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Astronomy and Meteorology.

No. 1.

MONTREAL, APRIL, 1887.

TEN CENTS.



Astronomy and Meteorology.

PUBLISHED MONTHLY BY

WALTER H. SMITH,

31 ARCADE STREET, MONTREAL, CANADA.

There will be no further issue of this paper unless at least two hundred subscribers' names at one dollar per annum each are received before April 25th.

Astronomy.

Nine comets were discovered in 1886.

Up to the end of 1886, Dr. Swift and his assistant discovered 540 new nebulae.

Zodiacal Light—that mystery attending our sun—is usually seen as an oval of hazy, nebulous light during the early evenings of April. Meteoric matter is the generally credited cause.

Warner Observatory has issued a nice pamphlet of some 70 pages, descriptive of the building, instruments, etc. There are also lists of the nebulae discovered by Prof. Swift, and the essays obtaining prizes on the subject of "Comets" and the "Red Sky Glows."

It seems to me that the *Sidercal Messenger* gets better every month. The February and March numbers are especially interesting. In them are to be found articles on such themes as "Astronomy and the Ice Age," "Meteorites, Meteors and Shooting Stars," "Kepler's Correspondence in 1599," as well as numerous "Editorial Notes" by Mr. Wm. W. Payne.

A congress of Astronomers is to assemble at Paris this month and discuss plans for a special survey of the sky. The heavens, from pole to pole, are to be

photographed, thus obtaining for the use of posterity, charts of the thousands—one might almost say millions—of stars revealed in the largest telescopes. The heavens will be divided up into portions, distributed amongst the different observatories, and the work, it is hoped, will be completed in about ten years.

Another object to be gained by thus carefully mapping the heavens, is the discovery of an ultra-Neptunian planet, by many believed to exist on the confines of the solar system. Left to chance for its discovery, it might be years, centuries, ere this far away orb is discovered. With the accurate charting now talked of, this faint body—less perhaps than a twelfth magnitude star—will, it is thought, be readily found.

The comet discovered by Dr. Thome, at Cordoba, on January 18, in the Constellation *Grus*, although not brilliant, has been visible to the unaided eyes of residents of the Southern hemisphere. The tail was at one time traceable for a length of about 30°.

It has been many times asserted in my hearing—generally by persons who should know better—that the public take no interest in astronomy, that, in fact, they can never understand the science. In its scientific, its mathematical sense perhaps not; but, that the public—or, at least, that portion of the public with whom I have come in contact—take a very great interest in the truths presented by the astronomer, I know to be a fact. It is the astronomer's own fault if he cannot make his truths entertaining, interesting and instructive.

But how do I know that the public take an interest in astronomy? First, from the eagerness with which any object of unusual interest in the heavens is looked at and talked of; second, by the many requests other writers, as well as myself, have from editors and others for "astronomical notes"; third, I know it by the immense amount of correspondence that reaches me; fourth, by the ever increasing interest shown in the work of the Astro-Meteorological Association; fifth, by the large audiences that assemble to listen whenever I lecture; and sixth, by the many requests I have had to commence ASTRONOMY AND METEOROLOGY.

The planet Jupiter has long been credited with a partiality for comets. Nearly all of these bodies of short period are thought at some time or another to

have been compelled to pursue new and more straightened paths owing to their having come within the giant planet's influence. But until now Jupiter was not suspected of having a predilection for asteroids. Prof. Kirkwood, however, has pointed out that an asteroid may yet be discovered with an aphelion more remote than Jupiter's perihelion. When this asteroid reaches its aphelion at the same time as Jupiter is at perihelion, he thinks that it may go hard with the asteroid, whose orbit may be entirely changed, perhaps made cometary instead of planetary.

PLANETS IN APRIL.

Jupiter, the golden hued, arrives at opposition to the sun on the 21st at 5 a.m. He is then at his most brilliant phase, rising before sunset, southing at midnight and setting in the twilight of the growing dawn. The large telescopes of most of the observatories will now busy themselves with him, and photographs of his belts and spots,—more particularly that one known as "the great red spot"—will be in order. His four moons, Io, Europa, Ganymede and Calisto, worlds in themselves, will doubtless be seen with more or less of markings on them, indicating, perhaps, seas and continents on these remote orbs. The owners of even the smallest field lenses can see these moons, in fact persons with extra good eyesight can sometimes pick one or two of the brightest up without other optical aid.

Saturn is overhead at 6 p.m. on the 8th, and is still well placed for observation, although by the end of the month he will have begun to draw visibly nearer the sun. On the 24th and 25th he is very close to *Delta*, in Gemini, a third magnitude star, *Delta* passing about 12' north of Saturn.

Uranus is overhead all night long, and favorably placed, having passed his opposition on the night of March 31.

Vesta, the largest of the asteroids, has been for some time visible in the constellation Virgo, N. of Jupiter, where she shines like a sixth magnitude star, but with a steady radiance.

Venus—well I need not direct attention to her, compelling, as she does, the upward glances of all who plod their homeward way about the time of the evening meal. She is always "fairest of stars, first in train of night," and bewitchingly lovely as she hangs out her scintillating lamp after sunset in the west.

Mars is invisible, passing conjunction (behind) the sun on the 25th.

Mercury may be picked up before dawn in the eastern sky about the 17th.

The Moon is near Saturn on the 1st, Uranus on the 7th, Jupiter 8th, Mercury 10th, Mars 24th, Venus 26th and Saturn on the 29th.

Ernhold Melbin;

OR,

THE WORLD OF MARS.

By Walter H. Smith.

"World of Mars:
Lives there a human brotherhood on thee,
Without the sins and errors of mankind."

CHAPTER I.

A CHANCE ACQUAINTANCE.

Since the present narrative concerns other people more than myself, it will perhaps be a sufficient introduction if I state that I take a considerable interest in astronomy, and that having been at the time of which I write a commercial traveller for a wholesale firm in London, England, my occupation necessitated my travelling considerably.

It was on the morning of the nineteenth of August, 1877, that I found myself *en route* from Bristol to London, via the Great Western Railway. I had a whole compartment of the first class carriage in which I rode entirely to myself for a considerable distance. When the train drew up at Clippenham Junction, I hailed a newsboy who was crying the morning papers just received from London by the down mail, and in so hailing the boy I attracted the attention of two travellers, who entered my compartment as soon as I had paid for my *Daily Telegraph*.

One of the newcomers appeared an ordinary looking man enough, with a sort of half policeman in plain clothes and half gentleman's servant air about him, coupled with a deprecatory manner that seemed to say "do not notice me, I prefer oblivion." Although usually of a conciliatory turn when first thrown into the company of strangers, I felt intuitively that to speak to this shy looking man would be looked upon by him as little short of an insult, and I turned my gaze on his companion.

He, I saw, was not, and probably did not wish to be considered a nonentity. As to his exact age I verily believe it would have taken a jury of experts to come to anything more than a hazy guess or general conclusion that he was not young. Still, a youth would have hesitated ere he called him old. His garments were not of the newest cut or fashion, he being apparently one of those who care little for dress; thinking more of the inner life than the outward look.

His glances were keen, yet exceedingly restless—his eyes never resting long upon one spot—and his movements were nervous and quick. His face was long and narrow—a Shakespearian one—or at least recalling the stern, intellectual countenances of the Elizabethan era. He had a thin beard and high forehead; a little too high perhaps for the modern phrenologist, who would have declared that the ideal portions of that brain overbalanced to an extraordinary degree the real, as well as too lofty for the ancient astrologer, (a set of men who once held much the same place as our phrenologists) for the old reader of planetary lore would, without a doubt, have calculated for the Ascendant Virgo;—Saturn in conjunction with the Moon—and then have decided that the native was of an exceedingly melancholy temperament, as well as a believer in visions.

A peculiar man this, thought I, but at that moment my eyes fell on my *Daily Telegraph*. I at once unfolded it and began to read.

Being something of an astronomer, my surprise and delight may be imagined when I read the following cablegram:—

WASHINGTON, D.C., August 18.—Prof. Hall, of the U. S. Naval Observatory at this place to-night discovered a second satellite circling the planet Mars, now nearing opposition. This last discovery is smaller in size and nearer the primary than the one discovered two nights ago. The larger satellite is believed to be not more than ten miles in diameter. There is no doubt but that these newly found celestial bodies are the smallest known. The new twenty-six inch refractor was the instrument used.

An interjectory Ah! having escaped my lips, was immediately seized upon by my old-young looking fellow-traveller as an excuse to strike an acquaintance.

"Anything new, sir?" queried he, with a peculiar twitch of the lips, that told of an exceedingly nervous temperament, and sensibilities strung to a high pitch.

Well, I thought, you are strange both in speech and manner my old-young friend; but civility necessitating an answer, I replied "Yes," handing him the newspaper with my thumb upon the paragraph.

Expecting that he would be considerably surprised, I was much surprised myself when he, having read the paragraph, quietly handed the paper back to me, saying with a sigh:

"Yes, that is true, quite true, but I knew it long ago."

"Indeed," I replied, half jestingly, for I doubted the assertion, "then you, I presume were the first discoverer of the Martian moons; but why did you not prefer your claim?"

A melancholy expression came over his countenance as he answered "Tush, it would have been useless, the world was then, and is now for that matter, too wise in its own conceit to have believed what I should have told it."

"But you could have demonstrated the fact by pointing the telescope wherewith

you made the discovery up to the Martian satellites, and compelling an incredulous world to witness for itself what it doubted."

"Had it been as you imagine, nothing were easier, doubtless," said my new acquaintance, "but I did not discover Phobos and Deimos—as I believe the *savants* intend christening them—with any application of the invention of the Florentine. Ah no!" he exclaimed, with a sigh, and speaking more to himself than to me, "not with thy optic lenses, Galileo Galilei, but by actual presence and sight saw I those pretty discs of light, as they swept across the Martian heavens; Yea, would that I could behold them now, and that all things were as then."

But here he began to recover from his reverie, and apparently remembered that he had been previously addressing me, for he said, spreading out his hands with a quick, deprecatory motion:

"Pardon me, sir, doubtless you think me mad, but—I am not mad, I assure you—No."

Whilst hastening to convince him that no such thought had entered my head, I remembered afterwards that the third passenger shifted on his seat, and seemed as though he were about speaking, but he did not. Continuing silent, he simply turned away—after a look at my companion—and stolidly gazed out of the window.

"You doubtless take a great interest in Astronomy, sir," I said, after a silence of a few moments.

"As a mathematician, No; life were too important to waste it in figuring and hair-splitting; but as a watcher of the orbs of light and a seeker after the truths that the All-Wise has written on His scroll of heaven, Yes."

"As a brother in Astronomy, might I request you to relate to me the circumstances under which your prior discovery of the moons of Mars was made? I urge this request with considerable curiosity, I must own, because, from your manner a few moments since, I feel convinced that much interest attaches to your story."

Without seeming to notice what I asked, he said, "Provided you had lost that which had been held most dear, that of all things most to be loved, cherished, idolized and guarded as sacred, would you care to converse about your misfortune? Would you not rather act as the strong man usually acts, eat your heart in silence, afraid lest the worldling with his cunning greed for gain should hear so much as a whisper of that which you cherished, and when heard, seek to turn that affection into ridicule, or worse, barter your story for gold?"

A strange look, which almost frightened me, here came over his face, but passed off rapidly, he saying, with a smile, ere I had time to reply: "But I have studied physiognomy somewhat,

and am not afraid of your lifting the curtain—at least without my permission—that has hitherto shrouded one portion of my life."

CHAPTER II.

THE YOUNG ASTRONOMER.

Having agreed that I would reveal nothing whatever my strange acquaintance might see fit to tell me, at least without first obtaining his consent, my fellow-traveller commenced his strange narrative as follows:—

"I promise you that it is a strange story that you are about to hear;" and he moved into the seat opposite mine, dropping at the same time his voice to a key that could barely be heard above the rattle and whirr of the train; "a very strange story. My name is Seybold Melvin." He here handed me a card on which was engraved, "Seybold Melvin, Grange House, Wilts." I replied by handing him a pasteboard from my own card case, when he continued: "I was born near Amesbury, a village on those Wiltshire downs where the intrepid Alfred conquered the fiery Danes. My birthplace stands within an easy walk of that marvel of antiquity, Stonehenge. My parents, fortunately or unfortunately, according to the light in which you choose to view the question, were sufficiently wealthy to preclude the necessity of my looking forward to a life of toil in order to gain a livelihood. It is possible, that, had I been ordinarily robust, they would have deployed me into the ranks of one of the learned professions in order to keep me from too rapid a pursuit of my hobbies, but this was not found practicable. The grand and sublime, both in nature and art, when continually encountered in one's youth, to leave ineradicable traces upon the mind through life. Whatever nineteenth century reasoners may have said to the contrary thus far, I maintain that the Bard of the Lakes spoke the truth when he declared that

'The child is father of the man.'

It was therefore small wonder if I—an only child—delighted more in lonely rambles than in the companionship of other children of the same age; my mind continuously feasting on the lonely grandeur of the great plain around me, until before I had reached the age of twelve years I had become noted for my fondness for solitude, and an affection for the poetical ideas wherewith what is termed 'Popular Astronomy' abounds. It also grew to be a delight with me to wander amongst those fallen or leaning masses of stone,—over which a world marvels—and there to indulge in the most poetical reveries, until for me

'Time would run back and fetch the age of Gold,' and I could almost imagine myself a denizen of that past, concerning which we know so little, and consequently are prone to imagine so much.

"If my waking moments were colored with the reveries and fantastic ideas of a romantic student and recluse, what shall I say concerning my sleeping ones? In early boyhood even, amidst visions of exploration and discovery I often sank to rest, so that it was little to be wondered that my dreams were full of imagined adventures. Adventures, too, of the most marvellous nature, amidst surroundings and people of which no geography I owned made mention. But, as I grew to manhood, my visions shaped themselves toward a centre, and at length a face, shrouded in masses of golden hair, reproduced itself continually. In time I grew enamoured of my vision, it became my ideal, and asleep or awake, I at last finally resolved to attach myself to none other than the beauteous counterpart. With such a resolve, day by day I grew more and more misanthropical and pre-occupied.

"When fairly in my teens, it was my father's wish to send me to Cambridge University, but about the same time I was afflicted with a severe nervous affection,—of which I still bear traces—and all manner of study was forbidden by my physicians. I felt keenly being debarred from the privilege of reading my beloved books,—chiefly poems of the sixteenth and seventeenth centuries, and astronomical works—this to me was worse than the malady. As for the proposed terms at Cambridge I cared little or nothing for the loss of them, shrinking as I did from any contact with the world. Time, which cures all things, restored me at last to health, but with a frame sufficiently impaired to preclude all idea of my ever entering college.

"With a fair prospect of wealth and a dislike for the companionship of persons of my own sex, it was considered peculiar that I was not attracted by some young beauty of the opposite, but not one I saw pleased my fancy, much less approached my dream ideal, and I remained heart whole. I admit that I often felt strange, unaccountable longings for the presence of that ideal, whom I imagined I should find some day, somewhere or somehow; and these longings I persisted in cherishing, notwithstanding their apparent fallacy. I think that most youths and maidens of a thoughtful or 'intense' frame of mind are cognizant of similar longings, which sometimes take a considerable while to combat; nor is this to be wondered at if we consider such images in the light of ideal creations formed out of the best thoughts of our better or 'innermost' selves; shadowing forth all that we consider great and good in mankind. Some think—I cannot say that I lean to the opinion—that these imagined shadows of purity are spirits, or at least persons of a higher order of being, whose desires are akin to our own; still the sequel might lead a wiser man than I to some such conclusion. But to return.

"My sickness, if it debarred me from reading, allowed more time for observation, and I made use of my hours of convalescence to continue my study of the heavens. Every constellation was mapped by my busy brain, every visible star noted, and I delighted to watch these, evening after evening, searching out the various groups, fancying figures—as did the ancients—amongst the stars. But, had the whole host of fixed stars been blotted from the firmament, I had scarcely murmured, since beyond and above them in my estimation were those

'Five other wand'ring fires that move
In mystic dance.'

Planetary observation grew in fact to be with me a consuming study. I could barely wait for the shades of evening to prevail, and would be at my look-out as the rooks winged their way homeward toward sunset. I often arose at midnight and walked forth under the stars, or just ere the Sun ascended went out to study those brilliants that hide themselves near the rays of the god of day. I needed no instructor to point me out those five steady glowing spheres amidst the thousands of twinkling stars. Even the wanderer Mercury,—so hard to locate with the unaided eye in this latitude,—was no unfamiliar orb to me, and at every elongation, east or west, evening or morning, my keen vision picked him up, for all the twilight and horizon clouds.

"When my strength returned, I sought and obtained permission from my father to build an observatory near those gigantic stones that had themselves often assisted the Druids, doing crude duty for a similar purpose in the days of old. I cannot attempt to express the satisfaction that I felt when my observatory was at length finished, and the large lens—obtained from London at considerable cost—finally adjusted, had been placed in position, tested by terrestrial comparisons, declared perfect as could be, and I was left alone, master of that great eye, capable of searching the abysses of space. That first night of actual telescopic observation is one of the remembrances of my life, only overshadowed in importance by one of which I shall speak later. I recollect that the magnificent orb of Jupiter was fortunately nearing opposition at the time, and a grander sight than the giant planet with his rosy bands and roving satellites it was impossible to conceive.

"I need not describe in detail my work as an observational astronomer, suffice it to say that I made a few discoveries. After I had become thoroughly used to the 'seeing' of my telescope, the time approached for a very favorable opposition of Mars. I made every preparation for this event, amongst other things resilvering my reflector, and procuring more powerful and perfect eyepieces.

(To be continued.)



Weather Forecast.

APRIL, 1887.

Writing on March 9th, just as we in Canada have experienced the first real break in the almost continued cold that settled down upon us here at the beginning of December; just as the first migratory birds have begun to put in an appearance, and the unprecedented falls of snow—which fell as forecast—have begun to give place to balmy breezes and showers; if I had now nothing else to go by except the laws of general compensation or the theory of weather relationships, I confess that I should perhaps be at a loss to know what to forecast. Why? Because the heat and drought of the summer of 1886 has been followed and fully compensated (as I expected) by extreme cold spells—we recorded 26° below zero here on Jan. 9th, 1887, the coldest for years—and by very heavy downfall. Talk of snow! why it has done nothing else but snow all winter in this section. Railways, roads, streets have all been blocked worse than the oldest inhabitant remembers. But what says Astro-Meteorology concerning April? She says that the month will be warm and dry for the season, with hot, advanced spring weather in the south and south-west, and fine, growing, warm, but dryish terms in the east and north. Vegetation will advance rapidly, especially about the perigee passage of the moon during Good Friday week and the positions favoring mild weather that take place during the last days of the month. The apogee passage of Luna on the 19th, and the opposition of Jupiter on the 21st favor a cold relapse toward wintry weather. Frosts and cool storms may then be looked for. Although the melting of the snow to the north will cause floods in sections, parts of this continent will report a scarcity of water. Navigation will open comparatively early. Below is my forecast by weeks:—

April opens cold, "borrowed days," with snowfalls in Northern sections.

Week ending April 9th: Opens fine, frosts North, cool weather South—High winds, unsettled, dull, dark, rainy, sleety or snowy, according to locality—A spring-like change—decided heat, with thunder showers to the South.

Week ending April 16th: Begins with a brief storm period, probably snow in the Province of Quebec and Gulf—Fine, seasonable, some warm days—Windy and rainy at the close of week, cool to cold, with April showers.

Week ending April 23rd: Enters showery and windy—Cold weather for the season, with snow flurries N. and cool rains S.—Milder, fine, with strong N.W. winds—End of week stormy, with hail and thunder showers in the S.W. and S.

Week ending April 30th: Begins hot and dry for the time of year, with warm winds and generally favorable weather for the crops—Showery, cool and wet at the close.

NOTES.

There may be a scarcity of April showers, but the May flowers will likely be all right.

Indian corn should do well this season as the summer promises quite a few terms of extreme heat. For best times to plant, see Smith's *Planetary Almanac*.

My paper on "Some recent weather relationships," read before the A. M. A., on Dec. 3, forecast: "Much heavy precipitation, most of it probable in the natural winter form of snow during the winter months of 1887." Was I right?

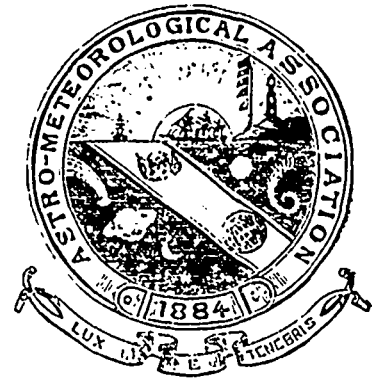
"In the South and South-west, winter," according to my *Planetary Almanac*, was to "end about the 9th or 10th with a mild period." A warm term covered the whole of the American continent on the dates named. At Montreal the general expression was "Spring is here."

During April I recommend proceeding with sowing and planting vigorously, especially on dates recommended in the *Planetary Almanac*. The spring bids fair to continue warm and advanced generally.

It will generally be found that those who talk loudest every spring in anticipation of floods, have some pet theory or scheme for flood prevention, which they wish to present to the public "for a consideration."

It looks as if the "May water" in the St. Lawrence, Ottawa and tributary rivers would be high this season. The immense accumulation of snow has to find its way out by these channels, and the denuded forests now permit the sun to melt it all "with a rush." Beside, there has been but one short thaw all winter, giving but a thin crust of ice in one place to the snow, and the sun will the easier penetrate. Lumbermen take note.

Without anything else to go by, I might easily forecast a "Summer on the warm side" by remembering that the period of sun spot activity is drawing towards a minimum. The past cool to cold summers have been periods of considerable solar activity, and the present period of quiescence is favorable for an excess of warmth.



[In launching forth upon my present venture, I do not know that there is much to explain. I have been told that there is plenty of room for my little monthly, and I have taken my friends at their word. They say that they wish to hear from my associates and myself more often than once a year, and my associates themselves declare that the Astro-Meteorological Association, from being a very "little one" is rapidly becoming "a thousand," and, as it grows in size, strength and beauty, naturally needs a mouthpiece of its own. In future, all who wish to hear of our meetings, papers and general progress will find full information in *ASTRONOMY AND METEOROLOGY*, the recognized organ of the Astro-Meteorological Association.]

Association.

FEBRUARY MEETING.

INAUGURAL AT THE FRASER INSTITUTE—INTERESTING ESSAY ON "PRE-HISTORIC ASTRONOMY."

The twentieth monthly and twenty-first regular meeting of the Astro-Meteorological Association was held at the Fraser Institute, Montreal, on the evening of Friday, February 4, 1887, at 8 o'clock.

There were present: Messrs. Walter H. Smith, (Presiding); Councillor Webster, Secretary Brown, Treasurer Austin, Associates: the Right Rev. B. B. Ussher, A. J. Pigeon, E. W. Beuthner, P. Charbonneau, H. Wray, W. T. Thomas, J. S. Vipond, J. Frutier, A. Hulek, Dugald Macdonald, Sydney Ussher, Mrs. Brown and Mrs. Smith.

After routine and the nomination of members for election at next meeting, it was unanimously resolved to appoint the Right Rev. B. B. Ussher, M.D., to the vacancy on the council.

The Bishop having thanked the meeting in a few appropriate words, letters from Vice-presidents Heatwole, (Va.) and Plumadore, (N.C.) were read.

A proposal to hold a fortnightly meeting was negatived, the president having been requested to lecture on Feb. 24, before the Congregational Union of St. Bartholomew's, Montreal.

Attention having been called to the partial Lunar Eclipse on Feb. 8, and a

number of minor matters discussed, President Smith read the following paper on "Pre-Historic Astronomy:—"

The traveller in a desert, who reposes delighted beneath the shade of a palm tree at an oasis, may not think of the sources of strength and nourishment below him, around the trees' deep roots, hidden in the sand, gathering sustenance and increasing during the passing years. The modern astronomer, like, yet unlike the traveller, safe beneath the shade of the glorious temple that science has perfected, and whose foundations are deep on the rock of unchanging truth, cannot help but remember with reverence and gratitude the stupendous achievements, the herculean labors, the mighty tasks that his predecessors have accomplished, as well as the unconquerable persistence of purpose exhibited by them.

I know it is customary, when reviewing our so-called "progress," to sneer at the accomplishments of our predecessors, to look with pitying eye, and turn with scornful lip from the labors of earlier generations. Such shallow minds apparently forget that

"Great events from trivial causes spring," and fail to remember that if there were no acorns there could certainly not be any oaks.

I have often thought what a satisfaction it would be, could we, in tracing backward, lay a finger finally upon the first astronomer and say it was in this or that mighty mind our science had its beginning. We cannot do this, but we can, nevertheless, see him "in our mind's eye." Not perhaps "in the first age of mankind," as affirmed by Rolleston, because I conceive that the exigencies of existence in those barbaric ages were too great for man to find time to permit his mind to soar upwards in contemplation of sun, moon and stars. Pre-historic, primitive man, must have been too preoccupied in his daily struggle for very existence—his hand naturally turned day and night against the overwhelming forces of nature which it was his unenviable lot to contend with. The earth was his—true, but he had to subdue, to conquer it, and in that contest, of which we can now only form terrible conjectures—when the gigantic mastodon and the mighty mammoth roamed the primeval forests as well as when every man's hand was turned against his fellow, little time could have been left for anything else, much less devoted to star gazing.

Centuries ran their course, the earth became less wild, and the mind of man, not entirely occupied with a perpetual struggle for existence, had time for contemplation, time for thoughts beyond self and its preservation. Familiar with its surroundings, the soul filled with a longing for the Infinite, the eye would naturally wander heavenward and the brain busy itself with problems—speculations, the magnitude and difficulty of which, we, after others

have solved them for us, can have no conception.

Astronomy, naturally, intuitively, was the first-born of the sciences. In fact it must have been almost coeval with mankind. Certainly co-existent with the dawn of civilization. Bailly asserts that astronomy began when the summer solstice was in the first degree of *Virgo*, that is, about 4,000 years before Christ. Bailly and others suppose it to have originated amongst an ancient civilized people, living in about 40° N., and that this people was swept out of existence by some sudden destruction, leaving only traces of their knowledge behind. He believed, in fact, that the first astronomers were antediluvians, and their destruction, the Noachian deluge. To this people he attributes a knowledge of the true system of the world—as enunciated in modern times by Copernicus and Galileo—the return of comets; the exact measure of the earth; the starry nature of the galaxy and the plurality of worlds. From this people the Chinese, Babylonians, Persians and Indians he declares originated, and the traditions of the Persians, Arabs and Hebrews are said to substantiate his theory.

Sir W. Drummond affirms as a fact which cannot be disputed, that at some remote period there were astronomers who knew that the earth, itself a planet, revolves around the Sun. According to Origen, as far back as the time of Enoch, the constellations had already been named and divided.

Be this as it may, it seems to me that the first astronomers must have been shepherds, whose business led them to watch and tend their flocks. While primitive man slumbered or caroused, they needed to be on the alert to guard their charge from human or animal robbers. Weary with the length of their vigils, without any method of computing time, it was but natural that such men should turn their eyes towards the heavens, and these would soon become the dial on which the watches of the night were recorded. Their work, their discoveries, their mapping of the heavens, have survived, not only their existence, but the rise, the fall of States and Empires, have remained for thousands of years, and are likely to endure as long as science has a votary.

Let us stand beside those primitive observers and count with them the secrets which the starry vault yielded, after years of patient watching, toil and labor. The moon, because of her size, and above all—her changes, must have been the object first watched. On that birth night of astronomy, perhaps she was but a thin crescent alongside some bright star, say *Aldebaran*, in *Taurus*. Her place, supposed fixed in the sky, is marked down. The succeeding night she is again noted. She is discovered to have increased in light, the circle of illumination is wider, and more wonderful still she appears to have

moved! *Aldebaran*, last night to the east of her, is now to the west! Surely there must be some mistake. Once again, her position is accurately noted, and perhaps for verification, a rough diagram is cut in an adjacent stone. The third evening arrives, and one by one the larger stars drop into sight. There can now be no mistake, the diagram on the stone proves it—the moon is discovered to be moving among the stars. Marching steadily along, she was found to make an entire circuit in the heavens, until she once more reappeared, a thin crescent in the evening sky.

Discovery must have led to discovery. These primitive astronomers doubtless concluded that, if the moon made the whole circle of the heavens in a given time, that at similar changes she would always be alongside similar stars. This was found not to be so. In her successive revolutions from "full" to "full," she was found ever lagging behind, and to be apparently moving backwards among the stars. This led to the additional discovery that the constellations along the moon's path were constantly moving to the west, being absorbed in the sun's rays, and finally re-appearing before sunrise in the east. Thus it became apparent that the sun was also moving slower than the moon, and that finally, after the lapse of what was found to be a year, he had returned to his original position. The sun's motion was found to coincide with the seasons; the seasons were attributed entirely to him, and it is small cause to wonder that, in those early ages men, unacquainted with the majesty of the infinite, worshipped the sun as a god, mistaking the creature for the Creator. They accordingly celebrated his solstices when he was highest or lowest, with great solemnity about the dates that we celebrate Christmas and St. John the Baptist days, and his equinoxes when he moved from one declination to another, at the time when we celebrate Annunciation and Michaelmas.

In watching sun and moon, the need of tracing their paths through the heavens led to the mapping of the stars into groups; hence the great antiquity, long anterior to the days of the Egyptian astronomers, to whom these figures are wrongly ascribed by Arago—of the signs of the Zodiac. The vernal equinox is at present in the Constellation *Pisces*, in the days of the Jews and Greeks it was in *Aries*, the former taking the latter sign, the lamb, as their symbol; earlier still the vernal equinox was in *Taurus*, the Bull, proved by the reverence shown that animal by the ancient Egyptians. Earlier yet, it was in *Gemini*, a time looked back to by those we call the Ancients, as the "Golden Age" of love and prosperity, when all things multiplied and were abundantly fruitful.

In tracing the Sun's course from North to South,—from midsummer to mid-winter—the shepherd astronomers were

doubtless led to invent the gnomon, or sun dial. The increasing or decreasing length of the shadows of tree and rock where shelter was sought from the fervid heat of the noonday sun, led to the discovery that the shadows would mark, with a degree of certainty, the limits of the sun's motion North and South, as well as serve to denote the changes of seasons and the actual length of the year.

Engaged in watching the moon and tracking the sun through the constellations, it could not have been very long ere one or more of the planets, those "wanderers among the stars," were discovered. In his early attempt to read the handwriting on the heavenly scroll, man up to a certain point must have believed that only the sun and moon were apparently on the move, and that all the bright points of light were eternally fixed in the star sphere. The first planet discovered must have been Venus, she being the brightest of the heavenly host; next the moon. Noticed as a star, near the sun; the first brilliant to appear in the evening skies, her position would be found to change until it could not be disputed, but Venus was moving out from the sun. Here was a discovery! What conjectures must they have hazarded, those primitive astronomers, as Venus, like a smaller moon, moved slowly on. Would she, like the moon, complete a circuit of the heavens, and finally be overtaken by the sun? Time alone could answer this question. Time and watching did answer it. When about a sign and a half [45°] from the sun, Venus was seen to hesitate, to stop on the celestial course, and then oscillate back, allowing the sun eventually to overtake her, when she became lost in the brightness of his beams. And so the early astronomers named Venus a planet or "wanderer."

Discovery again led to discovery. Groups of stars that were lost in the solar rays in the evening, were found to finally reappear before daybreak in the east. Venus would be watched until she also reappeared as a "morning star," when, still moving among the stars, she would be traced through a similar course as when she had been an "evening star." The discovery of one led to that of several other planets. Jupiter, Mars, Saturn and Mercury must have followed in the order named. A belief in the existence of a planet beyond Saturn is said to have existed amongst pre-historic astronomers, and the discovery of Uranus in the eighteenth century by Sir William Herschel may only have been a re-discovery after all.

Astronomy by this time had become a science. Its votaries were already able to predict with considerable accuracy the length of the day, season and year, as well as the return of moon and planets to their original positions. The prediction of eclipses would follow in time—

not perhaps to the moment, as with us, but at least to the day. The watching of the moon's phases and the phenomena observed at eclipses revealed to those primitive watchers the fact that the moon shone with a light borrowed from the sun, and that she sometimes passed over the sun and stars. Her place in space was accordingly defined as nearest the earth.

We need not to trace the mind of man as it slowly toiled onwards, overcoming its difficulties and deducing from the night watches of ages the fact that Mercury and Venus were near the sun, that Mars, Jupiter and Saturn were beyond, and that the stars were beyond all. Sufficient has been said to show that astronomy had its original home somewhere in those eastern lands, where all religion, all tradition, seems finally traceable, that it arose in one place, because ancient nations, widely scattered, Persians, Hindoos, Chinese, Egyptians, Chaldeans, all divided their week into seven days, all called those seven days by similar names, all dedicated one day each to sun, moon and the five visible planets.

Shall we, armed with the appliances of science, whose telescopic vision reaches the clustering of thousands of stars apparently without limit or number; we, whose universe has been extended until there seems no limit to vision; we, who find thousands of suns where those ancestors of ours had to be content with star points; shall we, I ask, despise the minds in whom our science had its beginning? Is not the tree known by its fruit? The astronomical germ, fructifying in the earliest ages, should be just as precious to a true astronomer as the latest discovery of a perfected science. If we have risen, it is owing to our earlier co-laborers. Inseparably joined, the astronomer of the present stands stretching out one hand forward to the astronomer of the future, and groping with the other hand for the astronomer of the past. Of the men who have belonged to the past, the present astronomer says, slightly paraphrasing Walt. Whitman's words:

"We use them, we do not cast them aside—we plant them permanently within us, We fathom them not—we love them—there was perfection in them also. They furnished their parts toward eternity, great or small, they furnished their parts."

Meeting adjourned at 10.20.

MARCH MEETING

OF THE CENTRAL COMMITTEE—SUCCESSFUL LECTURES—"ASTRONOMY AND METEOROLOGY"—THE CONDITION OF MARS—ICE AND ICEBERGS.

The twenty-first monthly and twenty-second regular meeting of the Astro-Meteorological Association (Central Committee) took place at the Fraser Institute, Montreal, on Friday evening, March 4th, at 8 p.m.

There were present: Messrs. Walter H. Smith, (presiding); Secretary J. Brown; Treasurer M. Austin; Associates: A. J. Pigeon, E. W. Benthner, P. Charbonneau, H. Wray, J. S. Vipond, J. Parratt, Mrs. Smith, Mrs. Parratt and Mrs. Brown.

The minutes of the previous meeting having been read and confirmed, the President announced that a large audience had assembled to listen to his illustrated lecture "The Worlds around us" at St. Bartholomew's on the evening of February 24th, and that owing to the lecturer's then success he had been requested to re-deliver it before St. Jude's congregation on March 10th. (Applause.) He further remarked that it gave him great pleasure to see so much interest awakened on the subject of Astronomy and Astro-Meteorology.

The following were then declared duly elected associates: Rev. W. Henderson, Glencoe, Ont.; Messrs. H. Wray, Sydney Ussher and J. S. Vipond, all of Montreal.

Nominated for election at next meeting: Messrs. R. Bickerdike and J. Parratt, Montreal.

Letters relating to Association matters were read from Vice-Presidents Mansill and Test and Councillor Murray.

Applications for information regarding the Association and its work were received from the Rev. G. Blair, Prescott, Ont. and W. H. Bartholomew, Vanessa, Ont.

The need of an organ for the Association was then discussed at length, the President reading a number of letters urging the immediate commencement of *ASTRONOMY AND METEOROLOGY*, to contain, amongst other matters, full reports of Association meetings. It was finally decided to support Mr. Smith in any venture of this nature he might see fit to undertake.

Meteorological reports were received and taken as read from Messrs. G. W. Redman, Indiana; R. Bueglass, Ont.; T. Birt, Utica, N.Y.; W. S. Wood, Wisconsin; M. T. Cole, Malone, N.Y.; L. Headley, Illinois; E. W. Barnard, Vermont; John S. Horne, New Hampshire; A. M. Moore, S. C., etc.

Notice was called to the verification of the theories of astro-meteorologists, who had looked for earthquakes at the two last ecliptic conjunctions of the sun and moon in August and February.

Mr. Smith made some remarks on the planets in March, directing members' attention to the visibility of Mercury, then about 5° N.W. of Venus in the evening sky, as well as the visibility of the asteroid Vesta, like a star of the sixth magnitude in the constellation *Virgo*, about 10° N. of Jupiter. He also directed attention to the occultation of *Alpha Tauri* (Aldebaran) by the moon on the evening of March 29th. Disappearance at 7.44 and reappearance at 8.50 p.m. Washington time.

The following papers were then declared ready for reading: "Observations on Ice and Icebergs" by H. A. Clift, Q.C., Harbor Grace, Newfoundland; "Geology and Genesis" (second paper), by W. J. Brown, Brooklyn, N.Y.; "Volcanic Eruptions of Mauna Loa" by D. Logan, Honolulu; and "The Thermal Condition and Color of Mars" by A. J. Pigeon, Montreal.

The President remarked that the eruption of Mauna Loa, on Jan. 17, had occurred with Mars at perihelion, Uranus "stationary" and Mercury in aphelion.

It was decided to hear Mr. Pigeon's paper first.

In his essay Mr. Pigeon apportioned the seasons on the ruddy planet as follows:—

Spring 191, Summer 181, Autumn 149, and Winter 147 days. The meteorology of Mars was described as similar to that of the Earth, the summers, however, being less hot and the winters less cold than ours. This theory Mr. Pigeon attempted to prove by maps of his own construction, showing clearly the winter snow and the ice caps of the Earth and Mars. Snow, it was mentioned, sometimes reached down as far as 30° N. on the Earth, but on Mars it was seldom noticed south of what coincides with the latitude of Cape Farewell, Greenland. Eminent astronomers, such as Lockyer and Schiaparelli, had watched the snow on Mars melt down from 28° to 7° in a little over two months. The thermal poles of Mars, like those of the Earth, it was explained, did not coincide with the poles of longitude. In warm summers the polar ice cap of the Earth melted away to 25°, or 1,500 geographical miles. On Mars, under similar conditions, the polar cap melted down to 7° or between 60 and 70 miles. Such facts as these went a long way toward establishing the fact that life might exist on Mars. The ruddy appearance was also considered, Mr. Pigeon believing it due to some element in the Martian atmosphere having the property of absorbing the blue and violet rays, and transmitting the red and yellow rays only. The paper concluded with a thorough description of the spectrum analysis made by Vogel, and expressed a hope that the very favorable opposition of 1892 would allow of the solution of the questions as yet unanswered by telescope and spectroscope concerning the condition of Mars.

The paper was illustrated by slides specially prepared from photographs by Mr. Pigeon.

A discussion followed in which the President read a chapter from his romance "The World of Mars" the beginning of which is now first printed in ASTRONOMY AND METEOROLOGY. The chapter described "Dave's Continent" in 15° N. Martian latitude, and mentioned the probable geographical strata, forests, agriculture, irrigation, methods of locomotion, etc., on that part of Mars.

Mr. H. A. Clift's paper on "Ice and Icebergs" descriptive of the packing and opening out of the ice off the coast of Newfoundland, and the relation of meteorology to the well-being of the seal fishery, the most important industry of that part of Newfoundland, having been read, the meeting adjourned at 10.15 to meet on the evening of the first Friday in April.

"Why do you have lady members?" was a question recently put to me, as president of the Astro-Meteorological Association. My reply was: "Because ladies often make more efficient workers where the object to be obtained is not lucre, as well as for the reason that some of our best astronomers have been ladies in the past. Take the late Caroline Herschel for instance, and remember how for more than forty years she assisted her brother William, how she published a catalogue of stars and prepared another of nebulae and clusters, and finally received as a reward of her labors the Astronomical Society's gold medal. Then there was Jeanie Dumée, who successfully studied the Copernican theory; Marie Caunitz, who helped her husband make up his mathematical tables; not to speak of Mrs. Hall, whose energy is said to have greatly helped Prof. Hall in his discoveries of the moons of Mars a few years since."

Correspondence.

All letters should be addressed:—
"Walter H. Smith, 31 Arcade Street,
"Montreal, Canada." For a personal
reply enclose stamp.

WANTS THE LECTURES PRINTED.

[1.] Your monthly will, I know, be decidedly nice, and should be popular. Will your lectures "How I forecast the Weather," and "The Worlds Around Us," be printed in it?

Malone, N.Y.

M. T. C.

Ans.—Yes, in future numbers, if space permits.

LUNAR INFLUENCE ON VEGETATION.

[2.] In your *Almanac* you offer to give information in regard to planting, etc. Please tell me, 1. At what times to set out strawberry plants. 2. How prepare the ground. 3. When best to plant rose slips.

Harrisonburgh, Va.

C. C.

Ans.—1. March 28 from 5.35 to 8.00 p.m. March 31 and April 1, 5.20 to 7.45 p.m. (☾ in ♈ with ☽ rising). 2. Cultivate deep, dress with well decomposed manure, and carefully pulverize the soil. 3. April 7 and 8, 5.00 to 7.05 p.m. (☾ in ♈ rising).

FOUND THE FORECASTS CORRECT.

[3.] In comparing your forecasts with my journal for the months of Jan. and Feb., 1887, I find a pretty near agreement, and up to this date (8th) for March, correct.

Utica, N.Y.

METEOROLOGIST.

THE MILD CHANGE CAME.

[4.] The sun is out (Mar. 8) for the first time for several days. It is mild and pleasant. No wonder, for on turning up your *Almanac*, it reads:—"Fine, a mild change, spring-like."

Washington, D.C.

C. R. F.

Meteorology.

Bishop Clut was at Good Hope, N.W.T., from October 1, 1885, to May 1, 1886, during which time the thermometer never rose above zero. In February, 1886, it was 52° below. The bishop reports having seen ice on Great Slave Lake as late as July 3, and on the McKenzie River—the latter beyond the Arctic circle—as early as Sept. 17.

December in Canada was remarkable for the number of depression areas which swept over the country. It was also noticeable for its low temperature. The average was below the normal except in Nova Scotia and British Columbia. The snow and rainfall was heavy.

The mean temperature at Montreal for December was 14° 21', or 4° 32' lower than the average. For January the mean was but 6° 78', or 4° 67' below the average.

At Toronto, the mean temperature of 1886 was 43° 71'. The highest recorded was 89° 5' on July 6, and the lowest 22° 8' below zero on Feb. 5. The yearly range was 112° 3'.

Excessive precipitation characterized January in Quebec, the Maritime Provinces and British Columbia.

The Dominion Meteorological Service issued 659 predictions in January, of which 480 were fully verified, or 72.8 percent. Will some reader send the number of forecasts in my *Planetary Almanac* fully verified in his section that month?

January in Canada was also remarkable for its storms. The average temperature was below the normal in Manitoba, Ontario, Quebec and New Brunswick.

February at Montreal gave ten days with readings below zero, the lowest being 11° below on 2. The highest reading was 45° on 8, and the mean, 13° 97', as against 15° 81' for the past 13 years. Snow and rain fell on 16 days, the former to the amount of 34.1 inches, and the latter 0.79 inch. The maximum barometer was 31.006 on 5, the highest recorded in 13 years.

At Toronto, Ont., the month of February was remarkable for its precipitation, the amount exceeding the average by 1.23 inches. This was only exceeded in the years 1851, 1857 and 1876. The snowfall (21.6) was 4.4 inches above the average. The total snowfall for the three months ending Feb. 28, was 5 feet 3 inches, or 1 foot 2 inches above the average. From November 6 to March 6 snow fell on 57 days. The forecast of "heavy precipitation" was evidently exactly verified at Toronto.

At Quebec, on March 8, there were 108 inches of snow on the ground, an amount not exceeded since 1873. The coldest day at the Ancient Capital was Dec. 30, when the mercury sank to 26° below zero. The coldest day in January was the 19th, 25° below; February 13, 14° below; and March 5, 20° below.

Montreal boasts a citizen who is "moon-blind," in the shape of a sailor who slept on deck one moonlight night during a voyage in the tropics. The next night he began to fall over everything, and has been "moon" or "twilight blind" ever since.

When the afternoon sun shines through a grey, watery haze, expect precipitation before daybreak next morning.

Lunar halos are not the sure indication of rain or snow that many suppose.

That barometric waves move across this continent, similar to waves over the ocean, may be often noticed. We frequently find that a depression exists on both sides of an area of high pressure, that, in fact, it is raining or snowing to the East and West, while in our locality it is clear.

CANADA'S CLIMATE.

A great deal of misapprehension exists respecting the climate of Canada. The fact is, it is one of the finest and healthiest climates in the world. A great deal is also said of its low temperatures, but these "cold dips," it should be remembered, never last more than a few hours, perhaps a day or two at the outside, in Eastern Canada. At such times the atmosphere is bracing, not to say exhilarating, and a few degrees of cold more or less is not felt. From about the end of March, when snow generally disappears, sometimes right up and into December, the ordinary weather of the North temperate zone obtains. The hot spells of July and August never reach that extreme experienced further south, and on those rare days when the mercury does get up in the neighborhood of 90°, after sundown there is almost invariably a cool breeze. "Bad sleeping nights," so common below latitude 45°, are a great rarity in Canada. The mean temperature of 44° 3' at Montreal, 44° 1' at Toronto and 43° 1' at Halifax for a period of years, proves that the climate of Canada

is not anything like as terribly cold as its enemies make it out to be. If it were, maize would not ripen, or small fruits flourish in such abundance. As a means of clearing away misbeliefs regarding our climate, the completion of the Transcontinental line of the Canadian Pacific Railway has done much. We now know for certain that it is just as easy to keep a railway open all winter to the north of the International boundary as it is to the south of it.

SPECIAL WEATHER REPORTS.

ILLINOIS EAST.

February's general characteristics here were cloudy, damp, foggy weather, a great many sudden changes and considerable electrical disturbance. Only four clear days. More rain than in several previous months together. Your forecasts for the month were remarkably correct.

Casey.

G. W. REDMAN.

NEW YORK NORTH.

The lowest reading for February here was 16° below zero on 13. Highest, 35° above on 10. On the 27-28 a high west wind prevailed for 36 hours.

Malone.

M. T. COLE.

WISCONSIN.

February's noon record gave a mean temperature here of 27°, compared with 24° 6' in 1886, 20° 11' in 1885, and 24° 07' in 1884. The total snowfall was 19 against 7 inches one year ago. Max. noon temp, 48° on 15; min. temp. 4° on 4. Slight rains 7 and 14. A big blizzard with 6 inches snow on night of 17. The mercury has been down to 30° below, and from 20° to 30° below several times in the early mornings. Only 10 clear or fair days. When rains and floods were raging in Ill., Ohio and Ind., we had snow and zero weather. The month left us with fully 15 inches of snow.

Shawano.

W. S. WOOD.

NEW HAMPSHIRE.

February entered mild, with snow on the 2nd and 3rd. Snow again on 6, 8, 11, 15, 18, (9 inches) 22, 24 (12 inches) and 25 (6 inches). The month closed with snow three feet on a level. A very cold and stormy winter here thus far. Rain fell on 11, and warm weather for the season occurred on 16.

Melvin Village. JOHN S. HORNE.

MASSACHUSETTS.

The mean temp. of February was 25° 1' against 26° 3', the mean of the past 48 years. The max. was 42° and the min. 4°. The month was dark, cold and stormy, there being but 10 days when the sun shone brightly. Wild

geese were noticed flying N. on the 17th. Robins and bluebirds were heard the same day. The precipitation was unusual. Heavy thunder shower, 18. The aggregate of melted snow and rain was 4.89 inches. The aggregate snowfall of the winter to the end of February amounted to 70.27 inches.

Worcester.

J. BRAINERD HALL.

VIRGINIA.

During 1886, there were 117 days on which rain fell, 23 of snow, 123 clear, and 102 cloudy, without precipitation. The Spring average temp. was 57°; Summer, 75° 2'; Autumn, 39° 5' and Winter, 31° 6'. Mean for the year, 55° 7'. Lowest, 12° below zero; highest, 95°. The deepest snowfall amounted to 18 inches; longest interval without rain, 13 days; highest wind, 66 miles per hour. One marked feature of '86 here was its heavy and unprecedented rainfall (78.41 inches). The extremes of temp. were not so marked as in former years.

Dale-Enterprise. L. J. HEATWOLE.

Planetary Influence.

The science of Astro or Planetary Meteorology is based on observation as well as theory. The latter supposes that the planets, including the earth and moon, are magnets, drawing out or repelling, as the case may be, the sun's heat. In passing around the sun, the planets are continually coming into conjunction, opposition, or other aspect, and the amount of magnetism, heat, electricity, call it what you will, is continually being shifted. Every atom in the system—yes, the universe—acts on every other atom, and, as the sun raises the temperature, and the moon the tides, so sun, moon and planets move the air, and change the electric currents as they flow from the north and south magnetic poles and back again. Grand sun storms have coincided with the farthest reaching auroral displays on earth and changes in the belts of Jupiter.

My weather records are voluminous, my correspondence is large as well as from various parts of this continent, and I have no hesitation in saying that the times of the perihelion and aphelion passages of the planets and the ecliptic conjunctions of the sun and moon coincide almost invariably with the worst disturbances. What little success I have achieved in "long range" forecasting has been due to a consideration of this and similar apparent facts. Seventeen consecutive cases of Mercury at Perihelion, for instance, have given atmospheric disturbances every time at Montreal within 24 hours of the passage.