



TRANSACTIONS

OF THE

LITERARY & HISTORICAL SOCIETY OF QUEBEC.

SESSION 1870-71.

PAPER I.—OPENING ADDRESS—"REVIEW OF THE
PAST YEAR: MOVING ACCIDENTS BY FLOOD
AND FIELD."

By DR. W. J. ANDERSON, PRESIDENT.

(Read before the Society, Nov. 16th, 1870.)

[Continued from the Gazette of Friday, December 30, 1870.]

THE ECLIPSE OF AUGUST 7TH, 1869.

The total eclipse of the sun of August 7th, in 1869, attracted very general attention, and several expeditions were sent out by various Governments to observe and report on it. It so happened that through the instrumentality of our senior Vice-President, Commander Ashe, the superintendent of the Observatory here, the Dominion Government was induced to send a party under his control, to Jefferson City, in the far West. Commander Ashe selected as his consorts, our then President, the Revd. James Douglas, and Mr. Falconer, of Bath, England,—and on his arrival at Jefferson he had the good fortune to be joined by Mr. Vail, of Philadelphia, and Mr. Stanton. Captain Ashe reports: "By Friday night all preparations were made, and we retired to rest with great doubts about having a fine day. However, Saturday came at last, and the morning was hazy and overcast; but about eight the clouds began to break, and Mr. Vail and I took observations for 'time.' The afternoon was cloudless; but still a haze near the horizon. At half-past three, we 'beat to quarters.' Mr. Douglas shut himself up in the dark room; I took charge of the telescope; Mr. Stanton with a light cloth covered and uncovered the 'object glass.' Mr. Vail had his telescope nicely adjusted; and Mr. Falconer was seated in a very good position to observe the dark shadow crossing the country, and to note any other phenomenon. At 3h. 35m. 40s., local mean time, the first contact took place, and the first photograph taken, showing a slight indentation on the sun's limb. We took the partial eclipse with an eye piece, giving a three inch picture; but as it was hazy, I removed it before totality, and took the photographs in the principal focus."

You will observe that the eclipse occurred in 1869, consequently it cannot be recorded as an event of 1870, but as our Vice-President was the astronomer, and our then President, the photographer of the expedition, and as their papers on the subject which enrich this year's transactions, were read to the society in the session of the present year; and further, as Captain Ashe's report has given rise to a controversy still undecided, I think I can introduce it to your notice quite legitimately, and I have great pleasure in directing attention to Mr. Douglas' paper on "Recent Spectroscopic Observations of the Sun, and the Total Eclipse of August 7th, 1869," which will be found to contain the most valuable information on the subject down to the present time; and to Captain Ashe's paper, entitled "The Canadian Eclipse Party, 1869," which a distinguished American astronomer has styled, "A draught of sparkling Astronomy," and which goes

"From grave to gay; from lively to severe."

I shall only further say here, that Mr. De la Rue, the Astronomer Royal, and some American astronomers, have taken exception to Commander Ashe's photographs, alleging that their most interesting feature arose from movement of the telescope. Captain Ashe still holds with some reason to the reliability of his photograph, and is able to give mathematical proofs for his belief, and has certainly got his opponents on the hip; one having clearly pointed out that the telescope must certainly have moved to the right, while an equally high authority who supports him, avers that it undoubtedly moved to the left—which involves an awkward contradiction.

The Royal Society commenced observations on the spots of the sun, two hundred years ago, and since then a host of eminent men have successively given their views, including among the more recent observers in England, the younger Herschel, De la Rue, Lockyer, and a host of others; on the continent, Fraunhofer, Jaussen, Vogel; Professor Young of Hanover, in the United States, and in Canada, our own Vice-President, Commander Ashe, and though they have done much by the aid of the spectroscope, to show what is the physical constitution of the sun, still it appears to me that as yet the darkness is rendered more visible.

The most noteworthy feature in the records of this, as of former eclipses, is the very wide range of differences in the estimates of the various phenomena. Thus in the eclipse of 1842, M. Petit, at Montpellier, estimated the width of the corona at barely one-fourth of the moon's diameter; while Baily, who then first observed with attention the phenomenon since known as "Baily's beads"—considered the corona about twice as wide. To Struve, the Prussian astronomer, the corona appeared still wider. "It is interesting," says a writer in the "Cornhill," "to notice these discrepancies between the observations of modern astronomers of repute for accuracy and observing skill. It shows that the differences recorded in the aspect of the corona, are not due to such errors as unpractised observers might be expected to make."

Whatever may be the extent of the corona; whatever may give rise to it, "it is a fitting crown of glory for that orb, which sways the planets by its attraction, warms them by its fires, and pours forth on all of them the electric and chemie influences which are as necessary as light and heat for the welfare of their inhabitants."

We all have heard of the *odium theologicum*, and the great affection which the members of the medical profession bear to each other: we are told that hawks (that is to say, lawyers) will not pick out hawks' een; but when I read of the extraordinary things which some of these celestial allege they have seen, and the cool way in which their brother astronomers give them direct contradiction, I am lost, not

"in wonder, love and praise," but in wonder and a *maze*. I am comforted, however, with the knowledge that I do not stand alone, for here is what another has written:

"A Comfortable Prospect.—The spots on the sun have given rise to much controversy among scientific men. Some hold the theory that the heat of the sun is maintained by the falling-in of planets, as lumps of coal are supplied to a furnace, and that the spots on the sun's surface are the furnace doors open to receive the fuel, meteorites being pieces of slag thrown off, which become reduced to very small portions by the long journey they have to make. But some carry this a good deal further, and believe that a distillation of matter is to take place, and that the whole of the systems of worlds are to be reduced to ashes and to be redistilled into a gaseous form, preparatory to a new creation taking place. The exact date of this event has not been given, but it is made out on purely philosophical principles. It appears to be something like the three wonderful Bedouin brothers. One jumped down the other's throat; the second jumped down the throat of the third; and he, with superhuman exertion, jumped down his own throat and disappeared from society. 'Retardation' in the case of the heavenly bodies, is to do it all. Nothing can be simpler. By the process of 'retardation' in space, all the planets must fall into the sun; the suns in their turn are to fall into each other, 'each time' (how wonderfully accurate is science) 'augmenting their heat-giving power, as their mutual masses increase.' There is something a little hazy about the word mutual, as so applied; but as the subject itself is a little hazy, it may pass. The result is what the unfortunate dwellers on the planets have to look to, and that is, as we have stated, that 'ultimately,' how long is not stated, and Time is the great consoler, there is to be nothing in the world but gas. There is so much of 'it' just now evolved in the public utterances of our great men, that really the theory does not seem to be so improbable as might be thought."

Addison makes Cato say:

"The stars shall fade away, the sun himself
Grow dim with age, and nature sink in years."

And another poet tells us:

"The sun is but a spark of fire,
A transient meteor in the sky."

Shakespeare also says:

"The cloud-capt towers, the gorgeous palaces—
Yea, the great globe itself, and all that it inherit—
Shall dissolve, and, like the baseless fabric of a vision,
Leave not a wreck behind."

Our religion teaches us likewise, that this earth shall be destroyed by some mighty catastrophe; not by any slow process, however, but in the "twinkling of an eye."

I do not believe that the sun wastes his strength, and that he would become completely exhausted unless he were renovated by meteors and comets. I believe that, as in electricity and magnetism, where there is a double action continually going on, the same ray of the sun which sends his heat to us also returns it to him; consequently, there is no waste. Byron, in his apostrophe to the Ocean, says:

"Dark-heaving, boundless, endless, and sublime—
The image of Eternity—the throne
Of the Invisible."

"Unchangeable, save to thy wild waves play;
Time writes no wrinkle on thy azure brow;
Such as creation's dawn beheld, thou rollest now."

What the "Great First Cause" is in general creation, I believe the sun is, in his own system, and that we may in truth apostrophise him in the words of Byron:

"Such as creation's dawn beheld, thou rollest now."

Something more than barren theory is likely, however, to arise from the observations with the spectroscope into the physical constitution of the sun, if the following can be relied upon:

"Use of Metals as Fuel.—An English inventor proposes to substitute metals for coal as fuel for ocean steamers, and has taken out a patent for a method of carrying out his views, his object being to obtain a larger amount of steam from a given quantity of fuel. When coal is burnt, the solid coal is turned into gas, a large portion of heat becomes latent and is wasted by volatilizing the solid. The oxygen of the atmosphere is a gas by reason of the large amount of heat combined with it. When zinc, iron or manganese is burned, the resulting oxide is a dense solid; little or no heat is wasted, as it is not turned into vapour. In addition to this, the inventor obtains the chemical heat latent in the oxygen of the atmosphere, and the result is, that one pound of zinc will evaporate more than four times as much water as one pound of coal, the advantage of which, on long sea voyages, is obvious. The zinc or other metal thus becomes a vehicle of power, much larger than can be obtained from the same weight or bulk of coal, and the oxide of the metal may subsequently be reduced at any convenient place where coal is accessible. The following is the manner in which it is proposed to carry out this invention: The furnace of the boiler is divided into two or more parts; first, the hearth, or grate, on which the metal is burned (in this description we will confine ourselves to the metal zinc); secondly, a chamber behind the hearth to collect the oxide. In the case of tubular boilers, the heated gas from this chamber is made to circulate through the tubes. The furnace has the bottom and sides, and sometimes the top also, of brick, fire-clay, or any other refractory substance. The air is admitted over the combustible metal, or a blast through the same; in the latter case pipes are built in the bottom or sides of the furnace.

"Whether this method will prove practically successful or not, it is certainly based on sound principles. Every one knows what a small proportion of coal, compared to the iron, is used in the furnaces of iron foundries, and how the partial combustion of the iron itself increases the heat derived from coal. If stoves could be built that would burn iron, it would doubtless be as cheap a fuel as coal, perhaps cheaper."

THE ECUMENICAL COUNCIL.

"There is not, and there never was, on this earth, a work of human policy so well deserving of examination as the Roman Catholic Church. The history of that church joins together the two great ages of human civilization. No other institution is left standing which carries the mind back to the times when the smoke of sacrifice rose from the Pantheon, and when camels and tigers and lions bounded in the Flavian amphitheatre. The proudest royal houses are but of yesterday, when compared with the line of the supreme Pontiffs. That line we trace back in an unbroken series, from the Pope who crowned Napoleon in the nineteenth century to the Pope who crowned Pepin in the eighth; and far beyond the time of Pepin the august dynasty extends, till it is lost in the twilight of fable." The opinions here expressed by Macaulay have been shared by many; and when it was announced towards the close of the last year, that the Roman Pontiff, Pío Nono, whose lengthened and eventful reign had already been rendered remarkable by changes spiritual and temporal, not only within the territories of the church, but among the great nations of Europe which acknowledged his spiritual sway; when it was officially announced that a council of the dignitaries of that church, such as had not been held for three hundred years had been summoned, and that the princes of the church were gathering to Rome, from Greenland's icy mountains and Africa's golden sands, "all the world wondered," and the attention of

thinking men Protestant, as well as Catholic, was excited, and continued with more or less interest to watch its proceedings from 8th December, 1869, its opening, to mid-summer, 1870, when the long-disputed dogma of Papal Infallibility was affirmed, but not without opposition from a powerful minority.

THE PAPACY.

The Council had scarcely adjourned when the necessities of the Emperor Napoleon compelled the withdrawal of the French troops from Rome, and the 20th September will be ever held in memory on account of the surrender of Rome on that day, to General Nino Bixio, the commander of the Italian army; and thus the temporal sovereignty of the Pope has apparently fallen,—having endured upwards of eleven centuries. Some have called this the fall of the Papacy, which others consider erroneous. The rules of our Society wisely prevent us from discussing matters religious and, political, and this pertains to both; but it is not out of order to note the historical fact, and it may also be permitted to state that there exists much difference of opinion, not among Protestants only, but among Catholics themselves, on the question, some maintaining that the loss of the temporal power may involve the breaking-up of the whole grand fabric, and bring about the destruction of the spiritual power; while others as confidently assert that this was all that was wanted, and that the laying down of the temporal sword will increase the power of the sword of the spirit, and that all Catholic nations will henceforth yield to the spiritual Pope a more willing and thorough obedience. It must be noted, however, that Pío Nono himself has entered his most solemn protest against what he deems an act of spoliation, and that he has been joined in this by prelates of the Catholic Church in the British dominions as well as elsewhere.

OBITUARY.

As interesting Quebec, I may refer to the recent death of Archbishop Baillargeon, a man fervent in spirit, zealous in good works, of a deep but unostentatious piety, of great humility, and abounding in Christian charity. He was endeared to every member of his own church, and respected by the Protestant community.

Canada has also, this year, to deplore another "great man fallen in Israel," in the person of the late Revd. Alexander Mathieson, of St. Andrew's Church, Montreal, who ministered to its congregation for nearly half a century. His bearing to the community in general was marked by affability and courtesy; while his congregation looked upon him as a father. The poor were the especial objects of his care. His death marks an epoch, not only in St. Andrew's Church, but in the courts of the Presbyterian Church of Scotland in Canada, where he always occupied a prominent position.

In the general obituary, the world has to lament the premature death of Charles Dickens, the great novelist, moralist, and lay preacher, at a time when his sun was still shining bright in the high heaven of literature. It has been truly said, that in all that he has written, not an expression can be found which could raise a blush on the cheek of maiden innocence. It may be also alleged of this great magician, as of Shakespeare, that "all who have studied his successive approaches to perfection, must see that he united the closest study to the keenest observation; that he attained the highest pitch of dramatic art, and the most accurate philosophy of the human mind; and that he was a profound artist, and not a blind and wildly-luxuriant genius."

FIRE.

1870 will be ever memorable for the conflagrations which have devastated several portions of the Dominion.

On Tuesday, 24th May, at 1 a.m., a serious fire broke out in the suburb of St. Rochs; and notwithstanding the energetic exertions of the citizens, and the active aid of the soldiers of the garrison, before it was subdued, 300 houses were consumed.

Then followed the calamitous fire in the Saguenay district, which inflicted great suffering on the inhabitants, and which might have been much more severe had it not been for the energetic conduct of a few men connected with the district, who by their prompt action with the government, and with their influence in the great cities of the Dominion, were enabled in a very short time to forward to the sufferers, supplies that were needful.

The community had scarcely recovered from the alarm produced by these great fires in the Province of Quebec, when it was called upon to sympathize with Ontario under an equally great affliction. In Ottawa, Carleton, and North and South Lanark counties, the fire raged with terrible fury. I have been unable to lay my hand on the statistics in connexion with the fires in the Lower Province, but it is stated that in Ottawa county 240 families, in North Lanark 40 families, in South Lanark 60 families, in Carleton 600 families, in all 900 families, were rendered homeless.

Some may look upon these visitations as direct from Providence. But with the experience of the past, who can doubt that they originated in the utter carelessness and improvidence, of man, who, totally regardless of past experience built up a suburb of materials which must sooner or later provoke its doom? It may be supposed that this assertion will not apply to the fires in the woods; but there can be little doubt that, though there was less criminality involved, they also originated in carelessness. I think that there was criminality in connexion with the fire in St. Rochs, but I do not wish it to be inferred that I point to incendiarism; on the contrary, I think the criminality attaches not to those alone who erected the wooden buildings in defiance of the law of the land, but more to the municipal authorities who closed their eyes to the fact that such buildings had been erected. Still greater will be the responsibility should in the future any buildings of combustible material be permitted to be erected within the limits of the corporation.

THE EARTHQUAKE.

On Thursday, 20th October, I was sitting in my parlor in Berthelot street, reading a biography of the Archbishop which had appeared in the *Journal de Québec*. I had just reached

the conclusion of the Archbishop's remarks to the students, and was reading its concluding words, "*Se ita ad astra*," when I thought my Newfoundland dog had got into the room and was scratching himself below the table; but looking below, I found I was mistaken, and at once became sensible that it was an earthquake. I mechanically got up, and taking out my watch, and making allowance for a few seconds lost, I found that it was just 23 minutes past eleven; the force of the motion very much increased for about a minute, but I could not say that it was in any given direction. I cannot describe the motion better than in the language of Scripture; "the earth trembled and shook." At 24 minutes past eleven, the motion was so violent that my heart sunk within me, as I thought the house was about falling; at this moment my daughter came into the room, and, placing her hand on my shoulder, said, with accents and look of great terror: "Oh, father, I am dreadfully frightened." At that instant the force suddenly ceased, and I noted a slight tremulous motion for thirty seconds more, when everything was still. I held my watch in my hand for five minutes more, expecting a second shock, but there was no repetition. Nothing was displaced in the room, though everything, especially articles on the sideboard, participated in the motion. My sister, who happened to be in the hall, felt the shock very slightly. The servant, had we not talked of it, said she would have thought it was only a cab passing. The shock was felt very differently in different parts of the city. Some estimate its duration at 30 seconds, some at three or four minutes; some felt two shocks after a short intermission, some only one, protracted, but increasing and diminishing in power. Mr. Peebles says it was felt very severely at the Gas-Works, and that there were two shocks, with a distinct interval. I am not aware of any one noting the time of duration by watch but myself. I asked Captain Ashe, who, I thought, would most likely have observed, and he told me that though he had an excellent opportunity of noting the time, having been in the Observatory; yet he was so absorbed with the violence of the motion that he had not thought of it, but he was under the impression that it had lasted about three-quarters of a minute. Putting all accounts together, it was the most severe shock felt for two hundred years in Canada; and if the accounts received are reliable, it was attended with great destruction of property and serious loss of life in the neighbourhood of "les Eboulements" and St. Paul's Bay.

Dr. Smallwood, of the Montreal Observatory, has published some very interesting notes on the meteorological phenomena which he observed. According to his statement, the shock occurred at Montreal at 11.17, just six minutes in advance of Quebec; and the direction seemed to have been from S.W. to N.E., and the tremulous wave of motion was of ten or twelve seconds' duration; and after an interval of a few seconds, a second shock occurred, of less duration and of less intensity, lasting only from five to eight seconds. He gives the following account of his observations of the usual meteorological phenomena of the few days preceding the earthquake and up to two o'clock on Thursday afternoon, the 20th of October:

"Rain fell on the thirteenth day, followed by a rise in the barometer, and a splendid display of the aurora borealis on the night of the fourteenth day. Numerous and very large spots were present on the solar disc, and which had been the case for some considerable time, more especially during the presence of the aurora on the nights of the 23rd, 24th, 25th and 26th days of last month (September).

"The maximum reading of the barometer at seven A.M. on the morning of the sixteenth day indicated 30.215 inches, and was succeeded by a very fine, warm day, the mean temperature of which was 63.9 degrees, wind S.W. Showers of rain fell on the 17th, from ten A.M. till three P.M., with a west wind, and with a falling barometer, which at nine P.M. of that day stood at 30.000 inches. From one A.M. of the 18th (Tuesday), a very rapid and sudden fall was observed, viz. 0.639 of an inch in six hours; and it attained its minimum, 29.361 inches, at seven A.M. on that day.

"From that hour, a gradual and somewhat sudden rise took place, accompanied by a very heavy gale of wind. The clouds were passing from the west, but the wind veered to all points of the compass. The register of the anemometer at the Observatory shows a complete disc of concentric circles, with a velocity varying from thirty-five to fifteen miles per hour.

"There was also a rise of 0.507 of an inch in the barometer, with a falling temperature. Frost occurred during the night, and a good breeze continued from the west. The thermometer at seven A.M. showed 33.1 degrees, and the barometer 30.070 inches.

"From this time the temperature rose and the barometer fell, and this morning, at 7 A.M., stood at 29.499 inches. Rain set in during the night, and at 7 o'clock 0.214 of an inch had fallen: thermometer, 42 degrees; wind, S.W.; mean velocity, 3.14 miles per hour.

"At 11 h. 17 m., Montreal mean time, a very considerable shock of an earthquake was felt generally throughout the city; its direction would seem to have been S.W. to N.E.; the tremulous wave of motion lasted for from 10 to 12 seconds, and was succeeded by a slight interval of a few seconds, when a second shock occurred, of less duration and of less intensity, lasting from five to eight seconds. No wave of sound was perceptible, and the wave of motion was undulating and in a straight line (rectilinear), and of considerable elevation. Domestic articles rocked to and fro, but no damage to buildings has resulted.

"The magnets were very sensibly affected at 10.30.

"The barometer is still falling. At two P.M. it stood at 29.299 inches; thermometer, 44.8 degrees; wind S.W., with rain.

"Professor Kingston telegraphs me that the magnets at the Toronto Observatory showed slight shocks at ten minutes to eleven."

N.B.—Though it was felt on the surface above a mine in the Eastern Townships, it was not felt in the mine itself. Quebec observers say the motion was nearly from east to west.

(TO BE CONTINUED.)

