. growing darker and IV. slowly brighter.



Markings seen on the Satellites.

They appear to vary in color, as different observers and different instruments see them of different tints. Herschel made I. and III. white, II. bluish, and IV. dusky and ruddy. Beer and Maedler say I. is bluish, II. and III. yellowish and IV. bluish. Secchi says III. is sometimes white, but generally red. Engelmann considers III. yellow, and IV. dusky blue, and Denning makes IV. ruddy. Vogel's spectroscopic tests give indications of atmospheres.

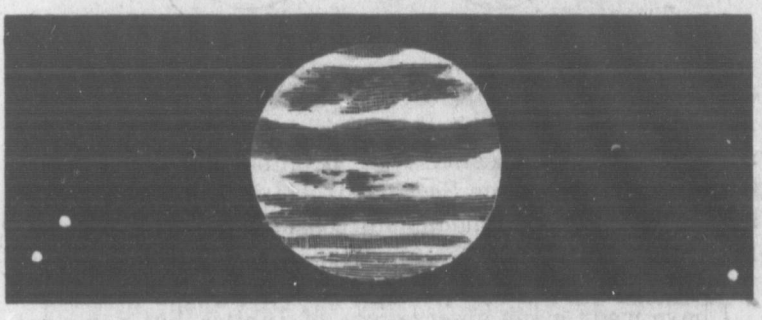
I have made many observations of Jupiter, but never yet saw him exactly alike twice. The drawing made on August 18, if compared with those of August 5 and August 22, will prove this. Of course the rotation period of Jupiter, which is not the same as the Earth's, accounts partly for this. But it does not account for changes in the general features. Look at the contour and breadth of the lesser South belt in the accompanying engraving, and compare it with what was seen on other occasions. Where have the white spots gone, and what has changed the appearance of the white equatorial belt, flecking it with two or three ill defined cloudy patches?

What has changed them? They are made of ever changing materials. What we see are dense, cloud-like formations, but resembling those of the Sun, rather than those of the

Earth. Not that Jupiter emits much light, else his satellites, when in their primary's shadow, would not disappear. Perhaps the brightest portions are at times self-luminous, and the interior, which we seldom see, must be heated, generating storms of terrible force, which, ejected to the outer portion, cause many of the changes noted.

That there are cloud stratas of great thickness is believed to be proved by the satellites' behavior when gliding on the disc. They often disappear and then reappear, seen, it is thought, in rifts several thousands of miles deep in the Jovian atmosphere. On the evening of August 8, I witnessed a beautiful illustration of this. The first satellite was about to transit, its ingress being given as 8h. 4m., Washington time. I was able to see it several minutes after, the fluctuations of light being readily noticeable, as it disappeared and reappeared.

SOUTH.



NORTH.

* Jupiter, August 18, 1888, at 7h. 50m.

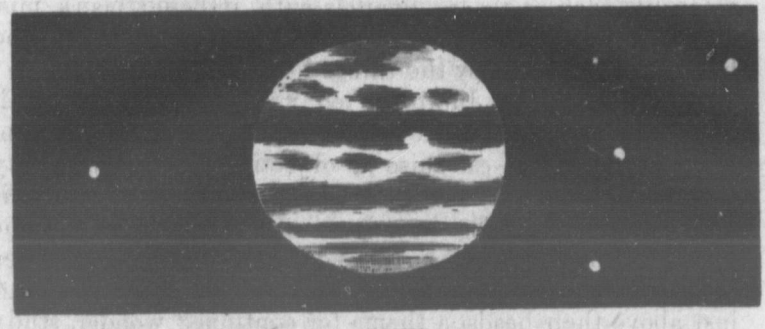
In making these drawings of Jupiter, I tried to remember his rapid rotation, not forgetting, as Webb remarks, "that the equator of this huge globe is flying 28,000 miles an hour, or between 7 and 8 miles every second, and a few minutes show the movement of the spots, but puzzle the draughtsman."

At the observation of August 18, I estimated the width of the belts, and, taking the polar diameter as 80,000 miles—made the South Central belt 13,500 miles in width. North Central belt about 12,000 miles. Minor belts from 4,000 to

* Powers used: 175, 250 and 360 on 8¼ inch silver-on-glass mirror. Definition good.

5,000 miles; but here we have to take into consideration Jupiter's rotundity, remembering that all parts near or approaching the pole, on so large a globe, must appear greatly foreshortened to us.

SOUTH.



NORTH.

Jupiter, August 22., 1888, at 7h. 20m.

The observation on August 22 was an especially good one. A comparatively low power (175) was sufficient to bring out details. The great central white belt was mottled, one patch existing near its centre, and another at each side. At the south edge a bay-like undulation was noticed running into the great southern belt, which was a delightful object, and thus described in my observation book: "Gorgeous, dark pink, edges undulatory, middle filled with a well defined dark cloud-like undulatory nucleus." The southern hemisphere contained masses of flocky vapor floating in cloud-like particles above the great south belt, and an irregular mass filled part of the polar regions. The great north belt is thus described: "Dark, billowy, cloud-like nucleus here also. Belt looked a black-red—two upheavals into central belt." A perfect narrow belt of dark blue was traceable across the northern hemisphere, traces of other belts occurring right to the pole. Satellite II. was west, I., IV. and III. East.

Have you seen and heard enough? If you are a born astronomer you have not. I have watched the planets and stars for years, and feel that I have as yet but hardly commenced to see the glories that are everywhere revealed. During those years I have but skimmed the shores of an unbounded ocean, filled with island suns and worlds unnumbered, uncounted, that cannot possibly be counted. A year, a

whole lifetime might be spent examining the planet Jupiter alone. Why, up to the present, man has not yet decided whether life does or does not exist there. The general belief at present leads us to suppose that it does not. By "life," I mean life such as we are familiar with, it being man's misfortune to be obliged to compare things outside, things beyond his own little world, by the things he sees herein.

But granting that Jupiter is too "youthful"—if you will allow the term—for "life" to exist upon his gaseous, unsolidified surface, I can raise no objections to the possibility of "life"—and that of the highest order—existing on his satellites. If so, what wonders must be exhibited to the fortunate inhabitants! All and more than that we see "through a glass darkly" at an immense distance, hangs just above their heads, a theme for continued wonder, study and admiration.

NOTE.—Copies of SMITH'S PLANETARY ALMANAC, with the above engravings finished in water-colors by the author, will be sent post-paid, to any address at the rate of *Fifty cents per copy*.

THE CALENDAR PAGES.

MOON'S PHASES. — These are calculated according to "mean" or correct time at the cities indicated—Boston, Montreal, Washington, Chicago and Omaha—and not the "standard" or railway times.

PLANETS PLACES. — The lines "Jupiter in Scorpio," "Saturn in Cancer," etc., represent these planets' places on the dates in question in those *Constellations*, not the *Signs*, which, owing to the Precession of the Equinoxes, do not now agree, the *Constellation* Scorpio, for instance, corresponding at present to the *Sign* Sagittarius, and so on through the list.

THE SUN.—"Slow" and "Fast" at the top of the column represents the number of minutes that the Sun when he reaches the noon mark, on the day indicated, is "slow" or "fast" of a clock correctly set to mean time at any place.

THE MOON.—"Zodiac" here means the *Zodiacal Sign*, and not the *Constellation*. The blunder of supposing the *Constellation* to be the same as the *Sign* is nearly universal in the quack medicine and other gratis Almanacs, prepared

by parties who do not know the difference. For instance, in such trashy publications when they say the Moon is "in the head," it is really "in the neck," when they say it is "in the feet" it is really "in the head," etc., etc. In SMITH'S PLANETARY ALMANAC the *Sign* always corresponds to the actual place of the Moon on that day in the *Zodiacal Sign*. "Souths."—This indicates the exact moment when the Moon "passes the meridian," or arrives at a similar position as the Sun at noon. For instance, on Jan. 18th, the Moon "Souths" at 1.01 morn. She is consequently a little past "full" and will be giving light nearly the whole night.

PLANETS ON MERIDIAN.—These tables are for the use of amateur astronomers, to facilitate observation. They give the exact time when the several planets (at intervals of eight days) come to their highest elevation above the horizon. From these tables it can be seen at a glance when any planet is visible, because planets that come to the meridian during the morning hours can be best observed as "morning stars," those that come to the meridian during the evening hours can be best observed as "evening stars." A good rule is to consider planets that pass the meridian between 11 a.m. and 1 p.m. as practically invisible.

THE SUN WITH SATURN.

Those who pretend to know, tell us that the planets exercise no influence upon the weather. What follows shows this to be untrue. One of the rules of Astro-Meteorology is: "WHEN THE SUN IS IN ASPECT WITH SATURN THE TEMPERATURE FALLS." An examination of the following table of Saturnian-Solar aspects for the past four years will show the truth of this rule. Out of 20 consecutive aspects, 18 gave a drop in temperature at Montreal.

Accordingly, when I forecast "colder weather" at such positions, my chances of realization were as 18 to 20, or 90 per cent! No wonder that SMITH'S PLANETARY ALMANAC forecasts — calculated eighteen months ahead of time, get ahead and keep ahead, so far as a percentage of verification is concerned, of those made daily for the 24 hours approaching, by the heavily subsidized Government Bureaus, whose professors laugh to scorn—not knowing any better—what they consider the ridiculous notion that a planet like Saturn, whose diameter is 70,000 miles, can influence the gaseous envelope called the Atmosphere on a globe whose diameter is 7,900 miles, and whose volume is less than the mighty Saturn's by 700 times. I wonder whether they laughed to scorn in their boyish days the idea that a big, burly fellow, just 700 times their own size was able, if he felt like it, to give them a hiding

SATURNIAN-SOLAR RECORD, 1884-8 (♄ and ☉).

Date.	Aspect.	Thermometer. Max.	Min.	Rose or Fell.	Fall of Max.	Fall of Min.	Weather at Montreal.
1884.							
Dec. 11	.....	29°	18°	.....	.....	.....	Heavy snow, clearing p.m.
" 12	☌ (180°) ...	29°	9°	F.	.....	9°	Snow flurries.
" 13	.....	15°	5°	.....	13°	.....	Dull, cloudy, cold.
1885.							
Feb. 16	Stationary.	31°	4°	.....	.....	.....	Cloudy. High wind and snow p.m.
" 17	.....	23°	−1°	F.	8°	5°	Snowy, unsettled, very high wind.
Mar. 6	.....	19°	4°	.....	.....	.....	Fine, cold, very cold p.m.
" 7	□ (90°)	14°	0°	F.	5°	4°	Dull and cold.
" 8	.....	13°	0°	.....	.....	.....	" " " p.m. clear.
June 17	.....	73°	55°	.....	.....	.....	Cool, fine, windy.
" 18	☍ (0°)	72°	52°	F.	1°	3°	" very fine, strong wind.
" 19	.....	89°	58°	.....	.....	.....	Fine, light clouds, high wind.
Sept. 30	.....	70°	53°	.....	.....	.....	Fog, calm.
Oct. 1	□ (90°)	68°	50°	F.	2°	3°	Fine, light clouds.
" 2	.....	68°	49°	.....	.....	.....	Very fine, breezy.
" 20	Stationary.	65°	46°	.....	.....	.....	Dark, thick clouds, very heavy rain.
" 21	Perihelion.	55°	37°	F.	10°	9°	Greatest rainfall ever recorded here in 28 hours. Clearing, cold.
" 22	.....	47°	36°	.....	.....	.....	Rain and melting snow.
Dec. 24	.....	40°	7°	.....	.....	.....	Clear.
" 25	.....	10°	2°	.....	.....	.....	"
" 26	☌ (180°) ...	6°	−3°	F.	4°	5°	"
" 27	.....	11°	−2°	.....	.....	.....	
1886.							
Mar. 21	.....	33°	28°	.....	.....	.....	Heavy, soft snow.
" 22	□ (90°)	35°	25°	F.	.....	3°	Snow and wind. Clearing p.m.
" 23	.....	31°	18°	..	4°	7°	Dull, stiff breeze.
July 2	.....	77°	59°	.....	.....	.....	Very fine.
" 3	☍ (0°)	81°	62°	R.	.....	.....	" " hot, high wind.
" 4	.....	85°	65°	.....	.....	.....	" " " " "
Oct. 14	.....	58°	43°	.....	.....	.....	High wind and dashing rain.
" 15	□ (90°)	59°	36°	F.	.....	7°	Fall like, unsettled.
" 16	.....	46°	27°	.....	13°	9°	Snow flurry, cold and frosty.
1887.							
Jan. 8	.....	−6°	−17°	.....	.....	.....	Clear and very cold.
" 9	☌ (180°) ...	−6°	−26°	F.	.....	9°	" " " " light snow p.m
" 10	.....	5°	−7°	.....	.....	.....	Snow, high wind and drifts.
Mar 16	.....	20°	10°	.....	.....	.....	Cloudy, cold, high wind p.m.
" 17	Stationary.	26°	17°	R.	.....	.....	Dull, light snow.
" 18	.....	38°	24°	.....	.....	.....	" " " p.m. rain.
April 4	.....	37°	33°	.....	.....	.....	Rain a.m., dark, dull, mild.
" 5	□ (90°)	36°	20°	F.	1°	13°	High wind, overcast, light snow.
" 6	.....	31°	14°	.....	.....	.....	Very fine and cold.
July 17	.....	79°	65°	.....	.....	.....	Dull, spittings of rain.
" 18	☍ (0°)	79°	60°	F.	.....	5°	Shower a.m., p.m. clear.
" 19	.....	84°	61°	.....	.....	.....	Very fine.
Oct. 28	.....	46°	28°	.....	.....	.....	Frost, fog a.m. Clear. Cloudy in
" 29	□ (90°)	43°	22°	F.	3°	6°	Cloudy with snow. [p.m.
" 30	.....	28°	22°	.....	15°	.....	Snow, dull, cold and windy.
Nov. 16	.....	36°	29°	.....	.....	.....	Light snow, dull.
" 17	Stationary.	38°	27°	F.	.....	2°	Snow flurries, clearing.
" 18	.....	36°	24°	.....	2°	3°	Fine, snow scuds, clear p.m.
1888.							
Jan. 22	.....	−4°	−20°	.....	.....	.....	Clear, "a dip," high wind and drifts.
" 23	☌ (180°) ...	7°	−6°	.....	.....	.....	Cloudy, light snow.
" 24	.....	5°	−9°	F.	2°	3°	Clear and cold.
Mar. 29	.....	40°	32°	.....	.....	.....	Rainy, sleet, dull.
" 30	Stationary.	36°	26°	F.	4°	6°	Clear. Overcast with snow, p.m.
" 31	.....	37°	28°	.....	.....	.....	Snow a.m., p.m. fine.
April 18	.....	45°	35°	.....	.....	.....	Fine, cloudy, mild.
" 19	□ (90°)	41°	31°	F.	4°	4°	" clear and cool.
" 20	.....	40°	30°	.....	.....	.....	Dull, snow flurries.
July 31	.....	83°	62°	.....	.....	.....	Thunder shower a.m., fine and hot.
Aug. 1	☍ (0°)	77°	56°	F.	6°	6°	Fine and warm, bush fires.
" 2	.....	83°	61°	.....	.....	.....	" " hot. " "

The Astro-Meteorological Association.

OFFICERS, 1888-9.

PRESIDENT:—WALTER H. SMITH, 31 Arcade Street, Montreal, Canada.

VICE-PRESIDENTS:—H. BEAUMONT SMALL, Ottawa, Ont.; A. J. PIGEON, Montreal, Que.; N. PLUMADORE, Asheville, North Carolina: L. J. HEATWOLE, Dale-Enterprise, Virginia; B. F. KIRKPATRICK, Harrisonburg, Va.; W. T. FOSTER, Burlington, Iowa.

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TREASURER:—F. G. PAYNE, Montreal.

ANNUAL REPORT.—SESSION, 1887-8.

At the conclusion of the most successful and satisfactory session that the Central Committee of the Astro-Meteorological Association has experienced since its organization on Oct. 29th, 1884, it was decided to print a brief summary of its proceedings, in order that non-members might become better acquainted with the excellent work carried on by this Association of Planetary Meteorologists and Astronomers.

The idea of forming an Association of this kind originated with Mr. Walter H. Smith. At the first, grave doubts were expressed as to the possibility of the experiment proving a success. To-day, all apprehensions of this nature have van-

ished, and a career of extreme usefulness is evidently before this Association.

Meetings are held in the Fraser Institute, Montreal, on the first Friday in each month from October to May inclusive, when essays on Planetary Meteorology, Astronomy and Meteorology are read by associates. When necessary, extra meetings are held. The special aims of this Association may be briefly summarized as the study of Astronomy and Meteorology, but more particularly with regard to Astronomy as connected with terrestrial phenomena.

Thirty-one papers were read during the session. Of these President Smith contributed 16, Secretary Beuthner 5, Vice-President Pigeon 4, Councillor McNab 2, Vice-President Small 1, Vice-President Foster 1, Councillor Birt 1, and Associate Lawrence 1.

FOURTH ANNUAL MEETING.

This took place at Montreal on the evening of Nov. 4th, 1887, the President in the chair. The meeting was largely attended. Eleven new members were elected. The retiring Secretary, Mr. J. Brown, read his annual report, which showed a gain of 45 associates during the year, bringing up the total to 68. Twenty-two papers had been read. The report was declared very satisfactory and was adopted. A vote of thanks being tendered Mr. Brown for his work in the Association's behalf.

The election of officers, whose names appeared in last years PLANETARY ALMANAC, followed, after which, President Walter H. Smith, on the occasion of his fourth successive election, delivered his Annual Address, taking for his subject "The year's progress in Planetary Meteorology, Astronomy and Meteorology."

The address dealt with some of the leading events that had transpired during the year in the sciences of Astro-Meteorology and Astronomy. It also touched upon the most noteworthy observations, astro-meteorological and astronomical, to occur during the twelve months just commencing. The successes of Astro-Meteorology during the year were pointed out in a review of the Meteorology of the year, and a hope expressed that at the close of next year predictive weather science would be in a yet more hopeful condition. "Go on," said Mr. Smith, "and the Light will come to you." He regretted the small interest in Astronomy taken by Canadians, when their neighbors over the border were doing so much, where Burnham, Young, Hall, Newcombe, Hill, Pickering, Chandler, Brooks, Barnard, Gould, Peters, Hough and Swift had

each made a lasting name as astronomical experts, and observatories had gone up in great numbers. The discoveries of the year were then mentioned, and a glance given to Meteorological work, a feature of which had been two special balloon ascensions for scientific purposes. A brief review of the special work of the Astro-Meteorological Association brought the address to a close amidst applause.

The Right Rev. B. B. Ussher moved a vote of thanks to the President for his address, which was carried unanimously. He also spoke in a most hopeful tone of the prospects of the Association.

Mr. Howard communicated some notes of interest to Planetary Meteorologists, which he illustrated with black-board diagrams, and Mr. A. J. Pigeon exhibited a number of photographs of Lunar Scenery, etc.

Fortnightly meetings having been decided on for the session, the meeting adjourned.

ADJOURNED MEETING, NOV. 18TH.

A special meeting was held on this date when 17 members and a number of visitors were present.

Dr. Thos. Dawson, of Charlottetown, P. E. I. contributed some valuable notes, amongst them being the following:

As the Metonic cycle consists of 19 years, then 19 years ago the moon should have been in the same place as she was in August last and there should have been a storm. I do not recollect any great storm then but on October 5th, 1869, we had "Saxby's storm" which was one to be remembered. That was 18 years ago. On Oct. 3-4, 1851, a terrible storm swept over this Island during which seventy-two American fishing vessels were severely damaged or cast ashore and a great many lives lost. This was just 18 years before Saxby's storm. This is as far back as my memory takes me, but some time ago I was talking to an old inhabitant about an event which she said she remembered on account of a terrible storm that blew down a church in Charlottetown. She could not remember the date. I was very anxious to find the date and took a great deal of trouble interviewing the old inhabitants. At last I found an old gentleman upwards of eighty who remembered all about it, and showed me his diary in which he had made a memorandum of it. It was August 10th, 1833. This is just about 18 years before the last storm. I found in the almanac in which the diary was written that the moon was new on the 15th while in perigee. That would account for the storm, as that was about the condition of things at the time of Saxby's storm, only in addition the moon was on the equator.

While I was hunting about for the date of the last storm I accidentally came upon the following in my readings. "In April, 1815, one of the most frightful eruptions recorded in history occurred in the province of Tomboro in the island of Sombawa, about two hundred miles from the eastern extremity of Java. It lasted from April 5th to July of that year, but was most violent on July 11-12. The sound of the explosions were heard for nearly a thousand miles. Out of a population of

12,000 in the province of Tomboro only 26 individuals escaped. Violent whirlwinds carried up men, horses and cattle into the air, tore up the largest trees by the roots and covered the whole sea with floating timbers." Here is another period of about eighteen years. Thus these five storms have occurred at periods corresponding almost with the synodic revolution of the moon's nodes. If one should make a long forecast and predict a storm for August or September, 1905, I think that the prospect would be as good as that of Dr. Halley, who predicted the reappearance of the comet that bears his name.

A table showing the mean temperature at Montreal during each month of the current year, was exhibited by Mr. Smith. It showed that January, February, March and April (1887) have given results below the mean of the past 13 years; May, June and July results above; August, September and October, results below.

It was decided, after discussion, to form special sections as an aid to study, as follows: Section "A." Planetary Meteorology; Section "B." Astronomy and Section "C." Meteorology.

Some notes on "The Accumulation of Ice at the Poles" were furnished by Mr. Pigeon, in reply to a question from Bishop Ussher.

He remarked that such accumulations could only take place by displacing an equal weight of water from the equatorial regions. Water had to find its level, and get equally distributed over the globe, and thus sustained the equilibrium. If the accumulation became abnormal, it would have no effect on the axis of the earth, the specific gravity of water being *nearly* the same liquid and frozen. Suppose some great accumulation of ice or rock to take place, despite the summer's sun, the consequence would be a rush of water over the Continents, more or less disastrous, without in the least disturbing the inclination of the polar axis of the Earth. So wonderfully had the clockwork of a Universe been adjusted by an All Wise Creator.

Mr. Brown contributed some "Current Notes on Science" and the President followed with a paper on "The Star of Bethlehem." *

He laid the blame of the nonsense then being said about "the Star of Bethlehem having again appeared," to the radiancy of Venus, near her "greatest brilliancy" at the winter solstice. He placed all the theories of astronomers accounting for this appearance under the following heads: 1. The star may have been a miraculous light; 2. It may have been caused by a close conjunction of planets; 3. It may have been a comet; 4. Or a new, temporary or "blaze" star. He followed, in a most fascinating discourse, the whole of these theories to a conclusion, and finally decided in favor of the new, or "blaze" star theory.

* Published in *Daily Witness*, Montreal, Dec. 17th, 1887.

The President having requested the pleasure of the members company at his house to take part in a meeting for telescopic observation, the meeting adjourned.

27TH MONTHLY MEETING.

This was held on Dec. 2nd, 1887, and was largely attended. Three Associates were elected.

On motion, it was decided that all papers prior to reading, must in future be submitted to the President for his approval at least three days in advance of a meeting.

President Smith submitted an application from Mr. W. T. Foster, of Burlington, Iowa, a well known planetary meteorologist. who desired to establish a branch. The request was granted. (This makes the third Branch opened in the United States since the organization of the Association at Montreal in 1884.)

Mr. E. W. Beuthner read a paper on "Meteorological and other effects on Sleep."

The cause of sleep, he remarked, was due to the production of the elements of tiredness in the brain. Nitrogen was consumed during our waking moments, and a want of it caused the brain to go to sleep. During the first hour, sleep was deepest, lessening in soundness as the hours passed. He gave the sun-light credit for the production of a sleep producing alkali in the brain called "Leukomaine." From this he passed to the effect of the moon's rays, especially in the tropics, where fish and other perishable articles were soon spoiled by them, and explained the affliction known as "Moon-blindness." Moonlight also had a certain bleaching power, and a human face exposed to it, grew whiter. White leather gloves hung in strong moonlight, would bleach better than by artificial means. The meteorological effects on sleep were numerous. Climbing a mountain by ascending into rarer air caused a desire to sleep, and the passage over a locality of a "depression," causing a thick atmosphere, produced a drowsy feeling. He closed by remarking that were more Natural Science and less Greek and Latin taught in schools, there would be more handsome men, more beautiful women and more sleep.

Mr. A. J. Pigeon followed with a paper on "The Cause of Earthquakes and the Possibility of foretelling them," a synopsis of which follows:

It is a recognized fact that the moon and sun exert upon the ocean an attraction producing the tides, an elevation of the waters underneath the moon and sun; more or less according to the two orb's action in concert or separate. Apparent in the water, the attraction is also felt by the earth. Every body attracts every other body, and the equinoctial gales are perhaps the most apparent proof of this attraction on the atmosphere. Cohesion of particles as regards the earth, resisted this attraction generally, but sometimes, when the moon and sun were in conjunction, the

moon in perigee, and some of the planets also exerting more than their usual influence, the solid crust of the earth was forced to yield. The atmosphere yielded first, and, focussed at the centre of attraction, produced sultry or "earthquake" weather. The earth might resist the first assault, but, as the moon came in to line with the rest, it would yield, as successive strokes on a bar of iron broke it. Afterwards, as the moon continued to come into conjunction with the planets, like a succession of rapid weak strokes on the bar of iron, she accomplished the same effect as her previous heavy stroke. Mr. Pigeon also read from an exhaustive table showing that planetary conjunctions accounted for almost every one of the numerous shocks recorded at Charleston in 1886. He showed why earthquakes, owing to the moon's orbit, were most numerous in the tropics, credited Jupiter, owing to his size, with being the principal earthquake factor, and showed that earthquakes not only happened in cycles, but that these cycles can be foretold by the Astro-Meteorologist, who had opened up the new science of Planetary Meteorology."

Numerous diagrams illustrated this article.

Mr. George Creak exhibited the optical portions of a fine refractor that he had just had made to order in Paris. Its mounting to be proceeded with at once, making the third telescope bearing high powers used by associates resident in Montreal.

28TH MONTHLY MEETING.

At this meeting on Jan., 6th, 1888, the President in the chair, ten associates were present. Five new members were elected.

The death of Mrs. Copp, of Magog, Que., a member of the Association, having been announced, it was moved by Associate J. C. Weir, seconded by Associate J. Brown, and unanimously resolved: "That a letter of condolence be sent to Mr. W. Copp, expressing the sympathy of this Association at the loss of his mother, a much respected member."

Communications were submitted by the President from Vice-Presidents Mansill (Illinois), Foster (Iowa), and Heatwole (Virginia.) That from Mr. Foster contained some notes on his system of weather forecasting.

President Smith announced having been invited to lecture at St. Matthew's, Point St. Charles, Montreal, on Jan, 11th. He also submitted some "Notes on the approaching Lunar Eclipse of Jan. 28," giving the elements of the Eclipse, and explaining why Lunar eclipses always begin on the East. He also stated that the effect of the dark shadow on the numerous peaks and craters of the moon was sometimes well worth noting.

A paper on "Thunderstorms" by Associate Birt, of Utica, N.Y., followed, in which he said that it is by electrical agency, that nearly all the phenomena in the material world, especially in the Meteorological world, is made manifest. Thunder storms excited great wonder, but were of very common occurrence. Generally regarded as a manifestation of Divine Agency, a rightly trained mind saw nothing more in a thunder storm than an energetic natural agent at work. The cause was an unequal accumulation of the electric fluid in a mass of cloud and in the earth beneath such clouds.

Mr. Smith read a paper entitled "A Cometary Brotherhood," in which he related the history of Halley's, Pons-Brook's, Olbers-Brook's and the Comets of 1846, 1847 and 1852.*

An invitation to meet at Mr. Smith's on the night of the eclipse closed the meeting.

29TH MONTHLY MEETING.

Eleven associates attended the meeting at the Fraser Institute on the evening of February 3rd, 1888, viz.: President Walter H. Smith, Associates J. C. Weir, W. McNab, C.E., E. W. Beuthner, G. A. Neville, A. J. Pigeon, George Creak, Treasurer Brown and Mesdames W. H. Smith, E. W. Beuthner, and J. Brown. Several visitors were also present.

After routine proceedings, a letter was read from Vice-President Plumadore, of North Carolina, to the effect that the secretaryship of that branch was now filled by Col. R. M. Furman, Editor *Daily Citizen*, Asheville, N.C.

An article from Vice-President Foster on "Planetary Meteorology" was read.

By request, Mr. Smith gave some "Practical Hints to Amateur Telescopists," specially applicable to observations on the Planet Saturn, then favorably situated for observing. He bade amateurs not to expect to see too much, but to remember that the planet was nearly 900,000,000 miles away. It was also useless to waste time trying to get a telescope steady on a windy night. He also recommended resting the eyes frequently by closing them, five minutes of good observation being better than a whole evening spent in straining

* Published in *Daily Witness*, Montreal, Jan. 7th.

the eyes. High powers ought only to be used on exceptionally fine nights, and wherever practicable an object should not be attempted before it was at least 45° above the horizon.

Messrs. Pigeon, Creak and others followed with additional hints of value. A brief report on the total eclipse of the moon was received. It stated that the "copper color" had been quite plain; that the earth's shadow in the telescope had proved most interesting, looking like a greyish cloud, merging gradually into the moon's brightness.

The President read a paper entitled "Some Comets of Short Period," embracing an account of the orbits and peculiarities of Encke's, Biela's, Fayes, Brorsen's, Winnecke's, Arrest's, Tuttle's and Temple's Comets.

Associate Beuthner followed with a paper entitled "Air and Water, in their relation to Meteorology."

In this essay he pointed out that wind was a quicker drying agent than the Sun, absorbing moisture as it came in contact with it. What became of these minute particles of water? They joined together, formed clouds, and, cooling, fell as mist, rain, snow or hail. In winter we could see the moisture absorbed by the atmosphere. In warm air we could not see these particles, as they immediately took the form of air, becoming visible only in the formation of mist, a result of cold. He also described at length the various climates of the Equatorial regions, the Temperate and Frigid Zones, and their results on the land and water.

Votes of thanks to Messrs. Smith and Beuthner, having been moved by Mr. McNab and carried unanimously, the meeting adjourned.

30TH MONTHLY MEETING.

At this meeting, held on March 2nd, 1888, two new members were elected. Amongst those present were: Messrs. Walter H. Smith, the Rt. Rev. B. B. Ussher, J. C. Weir, George Creak, R. Bickerdike, W. McNab, C.E., A. J. Pigeon, E. W. Beuthner, T. R. Lanskail, F. J. Vipond, J. R. Logie, several lady members and invited guests. President Smith announced having lectured during the month in St. Lambert School House, St. Gabriel Presbyterian Church, Montreal, and the Mechanics' Institute, Point St. Charles. Much satisfaction was expressed by members present at the evident increase of interest taken in Association work by the public.

The President called attention to the fact that the day

after Mercury had been last at Perihelion, the great tornado had occurred in Southern Illinois, proving the rule laid down by him at a previous meeting that the forecast at such positions should be "Tornadoes probable in tornado sections."

Mr. Beuthner read a most interesting paper entitled "Human influence in causing Climatic Changes," describing the effect of man's arts and sciences on such.

Mr. Smith followed with an instructive paper on "Some Comets of Long Period,"* making the third or closing paper on the subject of comets, the three families of short, medium and long periods having been described.

The paper was illustrated by diagrams and drew forth considerable discussion, in which Mr. A. J. Pigeon explained a theory that would account for the formation of cometary trains. He supposed a diffused atmosphere, or substance, surrounding the nucleus on all sides, across which the Sun threw its beams, thus causing the appearance commonly termed a tail, or train.

31ST MONTHLY MEETING.

A question having been asked at a previous meeting as to "the cause of Blizzards in the North-West," President Smith, at the meeting held on April 6th, in answer said that by explaining the summer conditions, those prevailing in winter would be better understood. To the South of the Canadian and American North-West, an arid space extended, from which in summer rose enormous masses of overheated air, and this drifted northwards, setting back the isothermal lines. This hot air met the cold air, and caused rain in Canada, while further South drought might be in order. As the sun went South, the great desert cooled, the wind rushed down from the North, gaining strength and speed as it went South. The gale of Manitoba became a blizzard in Dakota and Nebraska. In Eastern Canada the proximity of the Laurentian Hills and the Atlantic Ocean kept the blizzard at bay.

The President called attention to the approaching opposition of Jupiter, near conjunction with *Graffias* (*Beta Scorpii.*) Also to the close approach of Uranus to Mars on the

* Published in *Herald*, Montreal, March 3rd.

previous night when the two planets were both in the finder of a telescope.

During the month he had lectured at St. Luke's, and received a most cordial reception.

Mr. Smith also illustrated by diagrams the present position of Mars, drawing certain markings at the pole and near the equator of that planet, that he had been able to see in his $8\frac{1}{4}$ inch reflector at this opposition.

The following paper on "The Zodiacal Light" was read from Councillor H. B. Small, of Ottawa:

The pale glow of golden light lingering after sunset in March, and heralding the sunrise as co-partner with the dawn in summer and autumn, has long troubled Astronomers to explain, and the question: "What is the zodiacal light?" still remains unsatisfactorily answered. In our latitude it can only be seen either before daybreak or after sunset, the thickness of the atmosphere obscuring it at other seasons. Near the equator, however, where the ecliptic rises high above the horizon, it is visible nearly equally as well all through the year.

Shaped like a cone, it reaches upwards some forty degrees from the horizon; a soft, faint column of light, more nearly resembling a sunlit, cloud-like haze, of such tenuity that stars are easily discernible through it. Last March it was peculiarly brilliant, and the most favorable season for its observation is usually from the beginning to the end of March each year. In the tropics, where the atmosphere is unusually clear, it has been traced right across the sky, from east to west, forming a perfect arch, and the query has been raised: Does it extend as a ring round the whole globe?

Various are the theories advanced to account for its presence, but probably the child who gazes on it with admiration, knows as much about it in reality (not in theory) as the most learned scientist who discusses its constituents, and writes long treatises on its probable origin. It has been considered to be a ring, like those around the planet Saturn, revolving around the Earth; it has been thought to be a collection of minute particles of meteoric or cometic matter, travelling round the sun in a very eccentric orbit; whilst another theory is that it is a continuation of the sun's corona, indicating a lenticular shaped atmosphere of inconceivable rarity, surrounding the sun and extending out near the plane of the ecliptic beyond the orbit of the earth. Another theory is that the whole space between the earth and sun is filled with an immense cloud of meteoroids, and that the sunlight reflected on these cosmical atoms of star dust is the cause of the soft, luminous glow which lingers in the western sky long after sunset. This theory is to my mind the most acceptable and probable, and is borne out in analogy by the red and glowing skies after sunset, apparent in 1883; presumably traceable to the vast clouds of almost impalpable dust that reached the upper stratum of our atmosphere from (or believed to be from) volcanic forces in the great Java cataclasm of that year, and which dust reflected back the sunlight to the earth long after that luminary had sunk below the horizon.

Cosmic dust is perpetually falling or being precipitated to the earth, but in such imperceptible quantities, that it is only an accumulation of centuries that attests its reality. In the "Challenger" expedition, meteoric dust (or iron dust) was found at the sea bottom in its deepest

soundings, precisely corresponding to dust accumulations in a room long unoccupied and undisturbed. In Spitzbergen, where no ordinary dust could prevail, since the snow and ice there are "palœocrystic," patches of yellow and black dust have been observed, the former, on analysis, proving to be carbonate of lime, the latter, metallic iron dust, both evidently of meteoric origin and precipitation.

To conclude, the supposition is that congeries of atoms form molecules, other molecules form particles, congeries of particles form meteors, congeries of meteors form worlds, worlds form systems and systems form the Universe.

President Smith read a paper entitled "Chaldean Astronomy and its connection with Modern Symbolism." The essay proved a most exhaustive one, and was exceedingly well received.

Each paper was followed by a most interesting discussion.

32ND MONTHLY MEETING.

This meeting was held in the Fraser Institute on the evening of May 4th, President Smith in the chair. Two new associates were elected. An application for admittance to the Association from a gentleman whose weather predictions have been the subject of considerable ridicule, was not entertained.

The President announced having lectured during the past month in St. Ann's Hall, Montreal.

Papers followed. One by Associate Rev. P. C. Lawrence of Charleston, S.C., on "The Darkness mentioned in Matt. 27," and the other by President Smith entitled "The Giant Planet," and dealing with the Jovian system, the appearance of Jupiter, his present condition, etc.

After discussion, the meeting adjourned at 10.15, until Friday Oct. 5th, subject to the call of the President during the summer.

33RD MONTHLY MEETING.

This, the first re-union of the session of 1888-9 took place at the Fraser Institute, Montreal, on Oct. 5th. Amongst those present were: President Walter H. Smith, Right Rev. B. B. Ussher, Messrs. George Creak, A. J. Pigeon, J. C. Weir, F. G. Payne, E. W. Beuthner, Sydney Ussher, Mesdames Smith and Beuthner. Three persons' names were nominated for membership.

The President announced with great regret the loss sustained by the Association in the demise of Treasurer Brown

on May 8th last. He paid a deserved tribute to the late Treasurer's memory, and it was moved by Mr. Creak, seconded by Mr. Pigeon, "that the Association sympathizes with Mrs. Brown, and as a slight mark of the esteem in which it held her husband, it is hereby resolved: That her name be removed from the list of ordinary and placed on that of honorary life members of the Association." Carried unanimously.

The question of printing an annual report was discussed, and it was decided to print the same as a supplement to the PLANETARY ALMANAC for 1889, Messrs. Smith, Pigeon, Creak and Beuthner being named a committee to prepare the same for publication.

The Officers for 1888-9 were nominated, (as printed on page 53), after which the President read an essay entitled "Glimpses of Jupiter," embracing the result of his observations on that planet during the summer, (as printed on pages 40-48), exhibiting a sketch-book filled with water-color drawings of which the engravings in this issue of the PLANETARY ALMANAC are selections.

The meeting adjourned at 10.25 to meet on Friday evening, Nov. 2nd.

SECTION A.—PLANETARY METEOROLOGY.

Only subjects dealing with Astro-Meteorology are discussed at the meetings of this section. The Chairman is Mr. Walter H. Smith and the Secretary Mr. A. J. Pigeon. On Feb. 17th, 1888, a most interesting session was held, the Chairman remarking at the opening, that Montreal might feel proud of having inaugurated an association for the special study of Planetary Meteorology, whose chief aim is to establish a system of weather forecasting at "long range." No Society of this nature, he believed, had existed prior to the foundation of this Association in 1884 since one presided over by Dr. Simmonite at Sheffield, Eng., in 1844.

SECTION B.—ASTRONOMY.

This section deals exclusively with astronomical subjects. The chairman is Mr. W. McNab, C.E., and its secretary Mr. E. W. Beuthner. Three meetings were held during the past session, viz: on December 16, 1887, March 16 and April 20, 1888.