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# THE CANADIAN JOURNAL.

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## THE PRESIDENT'S ADDRESS.

BY THE HON. VICE-CHANCELLOR MOWAT.

*Read before the Institute, 21st January, 1865.*

GENTLEMEN OF THE CANADIAN INSTITUTE :

I feel deeply the great honor you have done me in asking me to become your President. The honor was a most unexpected one, and I confess it was not without some feeling of dismay that I learned that your choice had fallen upon me. I knew well the value of your Association, having, indeed, been a member of the Institute almost ever since its establishment; but the learning with which my busy life has made me familiar is not the learning which you cultivate; the sciences which I have made a special study, and the arts with which I have had to deal, are not the Sciences or the Arts to which, under your Charter, your attention is restricted. But the choice of me for your President is not my act, but your own: and I feel that it would be unbecoming and ungracious of me to decline the position amongst you which it is your wish, for some reason or other, that for the present year I should occupy.

Your Institute has two objects in view. First and principally, you desire to do something for the advancement of Science. You have done something for it, and will, I doubt not, yet do more. You number amongst your members some who have already a European reputation; and many of the papers which have been read and discussed at your meetings have been deemed worthy of publication

in some of the leading scientific journals of Europe. Your own Journal, in which such papers first appear, has already attained distinction among periodicals of the same character.

But you have had it also in view to induce a more general attention amongst the Canadian people to the objects of Science ; and, in the observations I am to make upon this occasion, I am sure that I shall have your indulgence, though I should chiefly keep in mind this part of your design, and though I should speak from the stand-point of a politician and a public man—a character which it is but a few weeks since I ceased to fill, rather than profess to speak from the stand-point of a man of science—a character to which I do not venture to make any pretension.

The worth of the Canadian Institute has not been altogether unrecognized in the Councils of the Province. Parliament has for many years been in the habit of making to it an annual grant. Our country is under popular government, and the mass of electors, or indeed of their representatives, make no claim to science ; and it is therefore gratifying to know that to some extent they appreciate the value of scientific pursuits. Our fellow Canadians are almost all engaged, as in a new country like this almost all must be engaged, in the struggle to obtain for themselves and their families the means of subsistence, or to add to these some of the comforts of life. Yet they have certainly shewn some ability to recognize, and some disposition to encourage, pursuits entirely foreign to their own, and of which, therefore, it always needs a considerable amount of intelligence to perceive the claims or the utility. This disposition will, I trust, gradually increase ; but that it now exists to the extent it does, is a fact of peculiar interest in view of the work which our statesmen are at this moment engaged in, of laying the foundations of a nation of which Canada will long be, and will perhaps always be, the most important portion : a nation, though still receiving, and wishing to receive, its Chief Magistrate from the sovereign of the Fatherland : a nation, though still cordially recognising the supremacy of the Imperial Parliament : a nation, not independent of any other, but continuing, and preferring to continue, part of the country from which we have sprung ; of the country whose language we speak ; whose institutions we adopt or imitate ; whose history is our own ; and which, in science and literature, in freedom and power and wealth, in the purity of its statesmen of all parties, and

in the patriotism and morality of its people, has long been regarded as second to no nation of any age. This England, with which the Canadian people desire a perpetual connexion, is greater and better, and more to be respected, imitated and loved, than the England of a century ago to which the American colonies of that day gave many proofs of deep attachment. She treats her colonies, too, with a generous consideration and a wisdom then unknown: and while the desirableness of continued connexion with the old land, has, in consequence, greatly increased, the distance between Britain and America, which was, formerly, one great difficulty in the way of long-continued connexion, has, through the progress since made in scientific knowledge, ceased to be any difficulty. Steam has brought us nearer, for all practical purposes, to the Motherland, than, at the period referred to, some portions of the British Islands were to each other; and for part of one ever memorable day, the 5th August, 1858, science accomplished even more than this; for, on that day, so far as relates to mutual communication, it annihilated all distance between us; and now we have again the gladdening news that a new atlantic cable is nearly completed, and probably will, before the year expires, renew the magic connexion between the old world and the new, never again to be broken.

In view of the contemplated union I have referred to, the men of Canada are daily reminding one another that we shall start on our new career with a population of nearly four millions: and that the increase of our population has always been, and is likely to continue, in a ratio far exceeding that of which European nations have had any experience. Our fellow subjects to whom the subject is interesting, (and to whom is it not interesting?) are calling to mind, that, in this population, there are half a million and more of able-bodied men between the ages of 20 and 45 to defend our country and our homes, from foreign aggression. They are referring to our vast grain fields, our extensive timber lands, our invaluable fisheries, our gold and copper mines, and our other yet almost undisturbed mineral deposits. They are reckoning up that the confederation, without taking into account the great North West, will embrace thirteen millions of acres of cultivated land; thirty millions of uncultivated in the hands of private owners; and many millions more that are still in the hands of the Government; that the exports of fish alone

will amount to ten millions of dollars ; that a year's produce of its fields and gardens will be worth one hundred and fifty millions ; that the present assessed value of the farms within its territory is upwards of five hundred millions ; and that the real value probably upwards of half as much more. But to the present provinces, with all these vast resources and all this great wealth, our statesmen are hoping soon to add the great North West, with its rich expanses of fertile prairies, and its treasures of gold, and iron, and coal, and salt ; and are reminding us that this North West Territory contains more land suited for the permanent abode of men than Canada itself does ; and that, including this territory, our British American Nation will be capable of supporting a population more than double that of the British Islands. It is remembered, also, that it is across the territory of this British American Nation there is to be found the shortest and cheapest route for the great railway which must one day be built to connect the Pacific with the Atlantic. Our politicians are calling to mind that the climate and soil of all these territories are precisely those by which the skill and energy and endurance of the human race are best developed ; that here thought and labor are the conditions of man's existence, but yield abundant rewards whenever they are faithfully bestowed. In view of all these facts, the Canadian people feel that the elements of Empire are here ; and so they are. But in the great scheme thus absorbing the public mind in British North America, are there no points which Science touches, and which may without impropriety be alluded to in this assembly of the learned ? I think there are. For the prospect before us increases immensely the importance of every agency that is fitted to advance the reputation or to mould the character of the people of this new nation ; and I look on the Canadian Institute, and the objects it has in view, as having a very close connexion with both our reputation and our future character as a people.

It is to be remembered, for example, that in connexion with the continuance of British supremacy, the contemplated scheme also involves an extension of power in some respects to the Canadian people. Our present institutions are popular institutions. For more than a score of years our people have been accustomed to self-government. Their local municipal affairs in town and country are in their own hands ; and their municipal councils have larger powers than those of

Great Britain. Once every year the people choose anew who shall exercise for them these powers; every township by itself; every county by itself; every village; every town; and every city. Almost every one who rents a cottage or owns a shanty has a vote in the selection. The whole land is divided, too, into common school sections; and the school trustees of every section are also the nominees of the people. Both houses of Parliament have a similar origin, though longer terms of office. The power thus already possessed by the people has sometimes been used well and sometimes ill, as all power is, by whomsoever held, and as power in the hands of imperfect men always must be. But it is satisfactory to perceive some of the past results of popular power in our country. What for example has been done for education? What appreciation has been shown of higher learning? What recognition has there been of the claims of science? All these things interest us as members of the Canadian Institute; and the answers to such inquiries are not discouraging.

The position and character of our public schools, the attendance at them, the amount raised annually by voluntary taxation for their support—all have been increasing in a greater proportion than our population or our wealth. We have in Upper Canada one magnificent University, endowed by the public and open to all. We have several denominational colleges of most respectable character, some, if not all of them, open also to every one; and supported, either wholly or chiefly, by the voluntary contributions of the people of the various religious denominations with which they are connected.

To go a little more into detail, I would remind you that over and above the endowment out of which the Provincial University and the Upper Canada College are maintained; and over and above the Grammar School fund in Upper Canada; and the endowments of the Universities and Colleges of Lower Canada, and of the denominational colleges of Upper Canada; that over and above all these, the grants made by the Canadian Parliament for the year ending 30th June, 1864, for common and superior education, amounted to upwards of \$300,000; and that in Upper Canada that portion of this sum which goes there to Common Schools and Grammar Schools, was supplemented from local sources, chiefly by self imposed taxes on the school sections and municipalities, by an amount equal to five times the Government grant, making the public expenditure for the year, in Upper Canada alone, for Public Grammar Schools and Common Schools, to exceed a million and a half of dollars.

The grants to other literary and scientific institutions amounted to \$14,800; of which \$750 went to you, \$4,800 to the Provincial Observatory here, \$2,400 to the Observatory at Quebec, \$500 to that at Kingston, and \$500 to that at Isle Jesus. I may observe, also, in connexion with these grants to Observatories, that the Legislature has made provision for records being kept of meteorological observations in every county through means of the grammar school teachers.

The Provincial Observatory at Toronto was established by the British Government twenty-five years ago, as one part of a scheme which has been admirably characterised by high authority as "the most gigantic scientific enterprise that had ever been conceived." The scheme was organized by the British Government through the united influence of the British Association and the Royal Society; but other European nations immediately took an active part in it. To carry it out, Magnetic Observatories were simultaneously established by governmental authority, at an enormous but not useless expense, at many points in Europe and America; and the number of well endowed Meteorological Observatories throughout the world has greatly increased since. Some years ago the Observatory here was assumed and amply endowed by the Canadian Government, and substantial buildings were erected for its use. The very great value of the observations made here has received the emphatic and repeated testimony of the highest scientific authorities of other countries, as well as of our own. I refer to this matter with all the greater interest because the advantages which the Observatory contemplated were not local or even immediate. It is only in connexion with observations elsewhere that those made here are very important; and whatever benefit they afford, other countries must partake of quite as much as Canada can; and it is even future generations, rather than our own age, that may reap their principal fruits.

So, again, I ought to refer to the Geological Survey of the country; for both our Geological Survey and our Provincial Magnetic Observatory are named with satisfaction wherever science is cultivated and knowledge esteemed. The Survey was instituted by the Provincial Government soon after the union of Upper and Lower Canada, and has been carried on steadily ever since. By the act first passed on the subject, the sum of \$10,000 annually, for five years, was set apart

for the purpose of the survey. At the end of these five years, the act was renewed for a like period. In 1856, the sum theretofore appropriated having (as another act, passed in that year, declared,) been found insufficient to carry out the survey in an effectual manner, and it being deemed by Parliament to be desirable that such an increase should be made to the establishment as would hasten the completion of the undertaking and enlarge its usefulness, the annual appropriation was raised to \$20,000, and was continued for five years more. In 1864, annual grants of varying amounts having been made during the three intervening years, Sir William Logan represented to the Government of the day the advantages that would result from being saved the necessity of making an annual appeal to Parliament; and I had, with other members of the Opposition, the pleasure, in the last session of my parliamentary life, of supporting a vote, recommended by the Government, of \$20,000 a year for a further period of five years from the 1st of January 1864.

Besides the direct and obvious practical advantages which this survey has yielded to the Province, it has done much to make the name of Canada familiar to men of science in Europe; and it has also served to advance geological science itself. Not to multiply the evidences of this, with which many of you are so familiar, I venture to read here the reference to the subject which was made by Sir Charles Lyell, the President of the British Association for the advancement of science, at the last meeting of that learned body.

Sir Charles refers to two points on which a gradual change of opinion had taken place among geologists of late years; and after disposing of the first of these two points he proceeds to say:

“In reference to the other great question, or the earliest date of vital phenomena on this planet, the late discoveries in Canada have at least demonstrated that certain theories founded in Europe on mere negative evidence were altogether delusive. In the course of a geological survey, carried on under the able direction of Sir William E. Logan, it has been shown that, northward of the River St. Lawrence, there is a vast series of stratified and crystalline rocks of gneiss, mica-schist, quartzite, and limestone, about 40,000 feet in thickness, which have been called Laurentian. They are more ancient than the oldest fossiliferous strata of Europe, or those to which the term primordial had been rashly assigned. In the first



place, the newest part of this great crystalline series is unconformable to the ancient fossiliferous or so called primordial rocks which overlie it; so that it must have undergone disturbing movements before the latter or primordial set were formed. Then again the other half of the Laurentian series is unconformable to the newer portion of the same. It is in the lowest and most ancient system of crystalline strata that a limestone about a thousand feet thick has been observed, containing organic remains. These fossils have been examined by Dr. Dawson, of Montreal, and he has detected in them, by the aid of the microscope, the distinct structure of a large species of Rhizopod. Fine specimens of this fossil called *Eozoon Canadense*, have been brought to Bath by Sir William Logan, to be exhibited to the members of the Association. We have every reason to suppose that the rocks in which these animal remains are included are of as old a date as any of the formations named Azoic in Europe, if not older; so that they preceded in date rocks once supposed to have been formed before any organic beings had been created."

While the Canadian people of all parties are contemplating with satisfaction the formation of a peaceful union of the British American Provinces, it is impossible not to think of the unhappy war which has for some years been dividing the States which lie south of us. At the time of their final separation from Great Britain, the population of the old American Colonies did not differ much from that which our Confederation would have at its formation. Considerably less than a century has since passed; and yet, in this dreadful contest, the Northern and Southern States, together, have raised, and have year after year kept in the field, contending armies which have seldom been paralleled amongst the oldest and most warlike nations of Europe; and have expended in the war more money than was probably ever expended in war by any country in the same space of time before; and the greater part of the enormous expenditure has been accomplished without loans from any foreign country.

This unhappy contest has served to direct an unusual amount of attention on the part of men of scientific skill and energy, both in Europe and America, to the improvement of the various means of attack and defence which war calls forth. The war of the Crimea had directed special attention to the subject, and

the American civil war has given to it renewed interest. Larger guns have accordingly come into use than were thought desirable formerly; and larger still will probably before long be employed. We hear also of the contending claims of Armstrong guns and Whitworth guns, and of gunpowder and gun cotton. Renewed and extensive experiments have been made under the superintendance or with the aid of men of the highest scientific skill in regard to the power of projectiles, on the one hand; and to new models for ships of war, and new defensive armour for ships, on the other. In regard to defensive armour, the conclusion, on the whole, seems to be, that no ships can be made to carry plates sufficient to withstand the new guns; and that it would probably be better to have no plates at all. While the smashing power of the new guns is found to be so enormous, these guns at the same time, in regard to range and precision, so far exceed all previous experience that, I observe, one very distinguished officer declared, in reference to them, that there was nothing in the Arabian Nights so wonderful; while His Royal Highness the Commander in Chief affirmed of the Armstrong guns, that they could do anything but speak.

There is, I think, an impression amongst unscientific men that the idea of substituting the use of guncotton for gunpowder for military purposes has been entirely abandoned. The official reports published in France were indeed very unfavourable to it; but their conclusions have by no means been acquiesced in. The experiments made by the Austrian Government, during a course of twelve years, had given results highly favourable to the use of guncotton, and, at the suggestion of the British Scientific Association, the British Government, in July, 1864, appointed a committee to investigate the subject in all its bearings, with General Sabine as President, and with a membership representing the army, navy and military, as well as civil engineering, and chemical and physical science.

The experiments which have been made under the auspices of this committee, during the last year, are said to have established (in accordance with the results of the Austrian experiments,) that guncotton possesses great superiority over gunpowder in both the simplicity and the safety of its manufacture; and to have indicated that the changes to which guncotton is liable, under conditions like those under which it would be used or preserved for military purposes, are very minute, and such as are not likely to interfere with

its employment for these purposes. Again, guncotton used in musketry has not the disadvantage of fouling the gun ; it has much less recoil, though the effect is the same ; one third of the charge is the equivalent proportion as compared with gunpowder ; and guncotton does not heat the gun. The ultimate substitution of guncotton for gunpowder, for military and most other purposes, thus appears to be quite possible.

In view of all these improvements in destructive warfare, it is satisfactory to remember that, as instruments of war become more destructive, experience hitherto has shown that wars become less frequent, are of briefer duration when they do take place, and lead to less loss of life in a generation, than when less effective means of warfare are employed.

An appreciation of the practical part of science may well be expected amongst a cultivated people. Its value in time of war, or in promoting the useful arts in time of peace, is not at all likely to be overlooked. So far as it is perceived to effect improvements in what ministers to the wants of men, science is pretty sure of attention. Indeed every day and almost every hour of our lives, we are reminded of the services which practical science has rendered in making life easy, and in promoting in every way our physical well-being. The additions made, directly and indirectly, to the wealth and comforts, the convenience and pleasures, of civilised countries, by the steam engine, the railway, and the electric telegraph, and by the numberless machines and contrivances of which scientific knowledge has led to the construction, are too obvious to escape the observation of any. Who could fail to recognise the value of the knowledge which serves to convert some raw material in nature to human use ? or which serves to contrive a new machine that saves labor ? or a new instrument that diminishes the cost of production ? or a new method of any kind which leads by a shorter road to wealth ?

On the other hand, that part of human knowledge, the application of which is either unknown or very remote, is less apt to receive attention, and less apt to be duly appreciated, than the other. This doubtless ought not to be so. Reason and experience alike shew that what seems more practical cannot long prosper if it be severed from what is more theoretical and abstract ; what is speculative to-day becomes practical to-morrow ; what is merely curious when

first perceived or discovered, is afterwards found, not only to be wonderful to contemplate or know, but also to be in the highest degree useful in its applications. When the attractive power of magnetic substances was first noticed, who foresaw that there would grow out of it the construction of an instrument which would enable vessels to be steered on the high seas with confidence and safety on the darkest night, and that, by means of such an instrument, transportation would be so facilitated that an enormous influence would thereby be exercised on the condition of the world? or who foresaw that the same strange power would lead to the wondrous telegraph line, and to the conveyance of men's thoughts by its instrumentality with the speed of lightning from one end of the earth to the other?

If, therefore, the peculiar condition of society amongst us, or any other cause, leads to the neglect of the higher sciences, an important office is performed by those who do what can be done to counteract this tendency; to foster the love of science on its own account, and apart from the effort to utilise it or from the immediate expectation of utilising it; and to thus encourage scientific studies for their own sake, though by no means neglecting the practical application of them.

There are certainly circumstances connected with our past and present condition which give a special interest to all such agencies, and I have touched upon them already. I refer particularly to the fact that our whole people is engaged in active life. We have no leisure class. Our country affords facilities unknown to the old world for any man of energy and industry to make or increase his fortune; and almost all are occupied with the work of obtaining or securing the means of subsistence or comfort. Again, the highest positions are open to every one who aspires to them; lowly origin or early poverty is no barrier. The consequence is, that those who are not absorbed in the pursuit of wealth or of physical gratification, aspire to power. The tendency of all this is to confine the labors of the intellect to these objects; and I recognise in the Canadian Institute, an important agency towards counteracting this tendency, so far as the influence of the Institute and the influence of its publications extend; and of directing to scientific pursuits the intellectual energy of some of those who have an aptitude for such pursuits, but might otherwise never cultivate them.

I rejoice also at the success which has attended this society hitherto, because there is so much in Nature yet to be observed and dis-

covered and investigated. The great work requires every agent that can be pressed into the service, and it is the plain duty of every civilised people to take an active part in the work. The progress of science hitherto has been wonderful; and yet it has but served to make it more clear than ever that the unknown and yet knowable far exceeds in extent and importance the known. The field of investigation to which you give attention, embraces, amongst other subjects, the wonders and laws of the heavens; geology; ethnography; natural history; the affinities of the natural properties of bodies; magnetism, galvanism, and electricity; light and heat; the combination and application of the mechanical powers; the use of steam; the analysis of mineral products, and of liquid and aeriform fluids; and the application of science to improvements in the arts. In this vast field there is assuredly room enough for many additional workers for ages to come.

Again, I am interested in the success of the Canadian Institute, because I desire that my country, whether it is to consist of Canada only, or of all British North America as I hope it soon will, should not be behind the nations of the world in furnishing workers in the field of science; in taking part in the advancement of human knowledge; in contributing to the enlargement of the empire of mind. Must it not be the wish of every lover of his country that we should not be satisfied with possessing ourselves of the learning of other lands, but should add some truths contributed by men of science among ourselves? Must not every man of any patriotic spirit desire to see our land an object of interest to other lands, not only for the prosperity of our people and the comforts with which industry surrounds them; not only for the farseeing wisdom and the patriotism of our statesmen, or for the learning and purity of our judges; not only for the general intelligence of our Canadian fellow subjects—most important as all these objects assuredly are—but in addition to them all, who would not wish to see his country an object of increased interest to men of science too, to men who, in other lands, are engaged in the investigation of nature's laws and in the discovery of new truths? What Canadian of enlightened mind does not long to know that we are giving to such men increasing proofs of our appreciation of their high pursuits; and are giving them yearly increasing aid in the great work of investigating the hidden truth of nature? The reputation of our country would by such means be

elevated in the world of thinkers; and these are the world's true, though it may be unrecognised, rulers.

I feel an interest in your researches into nature's truths, because while the subjects which occupy your attention, may now interest but few, they gradually make their way into the general mind of the people, and thus tend to raise the universal standard of attainment amongst us; securing to the people the advantage, which can hardly be exaggerated, of knowing the important truths you are occupied with; and enabling the legislature and the government of the land, from time to time, to recognise with increased distinctness the claims of science, as an important element of a nation's strength and prosperity.

I rejoice at your progress hitherto, because no pursuits can be better calculated than those which you foster, to inspire men with the love of what is true. For is it not truth that you are constantly in quest of? Is it not in their truth that the whole value lies of every new fact that is observed and published, of every new hypothesis that is suggested, of every new theory that is announced? The most splendid visions of the fancy you reject, if there is no truth in them. The coin, however bright and glittering, you put aside, if it is counterfeit. It is God's truth that you want to discover; it is God's laws that you are desirous of knowing, as these are manifested in the works He has created; and these laws you have found to well repay your search, for they are always more brilliant and marvellous than the loftiest visions of human imagination.

I rejoice at your prosperity, because the influence of the pursuits you cultivate is in opposition alike to indolence and to vice. They operate as a counterpoise to the stimulus of sense and appetite. They have a moral as well as an intellectual value. They raise the moral character as well as improve the mental faculties. The new world of ideas which they present, the new views of the relations of things, the astonishing secrets of the physical properties and mechanical powers which they disclose, present attractions well calculated, as far as such studies are appreciated and earnestly pursued, to exalt the standard of character in our country.

Who, again, can be familiar with even some of the results of scientific research, and his mind not be expanded, or his reverence for the God of nature, who is also the God of revelation, not be increased? Who can ponder, for instance, on the wonderful truths which the

investigations of geologists and astronomers have made known, without having some more distinct notion of the Immensity, and Wisdom, and Power, of the Great Creator?

When we find men able to read in the very rocks something of the history of our earth for millions of years before man was created; able to read there something of the changes of land and sea, and of climate, which our earth then passed through; what strange plants grew; what strange animals lived and flourished; when we learn the evidence which patient investigation has made it possible to accumulate shewing that over every part of the earth's surface, in every class of organic life, whole series of created forms have been changed many times; and that the whole human period is but a unit in the vast sum of time that is past; when we find how much of our earth's old history has in this way become known; when we learn the possibility that telescopic observations may enable us to know more of it even from the other planets of our system, as Saturn, Jupiter and Mars unfold conditions not now terrestrial, and the moon other conditions which perhaps await the earth; when we read the assurances of the learned that within the limits of our solar system countless comets, the gipsies of the skies, are running their vagrant course; when we learn that our sun itself is not fixed in space, but is constantly moving forward with a velocity it is supposed of 18,000 miles an hour, carrying with it its whole planetary and cometary system; that many millions of stars are distributed throughout space; that important truths in regard to their very substance are now known to us; that probably every star is the centre of a system as vast as our own; that all these systems probably travel through space as our own solar system is doing; that the whole universe is thus in a perpetual state of motion through boundless space; and when we learn that these stupendous marvels are thought to be, or are felt to be, but glimpses of the unknown and unimagined reality—who does not feel his soul lost in gratitude to God that He has made us capable of learning so much of His mighty works, and in praise and wonder as he reflects on the Majesty of Him from whom all these works received their being and their laws, and who sits on the throne of the Heavens beholding, maintaining, and governing them all?

But I have occupied your attention too long. Let me say in conclusion, that whether we regard the practical utility of scientific

pursuits; their moral tendency; the influence of such pursuits in promoting the intellectual progress of a people, and in raising them in the scale of human beings; the strength and prosperity and glory which science bestows on every nation that is alive to its value; the great services rendered to mankind by every conquest within the domain of truth; or, in a word, the important part science fulfils in promoting in a thousand ways the happiness and well-being of our race—abundant reason appears for parliament and people, for men of all ranks and degrees in the country, to do all that in their several places they can do to promote the great and interesting and important objects which your Institute has in view; and I most earnestly pray that the success you have had in the past may but symbolise the much greater success which awaits your high pursuits in the future.

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## NOTES ON LATIN INSCRIPTIONS FOUND IN BRITAIN.

### PART XI.

BY THE REV. JOHN M<sup>c</sup>CAUL, LL.D.,  
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65. The letters D.M. are commonly used, as is well known, for *Diis Manibus*, and usually commence a funereal inscription. So general was their use in this sense, that they are found even in Christian Epitaphs,\* inadvertently placed there without reference to their ori-

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\* This seems the simplest explanation of this anomaly. Perhaps grave-stones were kept ready for sale, having D. M. inscribed on them. See Orelli, n. 4223. Fabretti, p. 112, proposed *Deo Magno* or *Maximo*, as the expansion in such cases, whilst Mabillon, p. 75, with whom Morcelli, *Stil.* ii. 71, seems to agree, regards this use of D. M. as indicating that in the early ages, some of the less informed Christians retained a portion of the Pagan superstitions. Mr. Burgon, *Letters from Rome*, p. 213, remarks on this subject: "We begin 'To the memory,' which is quite the Heathen fashion. We talk (in poetry) of the 'urn,' the 'ashes of the dead,' the 'shade,' and so forth, without at all meaning it. Urns, and hour-glasses, and baby-head with wings, and a weeping willow, and ladies leaning against broken columns, are not by any means symbolical of our actual belief or practice."



ginal meaning. They are also, in my judgment, used in a different sense, *viz.*, for *Deabus Matribus*. Of this, there are, I think, two examples in inscriptions found in Britain. The first, to which I shall call attention, is thus given by Horsley, *Durham*, n. xxxii :—

D        M  
CONDATI  
ATTONIVS  
QVINTIANVS  
MENEXCCIMP  
EXIV.S·SOLL·A

He expands a portion of it thus; *Dis Manibus Condati Attonius Quintianus \* \* \* \* \* ex jussu susceptum solvit libenti animo*.

The following are his remarks :—

“This stone was found near Piercebridge, not far from Watling street. It has been published by Mr. Thoresby, as also in the later editions of Camden, and is inserted by Dr. Gale in his *Antonini Itinerarium*. It is a funeral monument erected to one Condatus, in the usual tenour of such inscriptions. I wonder, therefore that not only Mr. Thoresby, but also the learned and judicious Dr. Gale should take it for the name of a place, which does not use to be inserted in this kind of inscriptions; and that they should suspect it to be the *Condate* in the *Itinerary*, which by all circumstances appears to be in Cheshire. As *Condatus* is the name of the deceased, so *Attonius Quintianus* are the two names of the person who erected the altar, and I suppose MEN to be a third name of the same person. The line in the base I have ventured to read *Ex jussu susceptum solvit libenti animo*; because it was common for them to pretend that they took a vow upon them by the command or order of some deity. Parallel instances of this kind may be seen in this collection. “Mr. Ward reads the letters EX CO IMP: *ex charissimæ conjugis impensa*; and so refers *ex jussu susceptum* on the base, to the order of the widow, who, not being present, desired this *Quintianus*, a friend or relation of her deceased husband, to erect this monument at her expense. In *Manutius* CC stand for *Charissima conjux*; but if any think them put for *contubernalium* here, the sense will not be incongruous.”

It is evident that this is a most unsatisfactory explanation. *Ex jussu* certainly refer to ‘the order’ of the deities, to whom the altar was erected; and there can be but little doubt that those deities were not the *Di Manes*, for such an order is unprecedented and improbable. To the expansion—*ex charissimæ conjugis impensa*—the same objections may be made. EXCC evidently stand for\* *ex ducenario*,

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\* See Orelli, nn. 3182, 3342, 5064. These *ducenarii* are often mentioned in the list of Provincial officials. See the *Notitia*, ed. Böcking, pp. 54, 56, 58, 60, 277, \*70, \*72, \*75, &c., and compare Facciolati on the word.

and IMP most probably for *Imperatoris*. It does not appear that any explanation of MEN has been attempted: I regard it as standing for *Mensor*\*. If there be a point after IV as well as after S, then Horsley's expansion—*ex jussu susceptum*—is correct, but I am inclined to think that there was none after IV, so that IVS stands for *jussu*. But what of *Condati*? I think that the reference to *Condate* of the Itinerary is highly probable, and would expand the word in the inscription into *Condatiumis* or *Condatinis*, i. e. *Quintianus mensor ex ducenario Imperatoris ex jussu solvit libens animo*. Horsley's objection that *Condate* was far from the spot, where this stone was found, seems to me of trifling value. We have many examples of dedications to *Matres* or to other deities, in localities far distant from the place indicated by their designations. The dedication in the inscription is sufficiently explained by the supposition that Attonius Quintianus had resided at or visited *Condate*.

The other inscription, to which I have referred, is Horsley's *Northumberland*, n. xxxiii:—

D M D  
TRANQVIL  
A·SEVERA  
PRO·SEET·SVI  
S·V·S·L·M

He expands it thus: *Dis Manibus dicatum Tranquila Severa pro se et suis votum solvit libens merito*.

I have never met with an example of the dedication of an altar by any one *pro se et suis* to the *Di Manes*, and yet, if there had been such an usage, there would, most probably, be many such, for doubtless the object would be to induce them to spare in illness or to receive kindly after death. I have but little doubt that D·M·D stand for *Deabus Matribus Domesticis*; although it is possible that the reading may be incorrect, and that the letters are really D·M·ID, i. e., *Deæ Magnæ Idææ*.

66. The following inscription on a stone, found at Old Penrith, Cumberland, is given by Camden, iii. p. 426, ed. Gough:—

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\* *Mensores* are also noticed among Provincial officials. See the *Notitia*, ed. Böcking, 28, 38, 214, 236. \*293, 300.

. . . . .  
 GADVNO  
 VLP TRAI  
 EM·AL·PET  
 MARTIVS  
 FP·C

Horsley's expansion and remarks on it are as follows :—

"*Gaduno Ulpus Trajanus, emeritus alæ Petrianae, Martius faciendum procuravit.* Burton (I suppose from the authority of this inscription) reckons *Gadunus* among the northern tutelal deities; but by the conclusion of the inscription *faciendum procuravit*, I rather take *Gadunus* to have been the name of a person deceased, for whom *Ulpus Trajanus Martius* an *emeritus* of the *ala Petriana* took care to have this funeral monument erected. Mr. Ward thinks 'tis more likely the *emeritus* was the deceased person, and therefore reads this inscription: *Gaduno Ulpio Trajano emerito alæ Petrianae Martius frater ponendum curavit.*

Horsley's view that *Gadunus* was the name of the person deceased is very probable, but there is no authority for *Ulpus Trajanus Martius*, especially broken as it is by the intrusion of EM·AL·PET. It seems to me that VLP TRAI are parts of CH·I·VLPIAF "TRAIANAE AVG·C·R", which, we know from Hadrian's diploma, was in Britain in A.D. 124; and I accordingly regard *Gadunus* as a member of that corps at his decease, having previously served his full time as *equus Alæ Petrianae*. He had probably received his *missio honesta* from that *ala*, having served twenty-five *stipendia*, and obtained with it the usual privileges *civitatis et connubii*. FP·C appears to me to stand, (as Mr. Ward suggested), for *frater ponendum curavit*, *Martius* being the name of the brother.

67. In the *Illustrated Catalogue* of the Museum of the Society of Antiquaries of Newcastle-upon-Tyne, n. 70, "a part of a slab, from *Vindolana*, the modern Chesterholm," is figured. Dr. Bruce gives the following remarks on it.

"Its right bears a Roman *Vexillum*, or standard; the left is gone. The inscription is very imperfect. The first line has the letters COH, the second, PROBI."

In the woodcut the inscription is given thus, as I read it :—

COH  
 PROBI  
 OS  
 AVG.

Before OS is the fragment of a letter, which may have been C. If this be the fact, COS will stand for *Consulibus*, whence we may assume that the names of the consuls were wholly or partly in the preceding line. From this it may be inferred that the date of the inscription is A.D. 322, in which *Probianus* and *Julianus* were consuls. The letters AVG might suggest that the name of the Emperor was also given, but they more probably denote the month of August, and were preceded by some letters specifying the day, in which something was completed or dedicated by the Cohort named in the first line on the missing part of the slab.\*

68. It has been inferred, from inscriptions on some altars found in the north of England, that a god, called *Vetires*, or *Vitires*, was worshipped in that locality. See Horsley, *Brit. Rom., Nor.* lxxii., *Durh.* vi., xix. Dr. Bruce, *Roman Wall*, p. 399, 2nd ed., offers the following remarks on an altar, having the letters—VITIRBVS. :

“Vitres, or Viteres, or Veteres, is a god whose name is confined to the north of Britain. Hodgson remarks that *Vithris* was a name of Odin, as we find in the death-song of *Lodbroc* :—‘I will approach the halls of *Vithris* with the faltering voice of fear.’ If *Veteres* and the Scandinavian *Odin* be identical, we are thus furnished with evidence of the early settlement of the Teutonic tribes in England. The occurrence of the name of this god in a plural form, has suggested the idea that *Viteres* is not the proper name of a god, but that *diis veteribus*—the ancient gods—is the inscription intended. Most probably, however, *Viteres* was the name of a local deity.”

The following are the principal forms in which the name appears on those altars :—DEO VITRI SANCTO, DEO SANC VETERI, DEO VETRI SANCT, DEO VITIRI, DEO VITIRINE, DEO VITERINE, DEO MOGONTI VITIRES. But, the word is also found in the plural, as †DIBVS VETERIBVS, DEABVS VITBVS,

\* In proposing this explanation I have assumed that the stone is not of the class, called *Centurial*, but I am not satisfied that it is not.

† Horsley, Northumberland, lxxix., gives an inscription, which he reads *Dirus Vitiribus Deccius votum solvit libens merito*, regarding the first three words as the name of the dedicator. Mr. Wright, *Celt, Roman, and Saxon*, p. 296, 2nd ed., renders this inscription thus :

DIRVS	To the rustic gods
VITIRBVS	Vitires,
DECCIVS	Deccius
V·S·L·M	performs a vow willingly and dutifully.

This reading, DIS RVSTICIS, may be regarded as an improvement on Horsley's, but I have no doubt that both are incorrect. Dr. Bruce judiciously infers, from another altar. “which has the letter B of DIBVS quite plain,” that “Horsley should have read DIBVS, not DIRVS.” *Dibus* is sometimes used in epigraphy for *Diis*.

VITIRBVS. The explanation of these forms, which at once presents itself, is that the varieties are due to the misspelling or misreading of *Veteri* and *Veteribus*. †\**Vitirine* and †\**Viterine* seem to me, also, to be forms of *Veteraneo*, from *Veteraneus*, an adjective of the same meaning with *Vetus*. Thus we have on altars found in Germany, MATRONIS VETERANEHIS, which may be explained as *Veteraneis*, i. e. *Veteribus*, without reference to *Castra Vetera*, as Lersch suggests. The form *Deo Mogonti Vitires* is peculiar. I am inclined to regard it as standing for *Deo Mogonti \*Veteri sancto*, and infer from it a confirmation that the word, which has been taken for the name of a god, is really the ordinary adjective, signifying "ancient." These altars have characteristics that are worthy of notice. The †majority of them were erected by persons having but one name, not improbably Britons; on some of them the name of the dedicator is omitted; there is, I believe, but ‡one instance in which a military corps is specified; and there is not one, so far as I know, in which the date is given, nor am I aware of any example of *Deæ Veteri*. They all, however, seem to indicate a preference of the old objects of worship to the new, it may have been, of the native to the imported gods, or of paganism to Christianity. To the argument, derived from the fact that such inscriptions are limited to the north of England, I am not

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† The first of these forms appears on an altar, noticed by Camden; the second on one figured in *The Illustrated Catalogue, &c.*, n. 96. Dr. Bruce's remarks on it are:

"The letters are tolerably distinct, but the reading is doubtful. it may be—*Deo Veteri Nepos Calames (?) votum solvit libens*: 'Willingly dedicated to the ancient god, in discharge of a vow.' In every age there have been setters forth and denouncers of "Strange Gods"—advocates and opponents of the "new" and the "old learning." Hodgson reads it—"To the veterinary god."

It must also be borne in mind, in judging of this, that there seems to have been a local god, named Vitris or Veteres "

There can, I think, be no doubt that the expansion *Nepos* is incorrect, and that we should read *Deo Veterineo*. With regard to the remainder of the inscription, I venture to suggest that the letters read CALAM may be CH-I-HAM, i. e. *Cohors prima Hamiorum*, and that ES may stand for *ex suscepto, scil. voto*.

\* Mr. Ward's explanation *Vitæ restitutori*, which was approved by Horsley, is certainly erroneous.

† This affords a strong, but not decisive argument in favour of the deity being native.

‡ This favours the belief that the deity was not one specially worshipped by the auxiliary troops.

disposed to attach much weight. Altars both to known and unknown deities might be expected in that part of the island, where there was so large a concentration of troops to guard the wall and its outposts; and here, too, it is reasonable to suppose that there would be traces of the conflicts between old and new religions.

Of all such altars, the most interesting is one found at Chester-le-Street, and now preserved in the Museum of the Society of Antiquaries of Newcastle-upon-Tyne. It is figured in the *Illustrated Catalogue*, n. 151, and Dr. Bruce offers the following remarks upon it:

"The inscription is indistinct. It has probably been addressed—

DEABVS  
VET[ERI]BVS  
V·S·L·M."

The letters, as they appear in the woodcut, are,—

DEABS  
VITBVS  
VIAS  
VADRI.

There can, I think, be no reasonable doubt of the correctness of the expansion of the first two lines, as given by Dr. Bruce: but I can see no ground for the reading V·S·L·M. I am inclined to regard VIAS as standing for VIA·S[TRATA] or VIA[E]·S[TRATÆ], and VADRI for VADR[A]E. VADRAE seems to be another form of VEDRAE, the name of the river believed by Horsley to be the Tyne, and by others to be the Wear. But what is the construction? If it be taken as *Via Strata Vedrae*, and this be regarded as the designation in the Roman period of "Chester-le-Street," this altar may have been erected "to the ancient goddesses," by the town. But this is not probable. I prefer *\*Via Stratae*, as referring to the paved road—most probably that leading to *Pons Ælii*. Then *Via Stratae* and *Vedrae* may be either in the genitive or the dative. If we take them as the latter, then "the ancient goddesses" were the Road [and] the River; if as the former, then the deities are the ancient goddesses of the Road [and] of the River. Another construction may be suggested, whereby *Via Stratae* may be

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\* When *via* is used in composition as the name of a town, it is placed last, *e. gr.* *Vinovia*, *Bovium*. I am not aware of any example of the combination of *via* and *strata* in this sense, except, probably, *Stravinia*, a town in Pannonia, mentioned in the Itinerary of Antoninus.

in the genitive, and *Vedra* in the dative. The locality of the stone seems to support the views of those who regard *Vedra* as the name of the Wear, not of the Tyne. The term *Veteribus* may manifest a preference of the old deities to the imported, or to "The God" of Christians, or, perhaps, may indicate a jealous feeling as to some new road or roads, of which there seem to have been several at or near this station, or the belief in the superiority of the paved (*strata*) road to some other, a mere dug-way. In ancient Britain, doubtless, this superiority was as fully felt as it is now in this country. The inscription—*Deo qui vias et semitas commentus est*—intimates an appreciation, such as we are familiar with here, of the advantages of roads.

69. In n. 32 of the *Illustrated Catalogue* of the Museum of the Society of Antiquaries of Newcastle-upon-Tyne, "the fragments of a large inscription, evidently dedicated to Caracalla," are figured :

I SEPT  
I SARMATI  
ANTON  
RIE PROCONSVLI PRO  
M SENATVS HAC  
GIONVM ITEM

Dr. Bruce gives the following reading, translation, and remarks :

*"Imperatori Caesari*  
DIVI SEPTIMII *Severi filio*  
Marci ANTONINI PII SARMATICI *nepoti*  
Marco Aurelio ANTONINO  
PROCONSULI

To the Emperor Caesar Marcus Aurelius Antoninus, proconsul, the son of the deified Septimus Severus, the grandson of Marcus Antoninus Pius, [styled] Sarmaticus.....

The latter part of the inscription is too incomplete to admit of even a conjectural interpretation; the words *decretum Senatus*, and *legionum*, are, however, distinct."

The fourth line seems to me to be part of the formula *Patri Patriæ* (*scil. Patrie* for *Patriæ*), *Proconsuli* (as Dr. B. reads it), \**Propagatori Imperii*; and after this, perhaps immediately, came the name and titles of Julia Domna, possibly thus:—ET IVLIAE

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\* Caracalla inherited this title from his father. See Henzen, nn. 5340, 5493.

\*AVGVSTAE MATRI \*AVGVSTI·CASTRORVM. The M of *castrorum* is, I think, the first letter of the fifth line. Then we have SENATVS·†AC (spelled †HAC) and after this came PATRIAE.‡ The words *decretum senatus* were unquestionably not in the inscription, but it is almost certain that *legionum* was. After ITEM, perhaps, came COHORTES or COHORTIVM, for the dedication probably comprehended both legions and auxiliary cohorts, and, it may be, *ala* also. The inscription was on a scale of unusual magnitude, and was, I suspect, the joint dedication of the legionary and auxiliary troops stationed along the line of the Wall or its outposts. It affords strong additional evidence of the importance of the station at Risingham.

69. The fragment of another slab from Risingham, bearing a portion of a dedication to the same Emperor and his mother, also on a large scale, is figured in No. 37.

MIFILIODI  
IIRRTICHJET  
TRIBPOTESTA  
ATRIAVGVST  
POSVERVNT

The following are Dr. Bruce's remarks on it:—

"*Imperatori Cæsari Divi Septimii Severi Britannici MAXIMI FILIO DIVI Antonini Pii PARTHICI* (?) ET.....*nepoti Pontifici MAXIMO TRIBVNITIA POTESTATE*.....*Et MATRI AVGVSTI*.....*POSUERUNT* (The army) erected (this building and dedicated it) to the Emperor Cæsar the son of the deified Septimius Severus (surnamed) Britannicus Maximus and grandson of Antoninus Pius (surnamed) Parthicus and to the mother of the Emperor (Julia Domna).

The fragment is fractured, so that some of the letters at the beginning of the second line seem to be doubtful. There can, however, be but little doubt that Dr. B's. reading—PARTHICI—should be adopted. But his expansion is certainly not correct, as is plain from the absence

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\* I have given these in full, as there are no abbreviations in the fragments, but they were, probably, AVG·, and between IVLIAE and AVG· may have been P·F· *i. e., pia felici.*

† Thus, in Henzen, n. 6914, AC PATRIAE.

‡ Thus, in Orelli, n. 23, FORTISSIMO HAC BEATISSIMO, and in De Rossi, *Inscript. Christ.*, n. 376, CASTAE HAC SANCT.

§ It is strange that Dr. Bruce should have overlooked this reading, for he correctly gives a portion of the same formula in n. 120.



of NEP. or N. for *Nepoti*, after *Parthici* and before *et*, where, according to his view, it should appear. The succession of the titles of Caracalla, given here, seems to me to have been similar to that in Horsley's Northumberland, cxiii., so that the ET was preceded by DIVI TRAIANI PARTHICI and followed by DIVI NERVAE ADNEPOTI. See Orelli, nn. 926, 927. In n. 33, where a portion of another dedication to Caracalla is figured, we have in the second line a part of DIVI ANTONINI PII PRONEPOTI.

70. In the *Roman Wall*, p. 385, 2nd ed., and in the *Illustrated Catalogue*, p. 84, an altar, found at Risingham, is figured. It bears the following inscription:—

FORTVNAE  
SACRVM.COS  
VALERIVS  
LONGINVS  
TRIB

The inscription, a little abbreviated, is repeated, on a lower projecting base. Dr. Bruce, *Roman Wall*, reads it thus: *Fortunæ Sacrum Valerius Longinus Tribunus*; and in the *Illustrated Catalogue*, prefixes C i.e. "*Caius*." In the wood-cut the letters OS are distinctly legible after, or, rather, within C. If they are genuine, of which I have some doubt, arising chiefly\* from Dr. Bruce's omission of any notice of them, we have, I think, an example of the rare *prænomen*, *Cossus*. See Gruter, cvii. 1, 2; Fabretti, p. 26; Marini, *Atti*, i. pp. 86, 103; Orelli, n. 2713.

71. In the *Roman Wall*, p. 401, 2d ed., an altar is figured, bearing the inscription, as Dr. Bruce reads it—"LAMIIS TRIBVS,—To the three Lamiae." Altars to these female vampires, the terror of Roman† children, are very rare. I have never met with another example, unless my view be correct with regard to the inscription, given in Gruter, cvii. 4. It is there read thus:—

LVMIS  
EX VOTO  
PRIMICENIVS  
LITIO.

\* In the *Archæologia Æliana*, iii. p. 162. this altar is also figured. In that representation, a leaf point takes the place of the OS.

† Hor. A. P., 340. *Nec prænse Lamie vivum puerum extrahat alvo.*

Gudius suggested the emendation LYMPHIS. To me this seems much less probable than that the word was LAMIIS, the A being turned upside down, of which there are examples, for instance, Horsley's *Northumberland*, n. xviii.

72. In the *Illustrated Catalogue, &c.*, n. 92, we find the following "portion of an inscription" on the part of a slab found at *Æsica*, Great Chesters:

..... VS ANTONINO ET  
THICIS MEDICIS  
M \* IRAETORV  
TAT. CIT ET

"A hole has been bored through the stone at the place marked by the asterisk."

As there is no wood-cut representing the stone, nor any remarks on it, it is not easy to suggest a satisfactory rendering or interpretation. There are, however, some portions about which there can be no doubt. It is plain, from the epithets *Parthicis Medicis*, that the Emperors named were *Marcus Aurelius Antoninus* and *Verus*, and that the date is consequently A.D.\* 165-169. It may also be assumed that VS in the first line are the final letters of DVOBVS, as we have on a pig of lead, found in Somersetshire,

IMP·DVOR·AVG ANTONINI  
ET VERI ARMENIACORVM.

Here all that is certain is exhausted. If we accept the reading, as given by Dr. B., of the next two lines as correct, and regard some letters as lost by the boring between M and I, it is probable that M was the last letter of the designation of the building or work executed, or of the participle or adjective agreeing with it, and that the rest of the line was CH·I·RAETORVM (*Cohors prima Rætorum*), followed by EQVITAT· (*equitata*), or MIL·EQVITAT· (*Miliaria equitata*) of which the last three letters (TAT) are in the fourth line; and after this we seem to have FECIT·ET. This reading is liable to the objection that there is no evidence that a Cohort of Rætians was ever in Britain. This objection, however, is not of much importance, as there are other examples of Cohorts named on stones found in Britain, for whose presence in the island we have no other authority. When I

\* See Orelli, n. 859; Henzen's *Index*, p. 69; Clinton's *Fasti Romani*, vol. i. pp. 154, 162.

first saw the inscription, I read PRAETORIVM [COLLAPSVM VETVS]TAT·[REFE]CIT, regarding M as the last letter of the designation of the corps that executed the work, and supplying between it and I, C·R· or EQ· or M·EQ· I was not, however, satisfied with this. It then occurred to me that E perhaps was a misreading of S, and thus, retaining the reading P for I, we get CH·PR·ASTORUM i.e. *Cohors prima Astorum* (otherwise *Asturum*), the Cohort stated in the *Notitia* to have been stationed at Æsica.

73. In\* *Aquæ Solis*, or "Notices of Roman Bath," by the the Rev. H. M. Scarth, M.A., p. 77, we have the following account accompanying a drawing of an inscribed marble fragment found in that city in 1861 :—

"The inscription is on white marble, apparently foreign, since none is found in England, though it is in Ireland.

The letters are as follows :—

DEAE · S  
TI · CL · T  
SOLLEN

(also portions of letters, which may be E or F, and LI, or II or H, of smaller size.)

The letters are particularly well cut, and seem to belong to an early period of the Roman occupation of our Ireland. The small fragment of the letter S leaves little doubt that the dedication was to the DEAE SVL or SVLMINERVA to whom, as we have seen, six inscriptions relate and also a temple or other building was dedicated. In the second line we have the abbreviations of two names of the dedicator TI(BERIVS) CL(AVDIVS), with a triangular stop after each, clearly cut, and the first letter of the cognomen (T), which may be any Roman name beginning with that letter. The third line commences with the word SOLLEN; but the remainder is broken away, leaving us to conjecture that it was the word SOLLENNES or SOLEMNES, and referred to the vows paid to the tutelary goddess. The word SOLLEMNIS occurs in an inscription on marble preserved in *Fabretti*, and also given in *Orelli*, and is a fragment of a funeral laudatory Inscription of the Augustan age. The letters commencing the fourth line are cut smaller, but it is not possible to conjecture the word of which they formed components."

I have but little doubt that the letters SOLLEN formed a part of the name SOLLENNIS or SOLLEMNIS, the cognomen of the dedicator. These forms of the name are not noticed in the Index to

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\* A handsome volume, with numerous illustrations, lately published by R. E. Peach, Bath. It contains full and accurate information regarding the many interesting memorials of Bath, during the Roman period, that have been found in or near that city.

Gruter, but they are sometimes found *e. gr.* *T. Sennio Sollemni* on the monument at *Vieux*. See Smith's *Collect. Antiq.* iii. p. 92. In the first line *Suli* or *Suli Minervæ* followed *Deæ*. In the second after *TI·CL·T* were, most probably, *I·F* followed, perhaps, (according to the normal order), by the name of the tribe *e. gr.*, *GAL : i. e. Tiberius Olaudius Tiberii filius* [*Galeria*]. *Sollennis* in the third line may have been followed by the name of his \*birth place, and perhaps by the preposition *ob* or *pro*; and it is not improbable that the three broken letters of the fourth line were *FIL*, *i. e. filium* or *filiam*, *filio* or *filia*. We may conjecture, then, that this altar was erected on account of, or for the recovery of the son or daughter of the dedicator, *scil. ob filium (or filiam)*, [*morbo recreatum or recreatam*], or *pro filio (or filia)* [*morbo male adfecto or adfecta*].

Many altars of this class must have been erected in Bath to the deity presiding over the waters, either as a thank-offering for health restored or as a propitiation during sickness for recovery. In this case it seems probable that Sollennis vowed to Sul-Minerva, that if his child should obtain relief from the use of the waters, he would erect to her a marble altar; and that this fragment is a portion of that which he erected in fulfillment of the vow. See Horace, *Odes*, iv., 1, 20, where, however, the vow relates to a statue.

74. In the same volume, p. 79, we find the following fragment of an inscription:—

AIIVS  
ONDEDIT  
ET QVINTIANO COS

Mr. Scarth's remarks on it are:—

"The inscription, which was on white lias stone, was found in digging out the remains of a building, which was one of several that bordered on the line of the Foss Road, six miles from Bath, and about a mile beyond the Red Post Inn. It is not known what has become of it. With it were found part of a stone statue and pieces of painted stucco. The first line is much defaced, only the letters A, V and S, being distinctly legible. The letters between the A and V may have been a T and I, or P and I, or II, so that the name seems to have terminated in the form *ATIVS*, or *APIVS*, or *AIIVS*. The next word is plainly [C]ONDEDIT, an E being put for an I. In the third line we have *ET QVINTIANO COS*. So that we are able to supply what is wanting, knowing

\* Almost certainly on the continent, where doubtless the marble was got.

that **BASSUS** was consul with **QUINTIANUS**, A.D. 289, i.e. in the first or second year of **CARACUSIUS**. The inscription will therefore stand thus:—

Name of person who erected the building ending

ATIVS OR APIVS OR AIIVS  
CONDIDIT  
BASSO ET QUINTIANO COS

In the fac-simile which **MR. SKINNER** has preserved in his MS., the stone is small, about 8 inch by 2½ inch, and the building itself appears not to have been mentioned in the Inscription, only the name of the builder and the date. It was found in digging out the interior of a small inner chamber.

The reading—**CONDIDIT**—seems to me very improbable. For what was it that was “founded” or (as some translate) “built?” Certainly not *urbs* nor *oppidum*, nor the equivalent *menia*. Neither can it have been *murus*, *templum*, *ædes*, *basilica*, *horreum*, or some such object, for it will, I think, be difficult to find any authority in ancient authors or inscriptions for this use of the verb. A stone, indeed, is said to have been found, near Carlisle, on which was inscribed—**SEPT. SEVERO·IMP·QVI MVRVM HVNC CONDIDIT**, but this is evidently a \*counterfeit, bearing no resemblance to a genuine inscription. **Dr. Bruce**, of course, rejects it as “obviously spurious.” I suggest [**D**] **ON·I·EDIT**, i.e. *dono dedit* as a much more probable reading.

## MEAN METEOROLOGICAL RESULTS AT TORONTO FOR THE YEAR 1864.

BY **G. T. KINGSTON, M.A.**

DIRECTOR OF THE PROVINCIAL MAGNETIC OBSERVATORY, TORONTO.

THE mean temperature of the year 1864 was 44°.70, or 0°.53 in excess of the average of twenty-five years. The deviation of the monthly means above or below their respective averages, and irrespective of sign, had an average amplitude of 1°.36; thus indicating a year of unusually equable temperature, the average amplitude in twenty-five years being 2°.33.

\* See Camden, iii., p. 513.

The mean deviations of temperature in the four seasons, with their proper signs, were:  $-0^{\circ}.33$  in Winter;  $+0^{\circ}.79$  in Spring;  $+2^{\circ}.27$  in Summer; and  $-0^{\circ}.60$  in Autumn.

As regards rain and snow, there was, on the whole year, an excess amounting to 0.655 inches of water. An excess occurred in Winter, Spring, and Autumn—the total precipitation exceeding the average by 1.136 inches in Winter, 1.788 inches in Spring, and 0.186 inches in Autumn. In Summer, the rain was deficient as compared with the average by 2.405 inches. This deficiency was not much greater than that of the summer of 1863; but the distribution among the three summer months was very different in the two years, for while in the summer of 1863 there was a moderate deficiency in each month, the rain in June, 1864, was less than one-fifth, and in July little over one-third of the average fall; that of August being above the average in the ratio of 5 to 3 nearly.

In the following summary several of the results for the year 1864 are compared with the averages derived from a series of years as well as with extreme values of analagous results given by the same series.

TEMPERATURE.

	1864.	Average of 25 years.	Extremes.	
Mean temperature of the year .....	44.70	44.17	46.36 in '46.	42.16 in '56.
Warmest month .....	July.	July.	July, 1854.	Aug. 1880.
Mean temperature of the warmest month .....	69.73	66.98	72.47	64.46
Coldest month .....	January.	February.	Jan. 1857.	Feb. 1848.
Mean temperature of the coldest month .....	22.79	22.99	12.75	26.60
Difference between the temperatures of the warmest and the coldest months .....	46.94	43.99	—	—
Mean of deviations of monthly means from their respective averages of 25 years, signs of deviation being disregarded .....	1.36	2.33	3.58 in 1857.	1.36 in '64.
Months of greatest deviation, without regard to sign .....	May.	January.	Jan. 1827.	—
Corresponding magnitude of deviation .....	3.1	3.7	10.8	—
Warmest day .....	June 25.	—	July 12, '45.	July 31, '44.
Mean temperature of the warmest day .....	81.77	77.45	83.32	72.75
Coldest day .....	Feb. 17.	—	Feb. 6, '55 } Jan. 22, '57 }	Dec. 22, '42.
Mean temperature of the coldest day .....	-4.62	-1.02	-14.35	+9.57
Date of the highest temperature .....	Aug. 8.	—	Aug. 24, '54.	Aug. 13, '40.
Highest temperature .....	94.0	90.6	99.2	82.4
Date of lowest temperature .....	Feb. 17.	—	Jan. 26, '59.	Jan. 2, '42.
Lowest temperature .....	-15.0	-12.4	-26.5	+1.9
Range of the year .....	109.0	103.0	118.2	87.0

## MEAN METEOROLOGICAL RESULTS

## BAROMETER.

	1864.	Average of 18 years.	Extremes.	
Mean pressure of the year .....	29.5506	29.6133	{ 29.6679 in 1849.	29.5506 in 1864.
Month of highest mean pressure .....	June.	Septemb'r	June, 1849.	June, 1864.
Highest mean monthly pressure .....	29.6545	29.6629	29.8030	29.6545
Month of lowest mean pressure .....	May.	June.	March, 1850.	Nov. 1849.
Lowest mean monthly pressure .....	29.4721	29.5624	29.4215	29.5863
		Average of 9 years.		
Date of highest pressure in the year .....	{ Dec. 9, 10 a.m. }	—	Jan. 1855,	Dec. 1854.
Highest pressure.....	30.327	30.372	30.552	30.245
Date of lowest pressure in the year.....	{ Nov. 4, 2 p.m. }	—	March, 1850.	March, 1858.
Lowest pressure .....	28.671	28.892	28.286	28.849
Range of the year .....	1.656	1.780	{ 2.106 in 1859.	1.429 in 1869.

## RELATIVE HUMIDITY.

	1864.	Average of 20 years.	Extremes.	
Mean humidity of the year .....	76	78	82 in 1851.	73 in 1858.
Month of greatest humidity .....	{ Dec., Jan. and Feb. }	{ Jan.	Jan. 1857.	Dec. 1858.
Greatest mean monthly humidity .....	82	83	89	81
Month of least humidity .....	June.	May.	Feb. 1843.	April, 1849.
Least mean monthly humidity .....	63	72	58	76

## EXTENT OF SKY CLOUDED.

	1864.	Average of 12 years.	Extremes.	
Mean cloudiness of the year .....	0.65	0.60	0.65	0.57
Most cloudy month .....	December	December	—	—
Greatest monthly mean of cloudiness .....	0.80	0.75	0.83	0.73
Least cloudy month .....	June.	August.	—	—
Lowest monthly mean of cloudiness .....	0.30	*0.47	0.30	*0.45

\*The average lowest monthly mean of cloudiness in column (2) is the least of the twelve monthly means derived each from twelve years, and does not include the lowest months in each year, as these fall differently in different years. This explains why the highest minimum in column (4) should be less than the average minimum. The average value of the greatest as well as of the least monthly means of the several elements, and given in column (2), are similarly obtained, and therefore do not necessarily lie between the numbers in columns (3) and (4).

In the case of the warmest days, or the highest temperatures in each year, and other analogous quantities, the averages in column (2) are derived from the corresponding values in each year, independently of the time of their occurrence, and must of necessity lie between the numbers in columns (3) and (4.)

WIND.

	1864.	Result of 17 years.	Extremes.	
Resultant direction .....	N 76° W	N 59° W	—	—
Mean resultant velocity in miles .....	2.49	1.83	—	—
Mean velocity, without regard to direction .....	7.40	6.88	—	—
Month of greatest mean velocity .....	January.	March.	March, 1860.	Jan. 1848.
Greatest monthly mean velocity .....	10.22	8.67	12.41	6.82
Month of least mean velocity .....	June.	July.	Aug. 1852.	Sept. 1848.
Least monthly mean velocity .....	4.53	4.97	3.30	5.79
Day of greatest mean velocity .....	Jan. 1.	—	—	—
Greatest daily mean velocity .....	28.37	—	—	—
Day of least mean velocity .....	June 17.	—	—	—
Least daily mean velocity .....	Calm.	—	—	—
Hour of greatest absolute velocity .....	{ Nov. 10. }	{	—	—
	{ 1 to 2 a.m. }	}	—	—
Greatest velocity .....	40.2	—	—	—

RAIN.

	1864.	Average of 23 years.	Extremes.	
Total depth in the year in inches .....	29.486	29.955	{ 43.555 in 1843.	{ 21.505 in 1856.
Number of days in which rain fell .....	132	108	{ 130 in 1861.	{ 80 in 1841.
Month in which the greatest depth of rain fell .....	August.	November	Sept. 1843.	Sept. 1848.
Greatest depth of rain in one month .....	5.060	3.765	9.760	3.115.
Month in which days of rain were most frequent .....	October.	October.	Oct. 1864.	May, 1841.
Greatest number of rainy days in one month .....	22	13	22	11
Day in which the greatest amount of rain fell .....	Aug. 26.	—	Sept. 14, 1843	Sept. 14, 1848
Greatest amount of rain in one day .....	1.324	2.067	3.455	1.000
Hour of heaviest rain .....	{ Aug. 26. }	{	—	—
	{ 4 to 5 p.m. }	}	—	—
Greatest amount of rain in one hour .....	0.770	—	—	—

SNOW.

	1864.	Average.	Extremes.	
Total depth in the year in inches .....	74.6	63.4	{ 99.0 in 1855.	{ 38.4 in 1851.
Number of days in which snow fell .....	70	59	{ 87 in 1859.	{ 33 in 1848.
Month in which the greatest depth of snow fell .....	December	February.	Feb. 1846.	Dec. 1851.
Greatest depth of snow in one month .....	27.1	18.1	46.1	10.7
Month in which days of snow were most frequent .....	December	December	{ Dec. 1859. { Jan. 1861.	{ Feb. 1848.
Greatest number of days of snow in one month .....	18	13	23	8
Day in which the greatest amount of snow fell .....	{ Jan. 19. }	{	Feb. 5, 1863	{ Feb. 20, 1854
	{ Dec. 21. }	}	—	{ Jan. 10, 1857
Greatest fall of snow in one day .....	10	8.5	16	5.5

The accompanying table is a general abstract of the Meteorological Observations made at the Magnetic Observatory, Toronto, during the year 1864.



## GENERAL METEOROLOGICAL

Provincial Magnetical Observ

LATITUDE, 43° 39' 4" North; LONGITUDE, 5h. 17m. 33s. West.—Elevation above

	JAN.	FEB.	MAR.	APR.	MAY	JUNE.	JUL.
Mean temperature .....	22.79	24.32	29.12	40.05	54.81	63.03	69.73
Difference from average (25 years)...	- 0.82	+ 1.33	- 0.74	- 0.01	+ 3.13	+ 1.69	+ 2.75
Thermic anomaly (Lat. 43° 40') .....	-10.01	-10.38	-10.98	- 9.23	- 3.29	- 1.57	+ 1.03
Highest temperature .....	44.2	45.0	50.2	59.4	79.0	93.4	90.2
Lowest temperature .....	- 9.0	-15.0	3.0	28.1	32.2	34.8	49.0
Monthly and annual ranges .....	53.2	60.0	47.2	31.3	46.8	58.6	41.2
Mean maximum temperature .....	29.58	31.52	35.59	47.48	62.86	73.06	79.95
Mean minimum temperature .....	17.51	18.94	22.44	34.61	46.20	52.87	59.70
Mean daily range .....	12.07	12.58	13.16	12.87	16.67	20.19	20.19
Greatest daily range .....	26.9	37.4	28.4	24.4	26.2	31.7	31.2
Mean height of barometer .....	29.5987	29.4914	29.5082	29.5968	29.4721	29.6545	29.6289
Difference from average (18 years)...	- 0.047	- .1208	- .0741	+ .0098	- .1125	+ .0921	+ .0275
Highest barometer .....	30.102	30.124	30.067	29.964	29.788	29.961	29.831
Lowest barometer .....	28.910	29.009	28.829	29.301	29.166	29.007	29.319
Monthly and annual ranges .....	1.192	1.115	1.238	0.663	0.622	0.954	0.512
Mean humidity of the air .....	.82	.82	.80	.75	.75	.63	.66
Mean elasticity of aqueous vapour.....	.110	.119	.135	.194	.333	.380	.473
Mean of cloudiness .....	.67	.72	.66	.74	.68	.30	.44
Difference from average (12 years)...	-.05	+ .01	+ .06	+ .15	+ .15	- .22	- .04
Resultant direction of the wind.....	S 73 W	S 84 W	N 53 W	N 41 E	N 7 W	N 55 W	N 61 W
“ velocity of the wind .....	6.00	6.48	2.29	3.39	1.86	1.72	2.23
Mean velocity (miles per hour) .....	10.22	10.11	8.41	7.77	5.64	4.53	6.00
Difference from average (17 years)...	+2.22	+ 1.77	-0.26	-0.29	-0.95	-0.74	+1.03
Total amount of rain .....	1.165	0.397	1.620	3.633	4.070	0.570	1.332
Difference from average (24 & 25 yrs)	-0.166	-0.603	+0.063	+1.200	+0.864	-2.297	-2.142
Number of days rain .....	5	2	9	16	18	5	8
Total amount of snow .....	26.3	9.5	3.7	3.5	0.0	...	...
Difference from average (22 years)...	+11.15	- 8.55	- 5.46	+ 1.10	- 0.09	...	...
Number of days snow .....	14	14	12	3	0	...	...
Number of fair days .....	14	13	14	12	13	25	23
Number of auroras observed .....	0	4	2	4	3	5	3
Possible to see aurora (No. of nights).	11	11	15	10	12	24	19
Number of thunderstorms .....	0	0	0	0	5	2	4

REGISTER FOR THE YEAR 1864.

atory, Toronto, Canada West.

Lake Ontario, 108 Feet; approximate Elevation above the Sea, 342 Feet.

Aug.	SEPT.	Oct.	Nov.	DEC.	Year 1864.	Year 1863.	Year 1862.	Year 1861.	Year 1860.	Year 1859.	Year 1858.
68.58 + 2.37 + 0.08	56.36 - 1.48 - 5.14	45.17 - 0.48 - 8.63	36.91 + 0.16 - 6.29	24.66 - 1.50 - 11.34	44.70 + 0.53 - 6.30	44.57 + 0.40 - 6.43	44.35 + 0.19 - 6.65	44.22 + 0.05 - 6.78	44.32 + 0.15 - 6.68	44.19 + 0.02 - 6.81	44.74 + 0.57 - 6.28
94.0 47.0 47.0	73.0 37.8 35.2	67.0 28.0 30.0	60.2 21.0 39.2	50.4 - 10.4 60.8	94.0 - 15.0 109.0	88.0 - 19.8 107.8	95.5 - 5.2 100.7	87.5 - 20.8 108.6	88.0 - 8.5 96.5	88.0 - 26.5 114.5	90.2 - 7.3 97.5
77.24 61.41 15.83 29.2	63.94 48.96 14.98 27.0	52.05 39.73 12.32 26.0	42.85 31.31 11.53 24.2	32.23 19.71 12.52 31.4	... ... 14.57 37.4	... ... 14.73 39.6	... ... 14.43 37.0	... ... 14.42 33.3	... ... 14.24 30.7	... ... 13.66 39.8	... ... 13.84 31.2
29.5450 - 0.0763	29.6097 - 0.0532	29.5207 - 0.1293	29.5790 - 0.0349	29.5198 - 0.1282	29.5596 - 0.0537	29.6536 + 0.0403	29.6248 + 0.0115	29.6008 - 0.0125	29.5923 - 0.0210	29.6209 + 0.0070	29.6267 + 0.0134
29.863 29.099 0.764	29.975 29.230 0.745	29.890 29.026 0.864	30.126 28.671 1.455	30.327 28.854 1.473	30.327 28.671 1.656	30.502 28.704 1.798	30.469 28.805 1.664	30.330 28.644 1.686	30.267 28.838 1.429	30.392 28.286 2.106	30.408 28.849 1.559
.73	.75	.80	.78	.82	0.76	0.77	0.77	0.78	0.77	0.74	0.73
.516	.347	.248	.182	.121	.263	.266	.262	.262	.260	.249	.259
.70 + .23	.58 + .08	.74 + .11	.75 + .01	.80 + .05	0.65 + .03	0.61 + .01	0.63 + .03	0.62 + .02	0.60 .00	0.61 + .01	0.60 .00
N 70 W 1.38 4.75 - 0.43	N 38 W 1.89 7.06 + 1.52	N 60 W 3.17 6.66 + 0.52	S 72 W 3.82 7.64 + 0.17	S 82 W 4.94 9.98 + 1.66	N 76 W 2.49 7.40 + 0.54	N 41 W 1.34 7.13 + 0.27	N 48 W 2.03 7.33 + 0.47	N 56 W 2.11 7.47 + 0.61	N 60 W 3.32 8.55 + 1.69	N 61 W 2.24 8.17 + 1.31	N 41 W 1.59 7.64 + 0.78
5.060 + 2.034 16	2.508 - 1.222 11	3.321 + 0.791 22	3.765 + 0.617 11	2.015 + 0.404 9	29.486 - 0.469 132	26.483 - 3.472 130	25.529 - 4.426 118	26.995 - 2.960 136	23.434 - 6.521 130	33.274 + 3.319 127	28.051 - 1.904 131
...	...	Inap. - 0.78 1	4.5 + 1.38 8	27.1 + 12.41 18	74.6 + 11.24 70	62.9 - 0.46 74	85.4 + 22.04 72	74.8 + 11.44 76	45.6 - 17.76 75	64.9 + 1.54 87	45.4 - 17.96 67
15	19	9	12	9	180	181	189	165	174	169	178
6	4	2	1	0	34	44	48	43	58	53	59
12	14	11	9	10	158	182	176	150	190	199	198
5	4	0	0	0	20	24	24	27	30	30	19

## MONTHLY ABSOLUTE VALUES OF THE MAGNETIC ELEMENTS AT TORONTO, FROM 1856 TO 1864, INCLUSIVE.

BY G. T. KINGSTON, M. A.,  
DIRECTOR OF THE MAGNETIC OBSERVATORY.

**DECLINATION.**—The monthly values given in table I., are the means of six separate determinations, made at intervals during two or three consecutive days. Each determination includes five readings of the collimator scale, accompanied by simultaneous readings of the differential declinometer, by aid of which the corresponding partial determination was reduced to the monthly twenty-four-hour mean normal reading of the differential declinometer.

The mean monthly increase of westerly declination, derived by the method of least squares, from the 108 equations furnished by the monthly values of declination, is  $0'2606$ ; which, if the rate of westerly movement increase equally, will be the monthly rate corresponding to 1st July, 1860. But on p. vi. of Vol. II. of the Toronto Observations, the monthly rate of westerly movement proper to 1st July, 1848, was  $0'1627$ : whence the mean annual increase in the monthly movement is  $0'008$  nearly. The probable error of a single monthly determination is  $0'74$ , and the probable error of the mean determination,  $2^{\circ} 10'04$ , corresponding to 1st July, 1860, is  $0'071$ .

Table II. gives the monthly determinations of the dip, and Table III. those of the horizontal force, taken according to the method of which the details are given in the earlier volumes of the Toronto Observations. The determinations of the horizontal force are reduced to the monthly twenty-four-hour mean normal reading of the bifilar.

The monthly values ( $\phi$ ) of the total force in Table IV. are derived from those of the dip ( $\theta$ ) and of the horizontal force ( $X$ ), by the formula  $\phi = X \sec. \theta$ .

For the purpose of exhibiting the progressive secular march in the magnetical elements from the commencement of the observations, the annual means, as far as they are procurable, are presented in one view in Table V.

**DECLINATION.**—The annual means of the declination for 1841–42 are taken from p. xi. of Vol. I. of the Toronto Observations, and those for 1845 to 1851, from pp. iii. to v. of Vol. II. In 1853, 54, 55,

several months occur in which the absolute declination was not determined. In these cases, the approximate annual means given in the table are the averages of the results for the months wherein observations were made, these results being corrected for annual and secular variation. These corrections were determined as follows: The twelve monthly means on the average of the nine years, 1856 to 1864, being in the first instance corrected for secular change, by the application to them of the several multiples of  $0'.2606$ , from  $+5.5 \times 0'.2606$  in January, to  $-5.5 \times 0'.2606$  in December, were then subtracted severally from the mean declination  $2^{\circ} 10'.04$ , thus yielding remainders which have been adopted as the monthly *corrections* for annual variation. They are small, in no instance amounting to  $0'.6$ . Assuming these corrections, as well as those for secular change, to be applicable to the years 1853, 54, and 55, with sufficient accuracy for the purpose in view, the corrections applied to any one of the monthly means, in order to reduce it to the mean of the year, was found by taking the algebraical sum of the correction for annual variation, and that for secular variation, supposing the latter to be  $+5.5 \times 0'.2606$  in January, and to diminish each month by  $0'.2606$  till it becomes  $-5.5 \times 0'.2606$  in December.

**INCLINATION.**—The annual means of inclination for the years 1841 to 1856 are reprinted from p. cxix. of the third Toronto volume. The increase of the inclination from the minimum in 1843–44 was arrested in 1855, from which year the inclination has been steadily diminishing.

**HORIZONTAL FORCE.**—From 1845 to 1852, the annual means of the absolute horizontal force are reprinted from p. cxvii. of the third Toronto volume. The number given as the annual mean for 1855, is an imperfect approximation, being the average of the determinations in the four months, September to December. The progressive diminution in the horizontal force so apparent in the annual means prior to 1859—the year of maximum dip, has been converted since 1860 into an increase.

**TOTAL FORCE.**—The annual means of the total force for the years 1845–52, as well as for 1855, are derived from the annual means of inclination and of horizontal force by the formula  $\phi = X \sec. \theta$ . For the years 1856 to 1864, the annual means are averages of the monthly values of the total force given in Table IV.

TABLE I.

Monthly determinations of the Absolute Declination at Toronto, from 1856 to 1864 inclusive.

MONTHS.	1856.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.
January .....	1 54.30	1 58.54	2 02.82	2 06.41	2 08.53	2 2.37	2 15.71	2 17.41	2 23.66
February .....	1 55.33	1 58.79	2 03.78	2 06.90	2 09.26	2 13.30	2 11.99	2 17.07	2 21.36
March .....	1 55.23	2 00.61	2 04.44	2 06.73	2 09.95	2 13.24	2 13.91	2 17.88	2 21.23
April .....	1 56.34	1 59.69	2 04.03	2 06.56	2 09.61	2 14.22	2 13.77	2 18.10	2 20.95
May .....	1 56.12	1 58.85	2 03.72	2 06.84	2 08.93	2 13.17	2 14.44	2 18.51	2 21.20
June .....	1 56.09	1 58.89	2 03.54	2 06.90	2 08.93	2 13.03	2 16.73	2 18.93	2 22.53
July .....	1 56.06	1 59.85	2 04.33	2 07.24	2 10.38	2 14.10	2 16.22	2 19.87	2 23.19
August .....	1 54.44	2 01.86	2 06.34	2 07.39	2 11.36	2 14.71	2 15.91	2 19.87	2 22.71
September ...	1 58.52	2 01.58	2 05.36	2 08.77	2 10.77	2 15.23	2 17.10	2 20.25	2 22.27
October .....	1 57.06	2 01.69	2 05.27	2 08.52	2 13.91	2 15.04	2 17.41	2 19.67	2 22.28
November ...	1 58.31	2 02.47	2 04.75	2 08.53	2 13.30	2 15.69	2 17.59	2 20.87	2 22.24
December ...	1 57.57	2 03.67	2 05.52	2 08.27	2 12.62	2 17.24	2 17.18	2 19.67	2 21.24
Yearly Means. }	1 56.26	2 00.54	2 04.49	2 07.42	2 10.63	2 14.35	2 15.66	2 19.08	2 21.88

TABLE II.

Monthly determinations of the Absolute Inclination at Toronto, from 1856 to 1864 inclusive.

MONTHS.	1856.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.
January .....	75 23.70	75 24.25	75 24.60	75 24.47	75 24.37	75 23.80	75 23.10	75 21.69	75 21.53
February .....	24.33	23.83	26.60	24.93	23.47	23.53	23.37	21.67	21.88
March .....	23.97	24.47	26.22	24.97	24.57	24.30	23.62	21.77	21.45
April .....	23.52	24.98	23.72	25.50	25.10	25.30	22.74	21.84	21.30
May .....	22.72	23.93	23.67	24.37	24.27	24.33	23.33	21.94	21.34
June .....	23.62	23.90	22.85	24.60	23.37	23.40	22.77	20.93	21.23
July .....	24.15	23.92	23.25	24.07	24.20	22.97	22.90	20.93	20.19
August .....	23.80	23.93	23.73	25.07	25.07	23.70	23.78	21.76	19.61
September ...	24.82	25.12	25.07	25.00	26.40	23.27	23.55	22.12	20.74
October .....	24.87	25.02	24.50	26.43	26.00	23.80	23.85	20.99	20.53
November ...	24.57	24.43	24.47	26.03	23.83	23.37	22.82	20.91	20.61
December ...	24.55	24.10	24.43	24.27	23.93	23.27	22.43	21.14	20.79
Yearly Means. }	75 24.05	75 24.32	75 24.44	75 24.98	75 24.55	75 23.75	75 23.19	75 21.47	75 20.93

TABLE III.

Monthly determinations of the Absolute Horizontal Force at Toronto, from 1856 to 1864 inclusive.

MONTHS.	1856.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.
January .....	3.5003	3.4868	3.4779	3.4724	3.4771	3.4843	3.4839	3.4882	3.4941
February ....	5064	4728	4748	4771	4812	4826	4834	4890	4932
March .....	5052	5113	4725	4752	4760	4829	4846	4875	4903
April .....	5054	4761	4870	4796	4767	4787	4922	4902	4905
May .....	5057	4901	5010	4771	4862	4983	4867	4878	4923
June .....	5101	5025	4990	4793	4822	4836	4892	4897	4946
July .....	5108	5002	5014	4823	4805	4872	4860	4931	4943
August .....	5070	5002	5005	5015	4778	4847	4339	4903	4914
September...	5037	4826	4951	4799	4790	4790	4840	4889	5060
October .....	5039	4823	4941	4842	4774	4817	4763	4889	4890
November ...	5046	4762	4865	4816	4769	4822	4819	4884	4915
December ...	4959	4783	4907	4825	4760	4803	4889	4881	4910
Yearly Means. }	3.5049	3.4883	3.4900	3.4811	3.4792	3.4839	3.4853	3.4891	3.4932

TABLE IV.

Monthly determinations of the Absolute Total Force at Toronto, from 1856 to 1864 inclusive.

MONTHS.	1856.	1857.	1858.	1859.	1860.	1861.	1862.	1863.	1864.
January .....	13.8815	13.8567	13.8068	13.7829	13.8000	13.8195	13.8073	13.8026	13.8237
February ....	9157	7745	8252	8085	8141	8088	8093	8014	8255
March .....	9053	9373	8101	8016	7987	8217	8180	8009	8074
April .....	8989	8053	8290	8272	8097	8208	8344	8127	8086
May .....	8878	8450	8870	7997	8345	8856	8222	8049	8135
June .....	9193	8925	8632	8120	8048	8107	8194	7968	8207
July .....	9303	8347	8792	8177	8109	8185	8163	8105	8054
August .....	9099	8820	8329	9077	8135	8193	8180	8120	7835
September...	9123	8334	8824	8208	8389	7928	8147	8121	8582
October .....	9141	8305	8696	8602	8263	8006	8094	7945	7879
November ...	9123	7374	8386	8135	7968	8048	7952	7916	7993
December ...	8775	8005	8548	8198	7888	7927	8168	7938	7996
Yearly Means. }	13.9054	13.8436	13.8524	13.8251	13.8109	13.8173	13.8143	13.8028	13.8109

TABLE V.

Annual Means of the Monthly determinations of the Absolute Declination, Inclination, Horizontal Force, and Total Force, at Toronto, to 1864 inclusive.

DECLINATION.			INCLINATION.			HORIZONTAL FORCE.			TOTAL FORCE.		
Years.	Means.	Years.	Means.	Years.	Means.	Years.	Means.	Years.	Means.	Years.	Means.
1841	1 14.3	1853(a)	75 16.6	1853	75 22.2	1841		1841		1841	
1842	1 18.9	1851(b)	16.4	1854	23.6	1842		1854		1842	
1843		1855(c)	14.7	1855	23.5	1843		1855(d)	3.5151	1843	
1844		1856	14.8	1856	24.0	1844		1856	5049	1844	
1845	1 29.1	1857	15.5	1857	24.3	1845		1857	4883	1845	
1846	1 30.8	1858	15.1	1858	24.4	1846		1858	3.5443	1846	
1847	1 33.2	1859	15.3	1859	25.0	1847		1859	4900	1847	
1848	1 35.4	1860	18.3	1860	24.5	1848		1860	4811	1848	
1849	1 36.9	1861	18.8	1861	23.8	1849		1861	4792	1849	
1850	1 38.6	1862	20.0	1862	23.2	1850		1862	4839	1850	
1851	1 40.9	1863	20.4	1863	21.5	1851		1863	4853	1851	
1852		1864	20.5	1864	20.9	1852		1864	4891	1852	
									5110	1853	
									4932	1854	
									13.029	1855	13.937
									13.808	1856	13.905
									13.886	1857	13.844
									13.015	1858	13.852
									13.634	1859	13.825
									13.034	1860	13.811
									13.034	1861	13.817
									13.034	1862	13.814
									13.030	1863	13.803
									13.874	1864	13.811

(a) From determinations in July and August.

(b) From determinations in February, March, April, and June.

(c) From determinations in August to December, both inclusive.

(d) From determinations in September, October, November, and December.

Corrected for annual and secular variation.

## REVIEWS.

*An Account of the Smithsonian Institution, its Founder, Building, Operations, etc., prepared from the Reports of Prof. Henry to the Regents, and other authentic sources.* By William J. Rhees, Chief Clerk of the Smithsonian Institution. Washington: 1863.

*Annual Reports of the Board of Regents of the Smithsonian Institution, showing the Operations, Expenditures, and Condition of the Institution for the years 1857-1862.*

On the 26th of May, 1786, James Louis (or Lewis) Macie, a member of Pembroke College, Oxford, proceeded M.A. at that University. In the following year he was elected a fellow of the Royal Society; and in 1791 his first communication appeared in the *Philosophical Transactions* under the title: "Of some Chemical Experiments on Tabasheer;" a mineral substance extracted from the pith of the bamboo, and in many respects nearly identical with quartz, or common siliceous earth. According to a recent very meagre biographical notice in the *New American Cyclopædia*, his mother was Mrs. Elizabeth Macie, heiress of the Hungerfords of Audley, but this is probably a mere re-affirmation, in modified form of his own statement, to which we shall presently refer. He was at any rate a man of independent fortune, and, according to an obituary notice in the *Gentleman's Magazine*, "continued to enjoy the property of the Macies," till his death; when it was bequeathed in a way calculated to perpetuate his name as the founder of an institution of world-wide interest. But the name so perpetuated was not that of James Louis Macie. In 1803 a second paper, by the same author as that on the chemical experiments on Tabasheer made its appearance, entitled "A Chemical Analysis of some Calamites." But with the new century the inheritor of the Macie property had seen fit to abandon that name; and thenceforth, in philosophical transactions and elsewhere, he chose to be known as James Smithson. The only reasons which he appears to have assigned for this change, are thus set forth in the autobiographic note, with which his will is introduced: "I, James Smithson, son of Hugh, first Duke of Northumberland, and Elizabeth, heiress of the Hungerfords of Audley," or, as the *Gentleman's Magazine* has it, "of Studley," "and niece to Charles the proud Duke of Somerset."



The authority for the maternal ancestry of Smithson, as set forth in the *New American Cyclopædia* is probably nothing more than an adaptation of this testamentary autobiographic note; as other statements with which it is accompanied are not only vague but inaccurate. That James Smithson was a son of the first Duke of Northumberland is very possible; though if so it must have been in such a way as renders his change of name in mature years a curious assertion of an alliance that added the bend sinister to any heraldic honours he might thereby claim. Who the Macies were, whose property he enjoyed, or what was his actual relation to them, nowhere appears, so far as we are aware, in any authentic notice of him. They are said to have resided at Weston, near Bath, where, possibly, tradition or local histories preserve information which might be welcome to those who are curious about the biography of this singular man. It cannot be justly charged as a mere vulgar curiosity that would crave for further knowledge of the eccentric and scholarly recluse, who occupied offices of honourable distinction among the foremost scientific men of his day, and was spoken of from the chair of the Royal Society, when death had removed him from its roll of Fellows, as "distinguished by the intimate friendship of Mr. Cavendish;" and again as one who "rivalled our most expert chemists in elegant analyses."

It is sufficient to say, in reference to Smithson's claim to ducal paternity, that if Elizabeth, heiress of the Hungerfords of Audley, and niece to the proud Duke of Somerset, was his mother; the wife of Hugh, first Duke of Northumberland, was the lady Elizabeth Seymour, daughter of Algernon, Duke of Somerset; and no niece, but a grand-daughter of Charles, Duke of Somerset, to whom the appellation of "the proud Duke" was applied. There is mystery, and probably also romance, in the story thus curiously complicated by the change of names, and the claim of a noble-maternity, so unlikely to be associated with illegitimacy in any ordinary fashion. But at any rate it is sufficiently obvious that the claimant of such descent, however derived, who lived to bequeath inherited property sworn under £120,000 sterling, was manifestly no ordinary foundling. There is something curious also in a grave physicist of mature years, moving in the society of men alike distinguished for scientific and social rank, and accustomed to minutest observations of scientific evidence, gravely setting forth testamentary claims of ducal descent, which he knew that every one who chose

to be at the trouble to turn over the pages of a *peerage*, could ascertain to be false.

One fact, however, rests on the indisputable authority of Mr. Davies Gilbert, President of the Royal Society; and it is this: that Smithson enjoyed the intimate friendship of the Hon. Henry Cavendish, who could trace an unbroken pedigree, through Sir John Cavendish the Lord Chief Justice of Edward III. back to an ancestry of Norman blood, famous in the days of the Conquest; but whose claim to the memory of this later generation rests on the better foundation of his distinction among the English philosophers of the eighteenth century, when Watt, Priestley, Woolaston, Davy, Black, and Thompson along with Cavendish, were adding lustre to English science by their brilliant discoveries in chemistry, and the kindred sciences. But to have been the intimate friend of the high born British Chemist, implies some very peculiar traits in the possessor of such a claim to our notice. Cavendish was a recluse, scarcely less difficult of access than some eremite dwelling in desert haunts, remote from human kind. Such was his extreme reserve and love of retirement, that though for half a century a distinguished fellow of the Royal Society, a member of the French Institute, and a student of science who had won a European reputation: yet his modern biographer\* found it almost as difficult to recover any detailed materials for his life, as is now the case in reference to our less famous student of physics. By the time that Smithson began to take an active part in the proceedings of the Royal Society, Cavendish had his town residence in Montague Place, close to the British Museum, where the few visitors who were able to penetrate into the domestic sanctuary of the scientific recluse, have left on record that books and apparatus constituted its chief furniture. A suburban villa at Clapham, which formed his favourite residence, was in like manner occupied throughout with workshops, laboratory, astronomical, meteorological, and electrical apparatus. There his rare guests invariably found the same homely fare. According to the information supplied to his biographer by a Fellow of the Royal Society, the dinner table was provided with a leg of mutton, and nothing more. On one occasion

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\* *The life of the Hon. Henry Cavendish, including abstracts of his more important Scientific papers, and a critical inquiry into the claims of all his alleged discoveries of the Composition of Water.* By George Wilson, M.D., F.R.S.E. London: 1851.

when four scientific friends were engaged to dine with him, his housekeeper remonstrated against the invariable bill of fare: that a leg of mutton would not be enough for five. "Well then, get two," was the reply. One can fancy Smithson as one of the five, who, at this homely board, talked over the favourite themes on which they meditated in common; and speculated, with unimpassioned stoicism, on such laws of the universe as engaged their thoughts. Professor Playfair, who had met with Cavendish at the Royal Society Club, describes him as awkward in appearance, speaking very seldom and with great hesitation. "But," he adds, "the gleams of genius break often through this unpromising exterior. He never speaks, but it is exceedingly to the purpose; and either brings some excellent information, or draws some important conclusion," Smithson, one is tempted to fancy as little less shy and reserved; though with him some at least of the originating causes were very different. The Honourable Henry Cavendish was of untarnished ducal descent by both parents; and related by near propinquity to others of the most illustrious among England's ancient nobility. Smithson betrays in his will the nature of the wound, which, rankling in his breast, may have made of him the reserved, silent student of science, fitted by his retiring exclusiveness to be the friend of the misanthropical patrician Chemist, who shrunk from the society of his fellow men; had little intercourse with his noble relatives; and is reported by his contemporaries to have had a positive dislike to women. It is probable, however that his biographer is nearer the truth when he suggests that he did not hate women, but was only awkwardly shy and afraid of them.

But Smithson,—who commences his will with the assertion of a ducal descent on both sides, not less noble than that of Cavendish,—in one of the clauses of his will bequeaths the whole of his property to a nephew, the son of his brother, "Lieut. Col. Charles Louis Dickenson." The name adds fresh complication to the question of his family relations: with the "Louis" which he dropped along with the surname of his earlier years, reappearing as the only element common to both. But the significant clause is superadded, that in case of the death of this nephew, the whole property is to go to any children of his, "legitimate or illegitimate." But neither nephew, nor nephew's children, survived to claim the property of the old man. He had at one time, it is said designed making the Royal Society the administrator of his wealth; but his co-fellows

offended his touchy, sensitive nature in some way ; and after providing a small annuity for John Fitall a faithful old servant, and extending the terms of a loan to H. H. Saily, also formerly in his service, but who is described as "now keeping the Hungerford Hotel in Paris ;" he transferred the whole of his estate "to the United States, for the purpose of founding an Institution for the increase and diffusion of knowledge among men." The name adopted by Smithson's former servant for his Parisian hotel is, in all likelihood, another index of the sensitive assertion by his master of descent from the noble heiress of the Hungerfords of Audley, and so designed to gratify him by an acceptable humouring of his known weakness on this point.

Without domestic ties, and frequently apparently without any fixed home in England, he appears to have travelled on the continent, staying once and again a year or two in Paris, Berlin, Florence, &c., and spending his later years chiefly abroad. Occasional glimpses of his wanderings are still recoverable from his scientific memoirs ; as when in communicating to the Royal Society, in 1813, some analytic experiments on a substance from Mount Vesuvius, he remarks : "The present saline substance was sent to me from Naples to Florence, where I was, in May, 1794."

Smithson's last communication to the Royal Society was made in 1818, and is entitled "A few facts relative to the colouring matter of some vegetables ;" but reference to this paper shows that he had then abandoned all active labour as an experimental physicist. "I began," he says, "a great many years ago, some researches on the colouring matters of vegetables. From the inquiry being to be prosecuted only at a particular season of the year, the great delicacy of the experiments, and the great care required in them, and consequently the trouble with which they were attended, very little was done. I have now no idea of pursuing the subject. In destroying lately the memorandums of the experiments which have been made, a few scattered facts were met with which seemed deserving of being preserved. They are here offered, in hopes that they will induce some other person to give extension to an investigation interesting to chemistry, and to the art of dying ;" and so, apparently, closes the scientific labours of Smithson. He was probably then destroying papers, preparatory to one of his long sojourns in other lands. The date of his will, 23rd October, 1826, shows him in London, resident in Bentinck Street, Cavendish Square ; but when his death

took place, less than two years thereafter, he was again a wanderer, with so uncertain an abiding place at the close of his life, that the biographical notice in the *Gentleman's Magazine* states him to have died in the south of France, while a notice attached to the *Guide to the Smithsonian Institution and National Museum*, assigns Genoa as the place of his decease.

Smithson, as the friend of Cavendish, was—as may be presumed, not without some support from the imperfect glimpses we thus recover of him,—one to whom intimate intercourse with society at large was far from acceptable. But in another, and more interesting respect, he bore some resemblance to the great English chemist. He was singularly delicate in his scientific operations; and among his personal effects, deposited in the Regents' Hall, at Washington, are the miniature apparatus and laboratory with which he was wont to pursue his experiments as an analytic chemist while travelling either at home or abroad. He was referred to by Mr. Davies Gilbert, when noticing the blanks which death had made, by the removal of him and other recently deceased Fellows of the Royal Society, in the last address delivered by him from its presidential chair; and he then spoke of him as one unsurpassed in expertness and analytic skill among contemporary chemists. In illustration of his "elegant analyses," one romantic incident is referred to as proof of his skill. Happening, it is said, to observe a tear gliding down a fair lady's cheek, he started forward to catch it in a crystal vessel, ere it fell. Half of the falling tear escaped; but what remained was submitted by him to minute analysis, and enabled him to determine the nature of its included salts.

In the case of Cavendish, the sight of a strange face, even at the Royal Society Club, where he appears to have been most at his ease, was sufficient to strike him dumb. Such was his excessive shyness, that one of his contemporaries describes him as standing on the landing, at Sir Joseph Banks' presidential *soirées*, evidently wanting courage to open the door and face the assembled Fellows; and only entering at last, when the sound of footsteps behind compelled him to avoid the approaching company by escaping into the crowd. Shrinking as he thus did from the society of his own sex, it would be curious and interesting to ascertain to what extent the statement of Smithson's intimate friendship with him, which rests on authority so worthy of credit, is actually borne out by any existing evidence; and, if so, how far it was traceable to similarity in disposition and

temperament, as well as in scientific tastes. In one respect, however, they must have differed. Shy and reserved as Cavendish was among his fellow men, he literally fled from the gaze of a woman. So far did he carry this that Lord Burlington notes of him, "he would never see a female servant, and if an unfortunate maid ever shewed herself, she was immediately dismissed." One can hardly, therefore, fancy him, even under the most urgent stimulus of analytic zeal, snatching the falling tear from a lady's cheek.

In another respect, also, Smithson would appear to have differed from his illustrious friend, if his American biographer may be relied upon. "He was," says the notice appended to the Guide Book already referred to, "of a sensitive, retiring disposition; was never married; but appeared ambitious of making a name for himself." This, however, I suspect is a mere inference, and is not borne out by the terms of his will, which primarily destined his property to any collateral, and even illegitimate surviving relation, and accompanied the ultimate bequest to the United States with no ostentatious obligations, beyond the mere determination of the name of the establishment to be founded at Washington as the "Smithsonian Institution." To the pecuniary trust he did, indeed, add certain gifts of a more personal character. His American executors not only acquired by his will the ample funds left at his death, but also received in trust his whole personal effects; and among the latter were books, papers, scientific apparatus, and minerals, all illustrating his tastes, and furnishing important contributions towards a better knowledge of the man. The Institution is, or at least, was, in possession of two likenesses of Smithson: one a portrait of him while a youth, in his academics as an Oxford undergraduate; the other a medallion profile, from which the engraving has been executed which is attached to all the Smithsonian "Contributions to Knowledge." The first was procured from the widow of his servant, John Fitall, and the latter passed directly, along with his other personal effects, to the United States.

In the annual report of the Board of Regents for 1857, the following information is communicated with reference to Smithson's personal effects:—"The bequest of James Smithson included all his personal effects, and these were obtained by the Hon. Richard Rush, the agent of the American Government, through whom the legacy was procured. They were delivered by him to the Secretary of State and afterwards deposited in the museum of the Patent Office, where

they remained until the last year, when they were transferred to the Regents' room in the Smithsonian building. They have been arranged for exhibition in a large case of black walnut, and now form an interesting portion of the collections of the Institution. They consist of a very extensive series of rare though minute specimens of mineralogy; of the table service of plate of Smithson; and of the portable chemical and mineralogical apparatus with which he made his investigations. Besides the above mentioned articles, the Institution has had in its possession for several years the library of Smithson, containing 115 volumes, and a collection of manuscripts, principally consisting of what would appear to be the materials of a philosophical dictionary."

The collection of personal effects of the founder of the Smithsonian Institution is even more curiously minute than the above notice indicates. When last we visited the Smithsonian galleries at Washington, there were displayed in the Regents' Room not only the founder's minerals, chemical laboratory, balance, thermometer, and other scientific apparatus, but his sword, riding whip and walking cane, his candlesticks, travelling portmanteaus, snuff box, and umbrella.

In the report of 1857 it is justly added in reference to those varied personal relics of Smithson: "The whole collection taken together serves to exhibit the character of the man, and clearly to indicate his intention as to the nature of the Institution to which he gave his name. It serves to strengthen the conviction, if anything of this kind were needed, that the proper interpretation of the will has been given by the Regents in adopting the plan which makes active operations, the discovery of new truths, and a diffusion of these among men, the prominent object of the establishment. In this connexion it may be interesting to repeat a statement made in a former report, that the Institution is in possession of two likenesses of Smithson: one, a portrait of him while a youth, in the costume of a student at Oxford, the other a medallion, from which a steel engraving has been executed. The first was purchased from the widow of John Fitall, the servant of Smithson, and the other was among his effects, and identified by a paper attached to it, on which the words 'my likeness' were written in Smithson's own hand."

In the same report, the Regents add this remark:—"A list of the papers published by Smithson, and a record of all the facts which

could be gathered in relation to him, have been made, to serve hereafter for a more definite account of his life and labours than has yet appeared." It would appear, therefore, to have been in contemplation to prepare an extended biographical notice of the founder of "the Smithsonian Institution." And this seems to us no more than is due to Smithson by those who have assumed the responsibility of his executors for the world at large. He cannot be looked upon as the mere vulgar millionaire, bequeathing a wealth he could no longer use, in order to gratify his vanity by some costly charity destined to perpetuate his name. As a man of science his contributions to physics do not greatly enlarge our knowledge, or add materially to the resources by means of which chemistry and the kindred sciences have made such rapid strides in modern times; but they show him to have been a willing fellow labourer with some of the great men who confer so brilliant a lustre on the early years of the present century; and that under circumstances of abundant wealth, and peculiar social relations little calculated to have tempted him into the paths of scientific investigation, had his tastes not lain very specially in that direction.

But eight years have elapsed since the notice of Smithson's papers and other personal effects was inserted in the Regent's Annual Report; and the present year has been signalised by a disastrous conflagration, in which it is to be feared that the unused materials for the purposed biography may have vanished, with whatever secrets they contained. On the 12th of January the electric wires flashed across the continent the following unwelcome intelligence:—

"This afternoon, about three o'clock, a fire broke out in the Smithsonian Institution building, in the loft above the picture gallery, between the ceiling and the roof, caused, it is believed, by a defective flue. The ceiling soon fell in, and in a few minutes, the gallery was one sheet of flame. The fire, as it mounted the central tower and burst forth in full volume from the main roof, was magnificently grand, and a curious spectacle was presented by the steadiness of the revolution of the anemometer, or wind register surmounting the tower, while the fierce flame was ravenously mounting to its destruction. The windows of the picture gallery soon burst out, disclosing only the shell of the room. There were some 200 of Stanley's pictures here. He had negotiated for their sale to the Michigan University. Only five or six of them were saved. The loss is very serious, including the lecture room, the philosophical



instrument apartment, and most of the valuable instruments. The offices in the towers, and the originals of the private records and archives of the Institution, were destroyed. The top of the principal tower and several of the battlements fell. The conflagration was nearly altogether confined to the main building, and above the first story. The latter contained the Museum, which was damaged more by water than fire."

We know not whether the lost records and archives referred to included Smithson's papers and other personal effects; but, from the position of the Regents' Room, adjoining the centre of the main building, and above the ground floor, it is to be feared that the materials so essential to any minute biographical record of the founder of the Institution have perished, along with the valuable ethnological picture gallery, and so much else which has fallen a prey to the devouring flames.

In an early volume of this Journal\*, a valuable paper, from the pen of Professor Henry, was printed, devoted to the subject of Acoustics, as applied to public buildings; and an interesting communication was contributed to a subsequent volume† by the learned professor, with views and ground plans, illustrative of the manner in which the principles and conditions previously investigated by him, along with his colleagues, Captain Meigs and Professor Bache, had been practically applied in the lecture room of the Institution buildings. In adapting this to the special requirements of a public theatre for the display of scientific experiments, and the delivery of lectures to large audiences, the principles of acoustics had been applied with rare success; so that a lecturer could address an audience of upwards of two thousand persons, and make his voice heard distinctly in the remotest corner without effort. This admirably constructed scientific theatre, we regret to see, has perished along with other parts of the main building. But the principles on which it was so successfully adapted to the required purposes, are, happily, beyond the reach of such elements of destruction; and have been applied, with equally satisfactory results, in some of the recently completed legislative halls in the new wing of the Capitol, at Washington.

In some respects the news of the destruction, not only of the

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\* *Canadian Journal*, Vol. II., p. 130.

† *Ibid*, Vol. III., p. 110.

fine lecture room, but of the whole costly building erected on "The Mall," at Washington, might be received with less regret than would ordinarily pertain to the loss of an edifice specially set apart for such purposes as it was devoted to; for the building, with its lecture room, galleries, library, and museum, was the practical exposition of ideas relative to the application of the founder's bequest, which many looked upon with apprehension, as destined to squander the fund on purely local and popular purposes. One class of advisers advocated the founding of a large library at Washington, on which the whole bequest should be expended. A great public museum in the same city found another equally zealous body of advocates. A third class proposed to devote the fund to secure the services of lecturers, whose prelections on science and literature should be extended to all the chief cities throughout the States. The advice of a fourth class was urged in favour of a series of popular tracts, to be published and distributed among the million. It is a subject of gratulation frequently referred to in notices of the Institution, that the bequest of Smithson was brought over from England in British sovereigns, and these, after being deposited in the United States Mint, were recoined into American eagles, and so converted into part of the currency of the country. But, so far as the special destination of the bequest had been indicated by the testator, it seemed to run no slight danger of being frittered away on ephemeral popular gratifications, and effectually lost to its purpose of increasing and diffusing knowledge throughout the world. The Act of Congress which determined, as far as legislation has done so, the mode of carrying out the trust, aimed, apparently, at a compromise between the various conflicting schemes. It directs the formation of a library, a museum, and a gallery of art; authorizes the delivery of courses of public lectures; and provides for the erection of a building, on a liberal scale, to supply the accommodation requisite for all those varied purposes.

The building, which has to a great extent perished in the recent conflagration, was the first result of this Act of Congress. It is described in the Guide Book as a structure "in the style of architecture of the last half of the twelfth century, the latest variety of the rounded style, as it is found immediately anterior to its merging into the early Gothic, and is known as the Norman, the Lombard, or Romanesque." In reality, however, it might rather be described

as an attempt to adapt the details of the massive and sombre Romanesque architecture of the twelfth century, to the light proportions, elevated towers, and clere-stories of the latest perpendicular, as it merged into the florid Tudor Gothic. The result was one on which the architectural critic could look with little satisfaction ; while the scientific student was compelled to note everywhere in its interior, obtrusive evidences of the practical requirements of a scientific gallery and museum sacrificed to the efforts of the architect at mere picturesque display. The admirable lecture room was, indeed, an exception to this ; but its merits were in no respect due to the architect : whose original plans for such a room, occupying one half of the first story of the main building, had to be abandoned, owing to its obstruction by rows of Gothic columns rendering it impossible to apply those acoustic principles which ought to have the foremost place in the consideration of the architect, but which appear for the most part either to be deliberately ignored by the whole profession, or at best to be rendered wholly subordinate to mere ornamental effect : even where the subject of such misplaced decoration is a church, a lecture room, or a college hall.

To the neglect of all practical considerations of climate, or special adaptation, on the part of the architect, the destruction of the costly edifice at Washington is clearly traceable. Had the building been what it professed to be : a reproduction of the solid masonry, massive piers, and small round-headed lights of the twelfth century, it would at least have been adapted to the severity of an American winter. In the Report addressed by Professor Henry to the Board of Regents in 1858, after referring with regret to the fact "that the interest of the money expended on the building would have been much more efficiently applied in the development and publication of new truths," he goes on to say : "The changes which have been necessary on the building, to accommodate the increasing operations of the Institution have involved considerable expense. The corridors, which were entirely open to the north-west wind, have been enclosed with glazed sashes ; a large amount of space has thus been rendered available, and a considerable portion of the interior of the building protected from the inclemency of the weather." He then proceeds thus :—"The heating of the building is a heavy item of expense, and must continue to be so until double windows can be furnished, particularly on the north side, and a more economical as well as efficient method of warming be adopted. The smaller rooms are mostly

heated by stoves, and the larger ones by furnaces. Estimates have been procured for substituting hot water apparatus, but the expense of introducing this method is so great that we would hesitate to advise its adoption at present." Temporary expediency and prudential reasons have no doubt continued to prevail, until the recent fatal results demonstrated that it was a false economy to delay grappling with the evil. It is one with which all institutions requiring extensive accommodation find it peculiarly difficult to deal, and which has already involved the loss of many valuable libraries, museums, and galleries of art, on this continent.

The Smithsonian bequest was still hanging in unstable equilibrium between the various schemes which we have indicated above, propounded for its expenditure, when it fortunately passed to a great extent under the judicious control of Professor Joseph Henry, to whom, as secretary of the Institution, the scientific world is mainly indebted for the wise and beneficial expenditure of the income in the publication of the series of "Contributions to Knowledge," now extending to thirteen quarto volumes, embracing valuable monographs on Archæology, Geology, Philology, Meteorology, Mathematics, Natural History, &c.; in addition to the series of octavo "Miscellaneous Collections," devoted to meteorological and physical tables, directions for observations, and special reports; and thirdly, the Annual Reports, printed at the expense of the United States Government, but including reports or abstracts of the scientific lectures delivered at the Institution building, and selections and translations, chiefly from foreign scientific periodicals.

In the plan for the administration of the trust, chiefly, if not wholly due to the wise foresight and liberality of Professor Henry, the objects of the Institution are defined as:—1st, to increase, and 2nd, to diffuse knowledge among men; and in one of the general considerations set forth as a guide to the just fulfilment of the duties of the Board of Regents, it is remarked: "It should be recollected that mankind in general are to be benefited by the bequest, and that therefore all unnecessary expenditure on local objects would be a perversion of the trust." The increase of knowledge is accordingly proposed to be effected by stimulating men of talent to carry out original researches, and offering rewards for memoirs embodying new truths; while the different series of publications already referred to, are the exponents of the second part of the plan, whereby the diffusion of knowledge is secured.

The principles thus established in relation to the future expenditure of the income derived from the investment of Smithson's bequest, will, it may be hoped, continue to regulate its application hereafter; and valuable as are the ethnological and natural history collections already accumulated at Washington,—in so far as they have escaped the recent destructive conflagration,—we cannot evade the conviction that all such purely local expenditure of the fund is at variance with the cosmopolitan aims of the founder, and the consequent obligations assumed by the United States in undertaking the administration of the bequest “for the increase and diffusion of knowledge among men.” The jealousy with which the special administrators of the fund are seen to guard it against all attempts to divert it from its legitimate channels, is deserving of the highest appreciation. In 1861, when “the threatening aspect of political affairs” jeopardised so many interests, the secretary is found thus addressing the Board of Regents: “We trust that there is honesty, intelligence, and liberality sufficient in this country, whatever may be its political condition, to safely guard the bequest which was entrusted with unhesitating faith to the people of the United States for the good of mankind.” Had, indeed, the funds been left by some Gerrard, Astor, Lowell, or other naturalised or native-born citizen of the Great Republic, the diversion of a portion of the income to the adornment of Washington, and the instruction and gratification of the citizens who reside, or annually resort to the seat of federal legislation, might have seemed less inconsistent with a liberal construction of the terms of the bequest; but when it is borne in remembrance that the endowment was left by a foreigner, a man of science, and an active member of the Royal Society of London: who, after meditating the disposition of the fund by his survivors in the Council of that Society, finally selected the government of a remote country, to which, though a frequent traveller, he was a stranger, as the trustee and administrator of his will: the citizens of the Republic will have reason hereafter to acknowledge no slight obligations due by them to the liberal minded and indefatigable secretary of the Smithsonian Institution for the wise firmness and sagacity with which he has maintained the honour of his country in the execution of so delicate and peculiar a trust.

The difficulties with which the Board of Regents has to contend are of a multifarious and shifting kind. At one time they are found complaining of “the cost of keeping up a reading-room in which the

light publications of the day, obtained through the copyright law are perused principally by young persons." At another time their grievance is that they are forced to become the recipients and custodiers of a strange variety of live animals forwarded by government and private explorers, including "two bald eagles, monkeys, two wild cats, a jaguar, and a large grizzly bear from the rocky mountains!" The latest printed report is that for 1862, though including some early proceedings of 1863; but its novel grievance indicates the change of circumstances, which has, no doubt, contributed to delay the issue of any later report. In it Professor Henry is found in correspondence with Edwin M. Stanton, Secretary at War, in reference to thirty-three boxes and one bundle of books, maps, papers, and other articles, taken by the United States forces in South Carolina, and forwarded to the Smithsonian Institution by the Transportation Company; and also the library of Bishop Johns, brought in loose volumes, by army waggons, from Alexandria. Of those the Board of Regents are required to become the curators "until the termination of the present war;" and the Secretary reports his interview with the War Secretary, relative to the important question of funds for defraying the expenses incident to such an unexpected mode of increasing and diffusing knowledge among men.

It is curious indeed, and still more sad, to perceive in how many ways the terrible evils incident to warfare involve in their remote results the most beneficent cosmopolitan institutions, disturbing the quiet student in the retirement of his study, and converting the laboratory and work-room of the peaceful man of science into workshops of war. The Smithsonian Institution, administering the bequest of a deceased man of science for the benefit of the civilised world, might seem peculiarly protected from the recoil of foreign or domestic strife; yet, on the 31st of January, 1863, the Board of Regents is found recording this resolution: "That the secretary be directed to inform the Congress of the United States, that George E. Badger, one of the Regents of the Institution, has not attended the recent meetings of the Board, and they are advised that he is now in rebellion against the Government of the United States, and submit whether the name of said Badger should longer remain on the list of Regents of said Institution." Most earnestly do we hope that the time is not far distant when the renewed activity of the Smithsonian Institution, and of all other societies throughout the United States devoted to science and letters, will afford gratifying evidence that

the marvellous energies which have been displayed with such indomitable perseverance in war, are once more enlisted in the nobler arts of peace; and are directed, in the spirit with which the plan of organisation of the Smithsonian Institution has been so wisely imbued by its able secretary, for the diffusion of knowledge, and the benefit of mankind.

D. W.

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### THE HAIRY MEN OF YESSO.

*Glasgow Citizen, 7th January, 1865.*

An interesting communication was read at last meeting of the Ethnological Society, the writer of which was Mr. W. Martin Wood, and the subject "The Hairy Men of Yesso." The Island of Yesso is the most northern portion of the empire of Japan. These aborigines are named "Ainos," or "Mosinos"—the "all-hairy people"—this last being a Japanese term which marks their chief physical peculiarity. Their number is estimated at about 50,000. Yesso is only separated from Nippon by the narrow Strait of Tsougar; but the climate of the island is unpropitious and its soil is barren, so that the Japanese have only occupied the southern portion. They number about 100,000, and dwell principally in the cities of Matsmai and Hako-dadi. The former city is the residence of the feudatory prince who holds Yesso under fealty to the Tycoon of Jeddo. To this prince of Mats-mia the Ainos send a deputation every spring, who present a tribute of dried fish and furs, and do homage, and repeat a formal convention expressive of submission to the Japanese. Hako-dadi is the largest city of Yeddo, and is the third Japanese port opened to foreign commerce. Its roadstead and harbour are the safest and most commodious of any in the eastern seas. It affords an excellent port for the refitting of merchant vessels, especially for the American whalers, and it also forms a good rendezvous for the naval vessels of the various trading powers. From a temple in the centre of the city float the flags of England and France, and there the consuls of those powers reside. The Ainos live quite in the interior of the island and seldom show themselves at Hako-dadi or Mats-mai. Of a timid and shrinking attitude, these people seem utterly crushed in spirit by their long subjection and isolation. They are short in stature, of thick-set figure, and clumsy in their movements. Their physical strength is considerable, but, besides that peculiarity, there would seem to be nothing by which an observer can recognise the possibility of the Ainos ever having possessed any martial prowess. The uncouthness and wildness of their aspect is calculated at first to strike a stranger with dismay or repugnance. Esau himself could not have been a more hairy man than are these Ainos. The hair on their heads forms an enormous bunch, and it is thick and matted. Their beards are very thick and long, and the greater part of their face is covered with hair, which is generally dark in colour; but they have prominent foreheads and mild dark eyes, which somewhat relieve the savage aspect of their visage. Their

hands and arms—and, indeed, the greater part of their bodies—are covered with abnormal profusion of hair. The natural colour of their skins is somewhat paler than that of the Japanese, but it is bronzed by their constant exposure. The women of the Ainos, as if in default of the extraordinary endowments of their spouses, have a custom of staining their faces with dark blue for a considerable space around their mouths. The children they generally carry in a very singular fashion over their shoulders, and during a journey these tender charges are placed in a net and slung over the backs of their mothers. The children are lively and intelligent when little, but soon acquire the downcast aspect of their elders. Yet these strange people have a history, and, though its details are lost, they cherish the remembrance that their forefathers were once the equals, if not the masters, of the Japanese. This is supposed to have been in the sixth century before Christ, at a period coeval with the reign of the first Mikado of Japan. The Ainos were then masters of the northern provinces of Nippon; but they appear to have become dispossessed of their land by the Japanese, and then were gradually driven across the Strait of Tsougar into Yesso. Their final subjection was not accomplished until the close of the 14th century, when they were completely overcome by a Japanese general, and compelled to render tribute at Jeddo. As to the origin of the Ainos, we believe the whole college of ethnologists are at fault. They have no written characters, but have had their rude bards or sagas, who, in verses orally transmitted, have kept alive the memory of their ancient heroes and their exploits on mountain and flood. The world will not quite lose these wild strains, for a French missionary, the Abbé Mermet, is preparing a translation of them. The language itself has already been collected, thanks to the perseverance of a Japanese official, who has compiled a glossary of the Ainos tongue rendered into his own. This zealous linguist deserves to have his name recorded, and it is a sufficiently remarkable one, being Jasherotsona-notske. Possibly the Ainos tongue may have in it some valuable hints for professors of mnemonics. One of its chief characteristics appears to be a clumsy principle of repetition. Thus the numerals are compound and carry one syllable all through—as chena-ppou, one; so-ppou, two; re-ppou, three; eunes-ppou, four; oskina-ppou, five, and so on. Their name for the sun is baikrets-houscup, and for the moon knonnats-housoup; for water they have ba, and for hand, tekke. Probably the European public may shortly receive from the Abbé Mermet a translation of the Ainos Japanese dictionary. It is some evidence of the former influence of the Ainos in Nippon that the Japanese have adopted several of the Ainos words in the spoken language of Japan. The rude mythology of the Ainos is connected on some obscure principle with the animals of the chase and the monsters of the deep. The bear is their chief divinity, although they slay that animal whenever they can accomplish such a feat. In the process of dissecting the carcass they endeavour to conciliate the deity whose representative they have slain, by making elaborate obeisances and deprecatory salutations. The head they always reserve, and place it outside their habitations as a sure protection against misfortune. From the Japanese they have adopted some few Bhuddist notions, but their native theology mainly belongs to the class of fetiche worship. All tribes of men have some tradition of the origin of the race. That held by the Ainos places a woman as the first of our race; and she came, as they say, from the west. This was



soon after the world was formed out of the waters, which is the Genesis taught in their cosmogony. The Aïnos know of no land except islands; so that really this might be the form which tradition has taken since that remote period when the isles of Japan and the Kuriles were forced up, as they appear to have been, by volcanic action from the ocean bed. The Aïnos tell how this woman, the first of the race, floated over the waves in a vessel which was freighted with bows and lances, with nets and lines, and all things necessary for the chase and fishing. She landed on an island where was a beautiful garden, and in it she dwelt alone and happily for a long period of years. That garden still exists, say they, but no living man has yet been able to find it. The close of this reign of single blessedness, so long enjoyed by this the first of the amazons, was brought about by a singular circumstance, which, however, can scarcely be narrated here. There is not, as in most legends, the record of a broken commandment; though transgression of some kind is implied, the change being connected with the loss of the garden and the increase and dispersion of the race. These events followed after the advent of a self-imposed protector, whom the lady of the island, in a period of weariness, permitted to enter and share in her solitude. The Aïnos are extremely hospitable, and are even eager to place at the disposal of their visitors all their little stock of provisions, their dried fish and furs. Besides the implements and spoils of hunting and fishing, there is little wealth of any kind in their habitations. The Aïnos formerly were monogamists, but now, when their resources admit of it, they imitate the Japanese practice of polygamy. In their marriage ceremonies they also imitate those of their conquerors. Like most other degenerate races, the Aïnos have acquired a taste for tobacco and alcoholic drinks; of the latter they use sak-ki, an intoxicating draught made from rice.

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#### REMARKABLE PHOTOGRAPHIC EXPERIMENTS.

*From Glasgow Morning Journal, 14th January, 1865.*

The Florence correspondent of the *Morning Post*, writing on the 7th inst., reports the details of most remarkable photographic experiments on the eye of a murdered person. It appears that on 13th April, 2nd June, and 22nd August last year, three murders were committed in Florence, in almost precisely similar circumstances, the victims in each case being lodging-house keepers.

In each case the corpse was discovered lying on the floor, with the throat cut from ear to ear, a pool of blood below her head, but only there—no marks of blood in any other part of the room—and a pocket handkerchief, the property of some one unknown, close to her person. The trinkets and money which she was supposed to have about her had disappeared, as well as other articles in the house. As no cries had been heard by the neighbours, the conclusion come to by the Florence police was to the effect that the murder had been perpetrated, in all probability, by two assassins, who had obtained admittance into the house when the poor woman was alone, under the pretext of wishing to see and hire her rooms; that one of them had suddenly thrown a pocket-handkerchief over her mouth and brought her to the ground, and that, when thus held fast and her cries effectually stifled, his accomplice had cut her throat.

Such was the conclusion come to by the police, and, in particular, by its chief officer—the Commesso di Publica Vigilanza, Leopoldo Viti—who, amongst other steps taken by him in each case, applied to the higher administrative and legal authorities on whom he was dependent for permission to have the eyes of the murdered woman photographed—an application which, in the belief that the granting it could lead to no practical result, was twice refused. Suspicion meanwhile pointed to a young man, Benjamin de Cosimi, who on the occasion of the first murder suddenly disappeared from Florence, and was known to have reappeared at the time of the third murder. He was arrested, and in his possession were found articles belonging to the last murdered woman, Emilia Spagnoli, and a blood-stained knife, the blood freshly shed. He now awaits his trial. Meantime the application by the Chief of Police in the third case was granted, and the experiments, with the results, are thus reported by the correspondent :—

“ Under the direction of Marabotti, the examining judge, or Giudice d'Istruzione, a series of photographic experiments have been carried on, not for the special purpose of furnishing additional criminal evidence for conviction (as the other evidence, with that view, is believed to be superabundant), but in order to establish a general principle, or law, of universal or very frequent application. Emilia Spagnoli was found lying on her left side, her large, glazed right eye being turned upwards. The eye was photographed immediately after her decease. The photograph then taken has been reproduced in a greatly magnified form, so greatly magnified as to allow the lineaments of a human face, two inches in length, to stand out distinctly from the same. When I mention that Alinari, the first photographer of Florence, and indeed possessing a European reputation, was the artist by whom the work was executed, I need say nothing more as a guarantee of the fidelity and care employed on the occasion. From the tracing of the dim and nebulous outline, as actually found on the eye, to the completed outline of the face executed from that tracing by an artist who had never seen Benjamin de Cosimi, or any portrait of the man, and, again, from that completed outline to the two photographs of himself found in his possession at the time of his arrest—the transition, whether viewed as an artistic study or as a great question of medical jurisprudence, opens up inquiries of unsurpassed interest and importance. I am not, indeed, prepared to affirm that the first tracing in the series, as shown to me yesterday by the courtesy of the Judge of Instruction, Signor Marabotti, at his official chambers, so completely resembles the photograph of the living man, that, were I placed in a jury box, my verdict would be determined by the belief in their identity, but of the following fact there cannot be the possibility of a doubt. Whatever there is of marked, prominent, individual in that first nebulous profile has an exactly corresponding feature in the likeness of the living prisoner. A peculiar dilatation of the nostril, a depression in the centre of the upper lip (Benjamin dei Cosimi has lost his two front teeth), an unusual elongation of the mouth, a square but double chin, a certain massiveness about the region of the cheek-bone, and the outline of a whisker, are common to both. I purposely confine myself, in the present letter, to a simple statement of facts—of the circumstances under which these murders were perpetrated, the consequent photographic experiments instituted, and the result obtained, of which I was myself yesterday an eye-witness. There are very distinguished anatomists

—persons, too, deeply versed in all the laws of optics—who affirm that the whole thing is a mere freak of nature, to which no importance whatever should be attached. . . . I am happy to add that Signor Marabotti, with whom, from his official position, the prosecution of these inquiries rests, has evidently brought to his task a spirit worthy, in all respects, of a countryman of Galileo. The photographs, with all the accompanying and illustrative details, have been transmitted not only to the Medical College of Florence, but also to the medical colleges of Naples and Milan; and, by the authority of the Prefect of Florence, Count Cantelli, a series of photographic experiments will be instituted on the eyes of the patients in the hospital immediately after their decease.”

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## THEODORE II. AND THE NEW EMPIRE OF ABYSSINIA.

(Translated from the *Revue des deux Mondes*, Nov., 1864.)

### IV.

(Continued from page 76.)

The favour enjoyed by these two Englishmen, doubtless appeared to Mr. Gobat, the Swiss missionary who became later, Bishop of Jerusalem, an excellent opportunity for resuming his designs on Abyssinia. A kind of seminary had been founded at Basle under his patronage, in an old monastery, called Saint Crischona. There were prepared for foreign missions, and principally for those of Africa, young Swiss and Swabian mechanics, who received a very short theological education. The principle of St. Crischona and of Protestant missions in general, may be summed up in the following: the best way to give a barbarous people a high idea of European Christianity is, first of all, to make it appreciate the benefits of our civilization, by making it a partaker of them. Hence, they commence, not with preachers, but with trade-instructors. The principle is in itself a good and practical one, but its application at St. Crischona was defective. As a rule, the world measures the zeal of all kinds of apostles by the sacrifices which they make for their faith, and mistrusts those who gain money while occupied with the souls of their fellows. The authorities of St. Crischona had decided that twelve stations, each of which was to bear the name of an apostle, should form a chain on the road from Jerusalem to Gondar. The plan of this *via sacra* was very fine, but expensive, and almost impracticable. Eleven stations out of the twelve were Mahommedan territory; and whoever has seen the East knows the impossibility of making a single real conversion in Mahommedan

**Africa.** To this objection, they replied that these first eleven stations had no proselytizing end in view, and were only intended as commercial stations for the supply of the Abyssinian mission. Let it be so; but was it the intention of the subscribers to the undertaking, that their contributions should be employed to maintain private speculations, foreign to their religious interests, since these supplies could be much more cheaply obtained by means of a confidential agent, sent four times a year to Khartown or Massaoua?

In 1856 these attempts at religious propagandism began to be put into practice. M. Martin Flad arrived in Abyssinia from Basle: he was followed by ten of his countrymen, who have remained with him to this day, and who were located, some at Djenda, others at Darna, in the province of Dembea, and most of them in the hill of Gafat, about an hour's walk from Devia Tabor. They were very well received by the Negus, who tried to pass over the recent expulsion of the Lazarists; but when they asked permission to preach their doctrines, Theodore the Second quickly gave them to understand that he would tolerate no discussion of religious tenets, and only allowed them to make vague discourses on general morality. By special favour, M. Flad and a few others were authorized by the Negus to attempt the conversion of the Falachas (Abyssinian Jews), whom he disliked, and of the Galla prisoners, whom the Ouollo war had dispersed over the country. Before this decision, there remained but one alternative: to follow the precept of St. Paul and carry the Gospel to some people more disposed to receive it; but this was not the calculation of the reverend missionary Gobat, and, under the convenient pretext that it would be better to wait for some gracious interposition, they remained. They were soon required to satisfy the strange whims of the Negus.

Having read in the Bible that David went to war in a chariot, Theodore commanded *his Europeans* to make him one, leaving the form of it at their discretion. Accordingly, they did not make him an antique car, after the model of the Etruscan paintings, but a kind of green wagon that the Abyssinians took for a mysterious engine of war. This machine was carried to the camp, for they had forgotten to make roads to wheel it on. It was unfit for service at the end of a few days, and the wreck of the imperial chariot now adorns the arsenal of Magdala. The Negus, not troubling himself much with the result of this first attempt, ordered the missionaries to make him a mortar and bombshells. They at first declared that they had never learned to make them. There was then a repetition, but less tragical, of the

scene between the Dey of Algiers and the convicts, so humorously told by M. Raffanel, in his *Voyage au Sénégal*. The refractory missionaries were not decapitated, but simply placed under arrest, and their servants put in irons, so that, to save themselves from dying of hunger, they declared their readiness to attempt the work. Two of them had some mechanical knowledge. A Polish deserter, formerly an artilleryman, made a model for them; and the emperor came to Gafat in person to be present at the first trial which succeeded, that is to say, the shell went off and burst in the air. The Negus returned home very much agitated, without saying a word, and made a first distribution of favours to his apostolic-founders, with a liberality that attested the impression produced upon his mind.

Serious events soon came in the way to draw him off from these secondary objects of interest. The campaigns directed in 1855 by the Negus, first against the Ouollos, then against Tigre and Negousie the pretender to the empire, had excited attention in Soudan and even in Egypt. Said Pacha who was just then engaged in his triumphal progress through Soudan, appears for a moment to have entertained an inclination to invade Abyssinia, and measure his strength against the new emperor. Pretexts were not wanting. The Egyptians retained some sympathy for Oubie, a peaceful neighbour, who had been succeeded by a more restless and less manageable government. Moreover, Theodore had probably launched forth some of the bravadoes in which he impolitically indulges; and besides, there was a fear, justified by the event, of persecutions against the Abyssinian Mussulmans. Nevertheless, an Egyptian aggression under the then existing circumstances would have been accounted a gratuitous act of violence, and Europe could not have seen it with indifference. Accordingly, the Consuls General at Alexandria, decidedly put their veto upon it. The Pacha much annoyed, declared that Soudan had no value to him except as an open door to Abyssinia—and that since he was not permitted to enter by it he would disorganise Soudan. He kept his word. The capital founded by Mehamet Ali at the conference of the two Niles is no longer anything else than a nest of bankrupt slave merchants. Said was obliged to confine himself to sending as ambassador to the Negus the spiritual head of the Egyptian christians, *Abouna David*, in order to obtain some guarantees of peace on the frontier, and security for the Mussulmans of the interior.

David arrived at Devra-Tabor in December 1856. The first interview was by no means friendly. The Negus with that feverish distrust which is the most conspicuous trait in his character, could not conceive that a christian prelate could come to him under the patronage of a mussulman prince, and imagined that a Mahometan must be disguised as the Patriarch. He asked him dryly whether it was devotion to the Christian cause, or obedience to Said Pacha which had brought him to Abyssinia. The conduct of the *Abouna* justified the opinion of Theodore. David openly carried on even in Abyssinia the trade in Galla slaves. He did not at first comprehend the haughty and absolute spirit with which he

had to deal, and thought he could treat Theodore as his predecessors had treated the indolent and weak kings of Gondar. He proceeded so far that the Negus, without saying a word, drew a pistol from his girdle and capped it, then aiming at the terrified patriarch said calmly: "My Father, bless me!" David fell on his knees, and, with trembling hand, gave the required benediction. Even this lesson did not cure him; another day he spoke of excommunication, a serious measure, for a revolution might be its result. The Negus then begged Salama, the head of his church, to remove the ban of excommunication, and he, perfectly understanding the imperative nature of this prayer, hastened to comply with it. Theodore had assigned to each of the prelates, not far from his pavilion, a *zeriba* or enclosure of thorns, where they were to a certain extent in confinement, although surrounded with attentions and obsequious respect. David, upon the threshold of his door, stretched forth a menacing arm towards the tent of the Negus, and pronounced the canonical excommunication, to which Salama, from the middle of his *zeriba*, replied by a *veto* not less legal. Thereupon, the patriarch turning towards his suffragan, proudly told him that he was his superior, and that what he had bound no man could unloose. "You are my superior at Alexandria" replied Salama; "but in Abyssinia you are nothing and I am everything!" "Rebellious priest" said David, "I excommunicate you with your master!" "And I excommunicate you also" said the *abouna*, "And my excommunication is alone valid." In short, for two hours, the dreaded formula flew from one *zeriba* to the other, to the great scandal of the soldiers, who did not know which of these two infallible arbiters of the faith to believe. The Negus was not sorry to give the soldiers this practical lesson in scepticism, and to ruin, in their minds, a power which he dreaded for the future. When he thought the scandalous scene had lasted long enough he put a stop to it. The Patriarch David returned to Cairo without having accomplished anything. By way of reprisal, he caused everything that the Abyssinians possessed in Jerusalem to be seized, that is to say, the monastery founded by the ancient Ethiopian kings for pilgrims of that nation going to the Holy Land. The monastery and all its appurtenances were sold to the Russian bishop of Jerusalem for 60,000 dollars, which found their way into the patriarch's coffers. The Abyssinian monks cried out against the spoliation, but the Pacha of Jerusalem, gained over, it is said, by a timely bakshish, put them in irons and consecrated the spoliation for which the Negus has never forgiven the Copts and their Mahomedan patrons.

During these fruitless negotiations with Egypt, the Tigreen revolt suddenly assumed the dignity of a diplomatic question and entered a new phase. From his retreat in Halai, Mgr. de Jacobis, had patiently waited for an occasion to strike a serious blow at the persecuting power, which it is well known, he never acknowledged. The revolt in Tigre appeared to him to be vigorously carried on, and he did not hesitate to enter into it, giving it a religious and political character not yet apparent. In order to feel his way he sent to Negousie an obscure agent to ask him, now that he possessed the whole of Oubie's former territory, for the religious liberty which Oubie had voluntarily granted to the Catholics. This overture, which had nothing compromising in it, was well received by the young pretender, who easily saw the advantage to be derived from it; he replied by

the kindest assurances, but entered into no more than the necessary engagements, and invited Mgr. de Jacobis to remain for some time still at Massaoua, under the pretext that to enter Abyssinia during the rainy season might endanger his health.

A little while after, M. Chamin-Belliard, the French consular agent at Massaoua, a man entirely devoted to the designs of Mgr. de Jacobis, came to visit Negourie at Diksan near the frontier, and made the first step towards engaging the French government in the affairs of Abyssinia. That government, confiding in the agreement of the reports addressed to it by its direct or indirect agents in the Red Sea, recognized Negousie, who hastened to send to Paris two native ambassadors, escorted by a Piedmontese Capuchin monk, the bearers of an act, ceding to France the islands of Desset and Ouda near Massaoua, as well as the port of Zoula, the ancient and celebrated Adulis of the Ptolemies. Mgr. de Jacobis pushed forward this matter with a zeal more ardent than his superiors approved of, they being desirous of avoiding reproach against the interference of missionaries in politics. The embassy was well received at Paris. The French government, only possessing information of doubtful accuracy, adopted a line of conduct which has since been unjustly criticised, and which, then, was the only one possible. It recognized Theodore the Second as king of Central Abyssinia and Negousie, as king of Tigre, and, while entering into relations with the latter remained upon amicable terms with the Negus, who thought fit, without acknowledging the change, not to break with France.

The success of Negousie in diplomacy had to be supported by vigorous military action. The provinces in the north of Mareb, were still in the power of Dedjaz Hailo, a Theodorist general. This general imagined himself quite secure from an attack on the part of the pretender, separated from him by two provinces and the rude valley of Mareb; but he had counted without one of these strategic thunderbolts unknown in Abyssinia till the time of Theodore the Second, and which Negousie was happily able to imitate. The pretender passed in a single day (September 1858) from Diksan to the heart of Seraoue, by a fifteen hours' march across a wild and very broken country; he crushed Hailo in a single contest near Sabzega, killed his son Tesfa-Zion and chased Hailo himself into the *coimadega* (middle plateau) of the Bojos; then he subdued Seraoue, Hamazene, and Demblas, the northern provinces of Tigre, without striking a blow. The warlike inhabitants of the *Kolla* or lowlands of Konayn, tried to resist him; entrenched on a mountain, inaccessible in part, they defied the invader and beat their *nagavit* (war drum) till the moment when a body of picked men taking them in rear, surprised and made a fearful massacre of them.

These victories of the pretender did not take the Negus by surprise. His principal agent in Tyre wrote to him to make all possible haste, and gave him the news (absurd indeed, yet which filled all Abyssinia and even Soudan with the liveliest apprehension) that 12,000 French soldiers had landed at Massaoua. Theodore the Second was undoubtedly better informed by his agents at Massaoua, for, had he believed in the arrival of a single French battalion, he would have taken good care not to risk a battle; but he knew the true character of the relations of France with his rival, and, as if to bid defiance to Europe and civili-

zation, he revoked his decree against slavery, thus renewing the plague spot which still dishonours the Abyssinian empire; then he marched, with all haste, into Tigre. Negousie wished to wait and give him battle; but, persuaded by the Tigreen generals, who, in spite of their indisputable valour, dreaded in Theodore the fortunate soldier who had declared himself the man of Providence, he left his camp at Haouzene, crossed the Mareb and took up a position at Addi-Mangonti, to the north of Seraoue, not so advantageous for defence as for flight in case of disaster. Theodore followed him at a distance, careful not to press him too closely, and proving, by this circumspection, quite foreign to his usual style, the high idea he possessed of his enemy's skill.

It was in these untoward circumstances (1859) that M. de Russel, a distinguished officer of the French navy, arrived at Massaua, charged with the mission of entering into communication with Negousie and settling the acquisition of Desset. His mission produced a lively sensation, as is ever the case in the East in occurrences connected with the name of France. The report already circulated, that 12,000 Frenchmen had landed at Massaua, raised the hope of the Tigreens to the highest pitch. An old tradition, very popular among them, asserts "that the Franks will one day conquer Ethiopia, that they will enter by Hamazene and camp in the plain of Ad Johannis." This legend had just been rescued from oblivion by a nun, who had come from Godjam into Hamazene, where she had made for herself a great reputation for sanctity, and who publicly announced "that the new master of Abyssinia was about to arrive by the Red Sea." Great was the disappointment, when the French envoy appeared, followed by only six sailors, at Halai where he stopped, and where, badly surrounded and informed, he lost long days in the formalities of etiquette, and gave time to the Theodorists to organize. The militia of the warlike province of Kollagonzay surrounded Halai but without proceeding to violence. Tumultuous scenes took place at Halai among the Tigreens, who thought themselves betrayed; the French flag was trampled under foot. M. de Russel and his men showed much resolution and presence of mind; but surrounded by enemies, they had to give way, and descending into the ravines of Taranta, by night, they regained Massaua (February 1860.) Negousie, then, losing all hope of putting himself into communication with the French agent, made a disheartening retreat, which demoralized his troops more than a lost battle. Thirty leagues west of Adona, behind the level and open plateau of Tigre, begins a confused mass of low hills covered with virgin forests that man abandons to leopards, elephants and lions. This is the *mazaga*, a kind of African Sologne where deadly fevers reign, a vague frontier that the Barea negroes sometimes cross in order to surprise and plunder some Abyssinian village, but where the Abyssinians take good care not to follow them, although this country is nominally a dependency of the empire. It was towards these wretched valleys that Negousie fled, following the right bank of the little river Mareb, a rocky, wooded road, favourable to defensive warfare. His rival decided to cut off his retreat, left Axum and Tigre on his right and descended towards the Mareb by the plateau of Addi-Abo, an excellent position, at once commanding the Mareb and the Takazze; but when he arrived in the lowlands the enemy was gone and had already taken up a strong position in the heart of



the Ethiopian Alps; the Negus, hesitating to risk a battle and expose his troops to death from the murderous miasma of these grounds, followed him at a distance for one day, and, at last, was obliged to retire.

Gloomy and threatening, the Negus returned to Gondar. He had just heard that Mr. Plonden, the English consul, had been murdered by the soldiers of an insurgent chief called Garet. Some arms, discovered in the houses of suspected parties, furnished him with a pretext for terrifying the city by bloody executions, then he marched upon the Waggara in pursuit of Garet, who, feeling the inferiority of his forces, descended to the little plateau of Tchober. There, seized with frenzy, Garet resolved to risk a kind of duel: having recognized, from a distance, the Negus who was approaching, followed by a group of officers, he galloped up to Theodore. Having come within close range of him, he rapidly presented his gun, aimed at the Negus and fired. Theodore avoided the shot and got off with a slight wound in the shoulder. At this moment, the *Likamankuas* Bell, seeing his master in danger, made some steps forward to cover him, took aim at Garet and brought him down, dead; but, almost immediately Bell fell, pierced with a lance thrust in his side. Garet's men, dismayed, laid down their arms and the Negus brought them prisoners to his camp at Dobank in the highlands. There, his repressed fury burst forth and displayed itself in a frightful massacre. The prisoners, to the number of 1700 were cut to pieces and their corpses left unburied on the plain of this name, which I found, nearly three years later, still covered with whitened skulls.

However, the period of a decisive struggle with the pretender Negousie was approaching, and Theodore prepared for it with a gloomy and silent activity that contrasted with the indecision and want of system exhibited in all Negousie's operations. The latter, since the departure of M. de Russel, felt that he was lost; he was heard to say: "I fall as much by the hand of my friends as by that of my enemies." The head quarters of the Tigreens, a kind of flying camp between Adona and Haouzene, had become a theatre of intrigues and clamorous rivalry; a certain number of French adventurers had come thither, attracted by the reports noised in Europe, in connection with the name of Negousie. Commerce was dead and the peasants no longer dared to frequent the markets, periodically plundered by Negousie's bands. Nevertheless, the whole of 1860 passed over without any serious hostilities. The Negus still seemed doubtful of success and wished to treat with his two most formidable enemies, Negousie the pretender of Tigre and Tedla-Gualu, the chief of the Godjam insurrection. He proposed to leave them the two provinces they occupied, in fief, on condition that they should recognize him and pay tribute. What he held most to heart, in fact, was the recognition of his royal title: Negousie, almost independent viceroy of Tigre, but renouncing the title of Negus of Ethiopia, had never been more in condition to give umbrage to him than any other great vassal, entrenched on his impregnable mountain. Negousie replied that he had granted, by oath, several fiefs to chiefs whom he named, and that honour forbade him not keeping his word; Tedla replied in the same manner, adding derision to the refusal.

In January 1861, Theodore the Second put himself *en route* and marched towards the mountains of Temben, where Negousie was encamped. The intrigues

of the Negus, mingled with promises and threatenings, had already dissolved his unfortunate army. On the night which followed the arrival of the emperor at the Tigreen camp, the besieged heard with terror a herald posted on a neighbouring hill, invisible in the mist, making the following proclamation: "These are the words of *djan-hoi*. I pardon all who quit to-night the camp of Negousie, and assign them three *ghedem* (asylums), namely: the church of Axum, that of Adona and my own camp. As for those whom I shall find under arms to-morrow, let them expect no mercy!" In the morning Negousie had around him only his faithful Agaus and a small number of Tigreens; most of his soldiers had dispersed to their villages, the chiefs who were most compromised, having retired to the two churches of Axum and Adona. The unfortunate man, shedding tears of rage, assembled his last defenders, cut his way through the army of the enemy and threw himself into the mountains with twenty horsemen. Vigorously pursued, and daily losing some of his men by death or flight, he ended by falling in with some peasants, who recognized him by a broken tooth and brought him to Theodore, along with his brother Tesama. The pretender, it is said, exhibited little dignity before the conqueror. Theodore, for his part, seemed disposed to clemency: he told the two brothers that he would leave them their fiefs if they would pay tribute and caused supper to be prepared for them. The two captives passed the night full of hope; but the next day, the wind had changed: the Negus ordered the right hand and left foot of each to be cut off, and, by a refinement of barbarity, forbade that water should be given to quench the burning thirst which always follows this frightful operation. Tesama died under it the next day; the strong constitution of Negousie kept him up for a longer period, and, it is thought, that, had the Negus allowed him the attentions rarely refused to those punished in this manner, he would have been cured. On the third day, he begged, himself, for the lance thrust which put an end to his intolerable tortures.

Thus perished the only man who has seriously endangered the political edifice inaugurated by Theodore the Second. His death—closely followed by that of his principal generals, who were executed at Axum, in spite of the inviolability of asylum, and of the promise given—was imputed to the negligence of France and has served as a ground for many accusations against her: it has been already seen whether they are well founded or no. As for the conqueror, the infatuation that has come over him shows the degree of uneasiness that French intervention inspired him with. When he entered Axum, after the execution of the vanquished, and received the trembling deputation of Axumite clergy, he pronounced an oration, of which the following words are remarkable as the most foolish perhaps that man ever dared to utter: "I have made an agreement with God. He has promised not to descend to earth to injure me and I have promised not to ascend heaven to fight with Him."

#### THE POLICY OF THE NEGUS SINCE 1861.—HIS RELATIONS WITH EUROPE.

##### I.

In the spring of 1861, the Negus, Theodore the Second, the subduer of a rising which had nothing less for its aim than the dismemberment of his empire,\* had

\* See article in last number.

arrived at the summit of his physical and moral power. External difficulties no longer existed; resistance from within had altogether vanished before the prestige of a victory, so much the more brilliant on account of its having been so long disputed. None of the great native class felt themselves strong enough to raise the standard of Negousie; but the friends of the unfortunate pretender remained, who, at the extremities of Abyssinia, sought to pass unnoticed; there were Tedla-Gualu in Godjam, and *Dedjaz Merid* in Hamozene, who had valiantly defended this province against the great imperial officers of the frontier. Mered succeeded so well in hiding himself, that from August, 1861, he appears not to have been implicated in any of the political events of the empire so that finally the Negus generously pardoned him. As for Tedla-Gualu, his resistance was to be more serious, but it had not yet exhibited itself at the period of which we are now writing.

Borne along by an irresistible current of public opinion, saluted as the representative of the empire's order and unity, Theodore the Second was in one of the most favourable positions for applying to his people ideas borrowed from Europe with much prudence and discernment. The small class among us, interested in Abyssinian affairs, expected in some degree to see an African Peter the Great rise in Gondar. Did he seriously dream of playing such a part? Recalling the earlier stages of his history, we may doubt it. The Negus wrongly persuaded himself that Abyssinia was rich enough in historical wealth to draw from the past the element of its future progress. This system, extremely flattering to Abyssinian patriotism, could only be withstood by the influence of an intelligent European adviser, devoted and courageous enough to tell the Negus the truth to his face, and sufficiently loved by him to make him accept it. Radama the 1st of Madagascar had found such a man in a common sailor of Brittany, Coroller, whom he made prince of Tamatare, and to whom he owed much of his greatness. The death of Mr. Bell had unfortunately removed the only man who could have rendered a similar service to Theodore. The policy of the Negus, thus left to himself, rested upon this basis, that the revival of the Abyssinian empire required the reclaiming of its frontiers,—a project almost as Utopian as it would be for Turkey to seek the restoration of her limits as they were at the end of the sixteenth century. This programme would necessarily array him against a well organized government, that of Egypt, and against an ill organized, but obstinate and warlike people, the Gallas. The last years of Theodore's reign, which I am about to describe from my recollections, will in fact exhibit him directing his restless activity now against Egypt, and now against the Gallas, when not engaged in warfare with the chiefs of countries bordering on the Empire, such as Gadjam, whither Tadla-Gualu had betaken himself.

The causes of rupture with Egypt were numerous, and especially depended on geographical circumstances. Nature has clearly traced the boundaries of the two states; but at the foot of the last step leading to the Abyssinian plateau, in the latitude of Khartoum and Massaoua, live five or six tribes of shepherds who emigrated from Abyssinia, two or three centuries ago, probably on account of an excessive increase in its population, and who nominally recognise the sovereignty of the Ethiopian Empire, *sanghesta Aithiopiya*. The Turks, who conquered

Nubia in 1820, have profited by the isolated position of these tribes, nearer the Egyptian garrisons than to Gondar, to bring them under their yoke. Said Pacha, in 1856, promulgated in their favour a series of rude and protective regulations which the rapacity of the Egyptian agent made a dead letter of, and the people, whom the enlightened and truly civilized administration of Arakel-Nubar (1) and of his successor Hanan-Bey had given cause to hope for better days, fell into the hands of venal satraps, and saw their imports and levies yearly increasing. Thenceforward there sprung up a daily increasing sympathy for the government of Theodore the Second; but the Abyssinian governors of the frontier, in place of encouraging, with a view to the future, these amicable feelings, protested fruitlessly enough against the Mussulman conquest by inflicting upon the unfortunate inhabitants of a country as large as Portugal frequent sudden and murderous raids. To add to the difficulty, in the midst of these colonies, and about seven stâges from Gondar, there is established a camp of Egyptian refugees commanded by a man well known in Eastern Africa, Oued-Nimr, the son of the panther-king whose dramatic history we narrated three years ago. The faithful inheritor of his father's hate, Oued-Nimr has drawn around him in his town of Mai-Gowa, the many Bedorims who find the Egyptian yoke too heavy to bear: he makes incessant raids against the Arab tribes in subjection to the viceroy, and when he finds himself too closely hemmed in, he ascends the Abyssinian plateau where the Negus has given him the important fief of Kablita (Cafta.) In May 1850, upon my arrival in Africa, Oued-Nimr, calling himself a general in the service of the Negus, had made a brilliant stroke against the tribe of the Choubrie, the most powerful of the Arab tribes of the Nile, and in the name of Theodore the Second had demanded tribute from all Upper Nubia. The governor of Khartown had replied to this bravado by a bold dash upon Mai-Gowa, which had been burned, and Oued-Nimr, defeated in an unimportant skirmish, put off his vengeance to a more favourable opportunity. In fine, the attitude of the two states, Egypt and Abyssinia was in 1861 that of two neighbours very aggravated against one another, but hesitating to open serious hostilities, and fighting only with harmless proclamations.

The great care of the Negus was to settle with the Gallas. I have spoken elsewhere of this mysterious people, who closely resemble the Abyssinian in the features of the face and in their moral character, and whom the latest travellers have found living even at the equator, on the banks of the great lakes of the Nile. Having left three centuries ago the plains through which the Nebi flows (an immense river half fabulous and still waiting for its discoverer), they invaded like a rising tide the too vast and decaying empire of the Negus, and reduced to fourteen the forty-two kingdoms which rendered the monarchy so proud. They founded, in their turn, numerous states, monarchies as Gonderon, republics as Djimma, but they were feeble through their isolation and the want of every federative bond. In the midst of this barbarous invasion five or six Abyssinian kingdoms have survived, for whom a confused tradition preserves the name of Christians, but whom their separation from the great Abyssinian trunk has thrown

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(1) Brother of that Nubar-Pacha whom the Isthmus of Suez question recently brought to Paris. Arakel-Nubar died six years ago while governor of Khartown.

back into barbarism; among others are Gindjero, Gouraque, and Kaffa, which has given its name to the precious bean which Europe continues to buy from it, under the name of Mocha coffee. The Negus who had never resigned his claim to any of the ancient dismembered parts of the Abyssinian empire, had boldly announced his intention, as soon as the civil disturbances were settled, of reconquering all those kingdoms almost nominal, Gindjero, Bahagamo and many others, whose names vary in our maps at the will of a thousand suppositions, and of making Kaffa and Enarea tributary to him.

Meanwhile he confined his attention to that portion of the Galla race, which inserted like a wedge into the very heart of Abyssinia, formed a permanent obstacle to territorial unity: these were the Oullos, who had been so rudely tried six years before. After the death of Adara Billé, they had been organized under the command of a former page of the Negus, young prince Bechjo, whose patriotism had overcome his feelings of gratitude. Bechjo had availed himself of the troubles of Tigre to ravage, without mercy, the christian provinces.

Theodore, leaving Negousie, marched rapidly in 1861 to the river Bachilo, gained some success, but suffered much from a petty warfare in which the enemy, thanks to his excellent cavalry and to a ground unfavourable to the invader, had the final blow. The Negus was obliged to retire to Debra-Labor. His enormous army, dying with hunger and fatigue, strewed the road with the sick and wounded. The Oullos shewed to these unhappy men generosity which naturally astonished them; they collected, tended and fed the implacable enemies who had just burned their villages and carried off the children. The Negus, having but little gratitude for such a noble action on the part of the "barbarians," recruited his army quickly at Bachilo, entered again in 1862 the territory of the Oullos, destroyed them by a war of extermination, and advanced as far as Mount-Rollo, dragging after him poor prisoners whose hands and feet he caused to be cut off in cold blood. The greater part died from the effects of this horrible mutilation. "This act was done very speedily," said a native priest to me: each soldier seized a man and butchered him as he would a sheep. Nothing so atrocious had ever been witnessed before in Abyssinia.

When Theodore II. repassed Bachilo, he left behind him nothing but a bloody desert, covered with ruins, and traversed by some large bands, the remains of a great people who had formerly played their part in the great drama of the world's history. Vengeance was satisfied. The women and children had been divided among the soldiers, who sold them to the Mussulmans; therefore, in the month of May of this year, Metamna, the great market of slaves on the Egyptian frontier, was abundantly supplied. The men were carried far into the interior of the Empire and employed in the construction of roads. These roads are almost the only substantial benefit which the Negus has conferred upon Abyssinia. Already before this he had caused to be built a portion of a road near Drea-Tabor by way of trial, and had employed soldiers upon it. On one occasion they murmured and Theodore seeing this threw off the embroidered gown which he used as a cloak, quickly seized a heavy stone and carried it to the side of the road. "Now," said he, "let him who is too noble to do as I, tell me so." There is no necessity of saying whether his example was followed. Afterwards, when the

Negus had employed the Gallas on these works, he formed a network of well made strategic roads, especially between Derra-Lahor and the river Abai. I can bear witness in his praise that these Gallas, whose work-yards I have sometimes visited, were well fed, regularly paid, saved money, and on the whole appeared happy.

The remainder of the year 1863 was devoted to fruitless operations at Godjam, against the obstinate Tedla-Gualu, who, rendered strong by the sympathies of the province, lived without anxiety upon the *amba* of Djibela, the ancient fortress of Beurron Gocho or sugar-loaf, which, almost impregnable by nature, he had also fortified. Djibela, surrounded by abysses, communicated with the neighbouring plateau only by a very low path, in which only two men could walk abreast, and above it were suspended three or four enormous rocks secured by strong chains. Tedla had facetiously given them names from the calendar of the Saints. "If ever the Ruaranga, said he, leads his troops into this path, I will not fire a shot at him: it will be sufficient to let loose Saint Michael in order to sweep everything within 500 feet into the precipice." This country, offering no great attractions in a military point of view, coincided, however, for the Negus with circumstances which were destined to have a great influence over his future.

I enter here upon a series of events much more delicate to relate as I have been led to play a part in them which has not always been voluntary. The reader will understand without difficulty the repugnance which I feel in dwelling upon these remembrances, and the feelings of propriety which oblige me merely to mention facts rather than explain them. Summoned in 1862 to represent the French government at Gondar and to carry out in Abyssinian affairs a policy full of sympathy for the Negus, I arrived eight months afterwards at the court of Theodore, who gave me a brilliant reception and did not conceal the joy which he derived from this official proof of the good intentions of France. He had just received a no less flattering proof of those of England. The foreign office, after much hesitation, had resolved on appointing a successor to the skilful and unfortunate Plonden. It had chosen, from many worthy applicants, an officer of the Indian army, captain Duncan Cameron, who had become familiar with the East through his residence at the consular post of Poti on the Black Sea, and who was full of good will for the Negus and the new empire of Abyssinia. Theodore had received him well, had assured him of his esteem for England, for France and their sovereigns; then he had spoken of the Emperor Napoleon III. as being wrongly prejudiced against him, and of his desire of forming closer relations with the French government. Learning that Mr. Cameron had a French traveller for a Secretary, he intrusted to him a very courteous and suitable letter for the Emperor, and sent him away as soon as possible. Theodore II. has been accused of thoughtlessness in confiding such a message to an unknown tourist; but the Negus, after the provocations and the insults with which he had harassed Egypt, feared that if Abyssinian envoys should enter the Egyptian territory, they would be ill-treated by the impure hands of the infidels, and he knew that on the other hand the European had nothing to fear. It was about this time that I arrived at the court of the Negus, who received me, as I have said, very friendly, and desired me to accompany him in a new campaign which he was about to begin

against Tedla-Gualu. Desirous of not losing such an opportunity of maintaining the good feelings of the Negus in the interest of the mission with which I was charged, I did not hesitate a moment to follow him. I think it proper to employ here some leaves from my journal, to lose none of the remarkable incidents from the commencement of this journey.

"Feb. 11th 1863." The order for departure was given this morning at 9 o'clock. A tumultuous mass of infantry formed the advance as if to reconnoitre the road; after them followed, richly equipped, the little group called the staff, of which I form a part with the five or six invited Europeans, and in front of us was the Negus, accompanied only by a page who carries his shield. Behind us is a long column of cavalry, while our servants move amongst them, not without danger, and hold our spare horses by the bridle.

We pursued for two hours and a half a very good road through a country open, charming, filled with villages and with cultivated fields, which recalls to my mind, in some degree, the Norman Bocage, between Vinie and Dampont. To complete the resemblance, the land, by being intersected by numerous hedges and fences, informs us of a property very much divided, and this, however, is the general law in Abyssinia. This province is called Aferadanet. For nearly eleven hours we descended a somewhat steep declivity, and we saw through the trees a magnificent plain, unfolding itself to our view, covered with rich meadows, furrowed by a ravine in which roars a furious torrent, and called the Abai or the White Nile. This torrent, which, from the height where I am situated, appears only a thread of foam, corresponds so little with all that I have read about the Abyssinian Nile, that I only allowed myself to be convinced of its truth when I arrived at the Portuguese bridge, where we halted at noon.

"This bold construction, due to Portuguese engineers in the service of the Negus, resembles, in some respects, the magnificent bridges of the Romans: for instance that of El-Rantara over the Rummel, near Constantinople. It is said that the Portuguese have again found the secret of the Roman cement, vainly sought in our time; entire pieces of the parapet have fallen along the piers without the furious waters succeeding in separating the stone. Two little forts, guarded by select fusileers, command this important passage. The Negus has taken his place at a window of the lower fort, and we, in groups a little below him, witness the defiling of the troops. This is truly a very fine sight. What is wanting in order and discipline is compensated by the picturesque appearance, and still more by a military ardour which would delight a European officer. Cavalry, infantry, baggage, servants, in fact everything descends, or rather rolls, along in a thick cloud of dust through which thousands of lances flash. They defile over the bridges, generally four and four, always on the run. Etiquette obliges all the officers to walk while passing before the window where the Emperor reclines, so that we lose sight of the superior officers, the vassals of the Empire, who are surrounded also by their vassals. I was shown *ras* Enghedda, the dethroned prince of Godjam, who has remained some years in chains, but was recently set free, and now is very jealous against his ancient subjects. He is a very fine looking man, imposing, and has an appearance somewhat dejected, fierce and startling, which renders him interesting. I distinguish easily, in the crowd,

from twenty to thirty fusileers, clothed in the Arab fashion, perfectly disciplined, and commanded by a large fine young man, with a red caftan and a muslin turban. This sort of Malek-Adhel is nothing less than Naib Mohammed, prince of Arkiko and nominal sovereign of Maparua; although a Mussulman and a vassal of the Pasto, he holds in fief 16 villages of Abyssinia on the side of Halaï. The prince of Arkiko has come to the camp, it is said, to solicit the confirmation of this infeudation, which is very ancient, as it is mentioned by Bruce.

"The defiling lasts four hours, 4,000 men at least had passed. I experience a certain satisfaction in seeing this mass of men, in its apparent confusion, obeying evidently an active and powerful direction. It is indeed the army of order, hastening on to put an end to the last attempts of a selfish and incorrigible feudality. Such, at least, is the general impression. About 4 o'clock, the Negus gives the signal for departure by crossing the bridge: I follow him on foot as he and we climb quickly the steep side of the right bank, to avoid the crowd which encumbers the road called the imperial (*Negus Mangad.*) It is one of the pranks of this untiring walker to impose those severe walks upon those whom he admits to his rude friendship. We encamp a league further on, in a charming prairie, on the brink of a limpid river which is called, I know not why, the Black Water (*T'pokom Olha.*) My tent was scarcely pitched when I saw a column of 200 or 300 men coming towards the quarters of the Negus and uttering great cries of joy. I approach and I see a huge lion, pierced twice by a lance in the side, and borne upon a litter; the vanquisher arrives in triumph upon the shoulders of his comrades, while his right side is bleeding from four wounds caused by a blow of the lions paw. He is a little soldier of no great appearance. The Negus gives him 30 talaris, a fortune for a poor foot-soldier.

"Feb. 12. We began this morning to leave the low grounds (*Rolla*) and to climb the plateau of Aghitta, upon which we encamped about 10 o'clock. I embrace at one glance a thrilling panorama. At my feet, and at an imposing depth, a network of verdant and woody valleys is visible where the silver thread of the Trul winds along; a curtain of intricate woods robs me of the sight of the dark channel in which the Blue Nile rolls and roars, where bounds the cataract of Alata, so well described by Bruce. To the S.E. rises an isolated peak, which has a romantic and sinister name, *Asnola-Negus* (the King of the Vampires). It is there, the Abyssinians say, that the crowd of the *bonda*, half-vampires, half-ulche-wolves assemble, the heroes of a thousand tales which recall entirely the legends of Hungary.

Feb. 16. We are encamped on the top of the sierra of Arnid-Burnid while an intense cold prevails. From this height I can see 5 hours march towards the west, enveloped by the mist, the hills of Sakala, from the middle of which flows the triple source of the sacred river. This source was discovered within the last three centuries by P. Pæz and fellow travellers, and was seen again by Bruce in 1772. I would willingly add my name to these great ones; but the district of Lakala is in the power of the rebels, and the smiling valley of the Gumara, which we entered some hours afterwards has not consoled me for this disappointment."

I follow no further my personal memories, noted day by day, and I resume the record of military transactions. Everything promised success as far as the



mountains of Lagado, where we entered the enemies country. The rebels appeared terrified and incapable of fighting; but the invaded country passively resisted, trying to remain neutral in the contest, and refusing tribute and subsidies to belligerent powers. Theodore, who had neglected the commissariat was obliged to confess his error when there was no longer forage for his horses. He became furious, ordered the whole country to be pillaged and the villages to be burned. Two hours afterwards, 22 villages were in flames in the mountains of Lagado and Abizan. A peasant was led to the Negus who, posted at the door of a church where the people of the district had concealed their valuables, had defended the sacred place with arms in his hands and had wounded a plunderer. He stated that he had been charged by the Negus himself with the guarding of the church. "Who is this wretch," said Theodore, "who uses my name to tell a falsehood?" And he ordered his hand to be cut off. Such severe acts exasperated the inhabitants and did not assist the expedition. A numerous force, rushing forward to plunder the rich country of Araga, and scattering in order to rob, was surprised by the insurgent cavalry, vigorously pursued and lost several hundred men. After six days hesitation, the Negus ordered a retreat. The discontent of the army was shewn by numerous desertions. Theodore beat the country with masses of cavalry who slew without mercy all the soldiers who were caught in the flagrant crime of flight.

From this difficult situation a plot arose, the most formidable which had yet threatened the power and the life of Theodore. Several noblemen of distinction resolved to surprise the Negus while on one of those wild expeditions which he sometimes made, especially at night, and put him to death. The chief of the conspirators was the Governor of the province of Alga, and he, unfortunately for himself, had confided the secret to his wife. When he was mounting to rejoin the imperial camp, his wife came and desired him to purchase for her a valuable robe which she desired. Her husband refused, and his wife told him very coolly: "You shall suffer for this!" This circumstance caused him no uneasiness. She kept, however, her word, for some days afterwards she came to the Negus and revealed to him all the details of the conspiracy. Theodore, more surprised than alarmed, looked her in the eyes and said: "Nothing is ever done without some motive. What is it that has urged you to disclose that which dooms your husband and your son to death?" "I thought," said she, "that some one of the conspirators would discover the plot to you and that then mine would be irrevocably lost. In disclosing it to you, I obtain the right of begging the life of one of them, of my son, whom I love." Theodore dismissed her without making any promise. On the first of March, 1863, at 5 o'clock in the evening, in the midst of a battalion drawn up in square, 18 conspirators were brought before the Negus and had their hands and feet cut off; then a prohibition was made that they should not receive any care, and they all died after sufferings more or less prolonged. The son of the prefect of Alaza was spared no more than the others.

This abortive plot darkened the soul of Theodore, and had doubtless some influence upon the events of the next day the 2nd of March. That day, on absurd suspicions which I have never been able to explain, I was arrested by the command of the Negus and put in irons, as well as the Naib of Arkiko. He remained

in chains a month and received for reward a rich fief upon the frontier. I was released after a few hours on condition of remaining prisoner on parole. Devra-Tabor was assigned to me for my residence, with the permission to go wherever I pleased within a circle of 30 to 40 leagues. Nothing now remained for me to do except to remain as a spectator necessarily inactive in the midst of the great events which the new attitude of Egypt towards Abyssinia seemed to announce.

Egypt in fact, excited by the verbal or written provocations which had been directed over its provinces by the Abyssinian governors of Walkai and of Addis-Sobbo had re-established the organisation of Soudan upon the same basis as before 1856, and had sent to Khartown with almost unlimited powers, a governor general named Monca-Pacha, an energetic soldier, but a despot and a venal administrator. This man, who had formerly been a Circassian slave, boasted that he had emasculated or decapitated 14,000 men while he commanded the army of occupation in Nubia. He was, in the opinion of the viceroy Laid-Pacha, the only chief capable of contending with energy against Theodore. Having arrived at Khartown in the summer of 1862, with 4,000 regular troops and rifled cannon, he had passed the winter in disciplining his troops, and in January 1863 he had slowly marched towards Gallabat, where he arrived on the 19th of February at the head of 10,000 to 12,000 men. He had pretended to threaten Abyssinia, but he had confined himself to the oppression of the province, which this occupation of nine days completely exhausted. Theodore, lying almost 80 leagues from there, near lake Tana, did not stir, under pretext of eating fresh fish "as it was the season of Lent." To tell the truth, the two generals, although both brave, did not dare to risk a battle. The Negus had kept in remembrance the artillery of Salah-Bey, and the soldiers of Monca, not knowing that the horrible custom of mutilating prisoners had been abolished by Theodore, had a terrible fear of falling alive into the hands of the Abyssinians. The Negus understood without difficulty that the Egyptians would not attack him, and, assured of this fact, he directed all his attention to the insurrections which were multiplying in the interior. One Terso had revolted in the mountainous districts bathed by the Zarima; a very near relation of the Negus occupied Kowara, and had put in irons the governor appointed by the emperor; in another part of the same province, a *Nygade* or a mere merchant, called Rassa, had his head turned by priests who had related to him pretended revelations from heaven, and had convinced him that the reign of the emperor was at an end, that his was about to begin. Although he paid little money and was not a soldier, he had collected, it was said, 4000 men. In Choa, in Tigre, two or three more obscure rebels were in motion. This material anarchy was the result of the moral anarchy in which Abyssinia had languished so long; the Negus had bravely struggled against it at the beginning of his reign, but he was growing weary. Only one gloomy thought absorbed his mind: "God," said he, "who has raised me from the dust to supplant legitimate princes, has not performed this miracle without an object. I have a mission—but what is it? I believe at first that it was to exalt this people by prosperity and peace, but in spite of all the good I have done I see more rebels springing up than in the time of the worst tyranny. It is evident that I am deceived. This nation is stubborn and needs to be chastised before it is called to enjoy the blessings of Providence. I see now my true part, I will be

scourge, the judgment of God upon Abyssinia. As a sign of the new programme of his reign he had engraved upon the carriages of his howitzers: "Theodore, the scourge of the perverse." This strange idea destroyed the last scruples which retained him on a fatal descent. During the retreat from Godjam the army was subject to a threatening fermentation; the secret agents of the Gualu entered its ranks, spoke to these men, overpowered by privations, of the abundance which reigned at Djibela, of the rich cantonments of Godjam and of Damot. Desertions also increased in spite of punishments without number, and the discipline became worse every day. To keep them, the Negus determined, under various pretexts, to give up the finest provinces of the empire to all the excesses which an unbridled soldiery can commit. Sometimes it was not a raid upon horses, mules, and stamped money, but usually a general and laconic order was given: "*eat everything.*" For three months, from March to June 1863, fourteen provinces of an extent equal to that of Switzerland, were thus *eaten* one after the other. The excuse which he gave for Dembla the jewel of the Abyssinian crown, was that the inhabitants had allowed a mussulman chief to escape who had been sent among them. It is related that when the plunderers returned to the camp, the king, who was seated upon an eminence, recognized among the booty the favourite mule of the *abonna* Salama, who was living then upon his lands in Dembla, and exclaimed: "Ah! the robbers have pillaged without my order my fine province of Dembla!" while he shed some tears which deceived nobody.

Beghemda was in its turn sacked under the pretext that some insurgents of Godjam, flying and disarmed, had found refuge in some village or other. It was seed time, about the first of June, and the country ran the risk of being six months later exposed to dreadful famine. The suffering of the people only slightly affected Theodore II., and yet he was thus killing the hen that laid the golden eggs, the country which had supported him and his troops during the most powerful of the former rebellions. On the first Monday in June, the market day of Devra-Tabor, a proclamation was issued. I have furnished, said the Negus to the peasants, those who concealed my enemies, and unhappily my orders were exceeded; but I desire the happiness of my people, and I have commanded that these things should not be renewed. Consequently I invite the peasant to return to his plough, the merchant to his business, and all to return in peace to their various occupations." This proclamation was welcomed with transports of joy; but it was soon seen that it was only an odious falsehood. Two days afterwards, the news spread that the savage bands of *ras* Engbedda had rushed like a torrent over Togara, Oauzaghié, charming countries, whose name recalls to the traveller only pleasing impressions. This report was only too well founded. The pillage extended to Terka; the venerated sanctuary of Baatha was not respected.

The Negus, from his camps of Boxarghef and Isti, where dysentery and hardships decimated his troops, continually directed rapid raids against the hostile provinces. He went out generally at night, with 500 or 600 horsemen, after having openly announced a raid which was never that which he really made; he would march all night and in the morning would fall upon the enemy sur-

prised and unprepared for resistance. Thus he invaded about the end of July the province of Agaumida, where he surrounded some thousands who had deserted from his army and had fled to the people of Tedla-Gualu. He had no mercy, put them all to the sword, beat one of the best generals of the enemy who had left his service for that of the rebels, and published everywhere an official bulletin which raised the number of men killed in this engagement to 15,000.

I am convinced that he at least quadrupled the number since, on his entry into Agaumider, he had only 400 men, to which he added on his route some faithful contingents. After having ravaged this province and Alaza he returned to Genda; where he rejoined the English Consul, Mr. Cameron, on his return to Abyssinia after four months absence. The religious disturber of Konara, the veggade Kassa had taken refuge, on the approach of the Negus, in the *Kolla* or low grounds of the province. The country, terrified by the devastation of the neighbouring districts, was little disposed to assist him, and when Theodore ordered the inhabitants of Konar to destroy the rebel under pain of being treated like those of Alaza, the Kuaranya rushed to arms, defeated Kassa with ease, took him prisoner, and carried him to Djenda (August 19th.) The Negus had been greatly irritated by this revolt in the bosom of the only province in which he placed any confidence. "You have pretended that my reign is over," said he to Kassa, "but if such were the case have I not a son to succeed me, and by what means has he forfeited his claim?" It was evident to any one acquainted with the Negus that he would be implacable towards the audacious person who had doubted the stability of his dynasty. Kassa was summarily condemned and tied to a tree. Theodore sat coolly opposite him, had his gun given to him, took aim, and pronouncing the words of the sacrament: "In the name of the very Holy Trinity!" he sent two balls into his breast. The soldiers who were present pierced the corpse with their lances, and reduced it to a sad and formless mass. An event, which had been foreseen, happily gave a diversion to these bloody scenes. The ambassador of the Negus to Paris returned to Gondar in the beginning of September, bearing an answer from the French Government to the letter of Theodore II. He, proud of this diplomatic success, convoked at Gondar all the Europeans settled in Abyssinia to assist in the reading of the imperial message; but he previously opened the letter to deliver it to the interpreters, so that its contents were quickly known, and I was permitted, in advance, to act in concert with my British colleague, and the most influential members of the little colony, with a view to a common action upon the mind of the Negus in the sense of the instructions which I had received. The official letter demanded, in courteous but firm terms, religious toleration for the Roman Catholic missions, protected by France. I should render this justice to the missionaries of Basle in saying that they, directed by the English consul, and by M. Martin Flad, their principal leader, showed a great desire to offer me their assistance in this religious question with a view to toleration, conformable, as they justly said, to the spirit of enlightened Protestantism.

All this diplomacy was exerted in vain. The Emperor had been much irritated by the reception of the letter relating to the Roman missions. "I know," he had said the mode of European governments when they wish to seize a country in the East. At first missionaries are sent, then consuls to support missionaries, then

battalions to assist the consuls. I am not a rajah of Hindostan to be laughed at in this way. I prefer dealing with battalions at once." After a series of curious and characteristic scenes, Theodore answered what he regarded as a provocation on the part of France by an order for the expulsion of the agent (28th September, 1863). I hastened to reach Massaoua before the news of my disgrace, spread over the route, might expose me to annoyances from the local authorities. I was henceforth reduced to the part of a disinterested, but not indifferent, witness of the events which were passing in this country, from which a personal misfortune had not withdrawn my sympathies. Not having formed any hopes, I had none to lose.

I had become very intimate with my English colleague, Captain Cameron. As we were breakfasting on the day that the decree for my expulsion was issued, Mr. Cameron said to me smiling; "Well! colleague, are the irons of the Negus heavy?" "Would you like to try them!" I answered in the same tone. "Ah! who knows?" Alas! the brave officer did not think he was speaking so truly.

## II.

My expulsion left the field open to a new favorite of Theodore. He was the French agent of Negus of whom I made mention before, a young man, active, very intelligent and attentive, but destitute of tact and prudence. His self-possession, and a respectful familiarity, which is not the most unskilful flattery, had captivated the Negus, who, as a soldier, liked these bold qualities very much, (soldier-like, as the English say). Theodore found in him something more attractive; he was tired of the low and timid obsequiousness of the missionaries of Basle, who, after having formed canons for him, made brandy for him; and whilst he called them officially his children, he gave them the name of hypocrites in his humorous moments.

MONTHLY METEOROLOGICAL REGISTER, AT THE PROVINCIAL METEOROLOGICAL OBSERVATORY, TORONTO, CANADA WEST.—DECEMBER, 1864.

Latitude—43 deg. 39.4 min. North. Longitude—5 h. 17 min. 33 sec. West. Elevation above Lake Ontario, 108 feet.

Day.	Barom. at temp. of 32°.		Temp. of the Air.		Excess of mean above Normal.		Tens. of Vapour.		Humidity of Air.		Direction of Wind.		Re-sultant Direc-tion.	Velocity of Wind.				Rain in Inches.	Snow in Inches.				
	6 A.M.	10 P.M.	5 A.M.	10 P.M.	10 P.M.	10 P.M.	6 A.M.	10 P.M.	6 A.M.	10 P.M.	6 A.M.	10 P.M.		6 A.M.	2 P.M.	10 P.M.	6 A.M.			2 P.M.	10 P.M.	11 A.M.	
1	29.787	29.843	56.7	42.3	38.7	38.92	3.15	180	199	179	185	W b N	N 63 E	W	6.0	3.0	2.0	1.99	4.29	...			
2	805	612	36.0	37.0	40.3	38.61	7.30	180	201	230	219	E b N	N 78 E	W	11.6	18.5	12.0	12.55	13.04	1.130			
3	779	1333	27.52	40.8	38.3	41.48	+11.40	207	207	170	202	W b S	S 77 W	W	3.0	28.4	19.5	13.08	14.86	0.250			
4	370	448	33.8	34.2	33.8	34.2	0.4	133	125	125	125	W b S	S 86 W	W	17.4	10.0	5.5	10.63	10.76	...			
5	503	466	408	31.5	36.3	33.92	+4.55	133	140	185	153	SSE	S 36 E	W	1.5	8.5	6.0	3.84	4.56	Imp.			
6	380	265	430	36.7	42.1	33.38	+8.95	107	232	134	189	W b S	S 57 W	W	2.5	13.2	9.2	6.16	6.94	Imp.			
7	331	28.918	236	35.6	30.6	31.70	+3.08	169	292	129	189	W b S	S 59 W	W	1.0	4.0	24.0	11.60	15.37	0.465			
8	487	29.748	30.109	16.5	10.2	31.11.55	+16.92	088	046	051	074	W b S	S 74 E	W	22.5	30.5	17.2	22.33	22.67	0.1			
9	30.232	30.210	30.044	8.5	20.1	24.8	18.42	-9.75	069	079	082	SE b E	N 85 E	W	11.0	3.2	19.2	9.12	10.66	4.0			
10	29.729	29.508	29.622	26.9	32.0	23.3	26.22	-1.68	124	158	110	125	SSE	N 85 E	W	15.8	3.6	5.8	1.09	6.59	3.0		
11	415	118	21.5	30.9	21.5	30.9	0.4	109	164	158	110	125	SSE	N 85 E	W	7.0	15.0	19.5	10.31	17.15	5.0		
12	369	731	6972	12.2	13.2	1.0	7.97	-19.38	065	034	032	048	W b N	N 69 W	W	22.5	22.6	1.5	10.57	10.65	...		
13	871	571	5518	5.7	24.4	26.0	19.75	-7.40	053	086	133	098	W b N	N 69 W	W	6.4	12.4	3.8	9.10	11.67	1.0		
14	283	489	5670	29.1	23.7	2.8	17.47	-9.50	141	076	044	087	W b N	N 74 W	W	12.5	24.0	2.5	9.86	10.78	0.2		
15	907	785	6149	7792	3.1	19.7	25.2	16.35	-10.43	047	080	123	084	W b N	N 74 W	W	4.5	1.5	3.2	1.67	4.62	0.1	
16	733	723	6340	6967	23.3	25.4	32.4	27.62	+1.03	110	142	176	141	W b S	S 85 E	W	3.5	0.5	5.8	1.85	4.69	Imp.	
17	649	800	7982	31.1	36.7	32.7	33.22	+6.85	173	189	143	164	W b S	S 85 E	W	1.5	9.8	6.0	5.13	6.41	...		
18	600	687	7982	31.1	36.7	32.7	33.22	+6.85	173	189	143	164	W b S	S 85 E	W	1.5	9.8	6.0	5.13	6.41	...		
19	237	107	2992	62.4	31.9	24.1	29.37	+3.30	065	137	078	121	W b N	N 79 W	W	4.0	22.5	24.5	15.78	16.74	0.175		
20	623	539	4497	18.2	23.2	27.0	23.00	-2.85	075	080	115	093	W b N	N 79 W	W	10.0	10.0	10.0	8.14	8.45	...		
21	270	28.882	0.02	0487	25.1	26.6	0.1	1.40	-24.24	038	027	040	036	W b N	N 79 W	W	1.5	12.4	21.0	11.76	15.52	...	
22	697	669	6960	0.3	5.0	0.6	1.40	-24.24	038	027	040	036	W b N	N 79 W	W	2.8	13.5	10.5	11.76	15.52	...		
23	797	669	6253	1.6	16.8	17.6	11.62	-13.95	039	073	065	093	W b N	N 79 W	W	7.8	10.6	10.2	8.80	9.10	0.1		
24	515	607	6463	20.5	24.6	30.9	25.93	+0.45	093	112	123	120	W b S	S 33 W	W	5.5	3.0	13.0	10.58	11.03	0.1		
25	681	451	—	23.4	36.0	—	—	—	131	164	—	—	W b S	S 33 W	W	7.5	3.0	13.0	7.75	7.85	0.2		
26	435	400	—	34.9	36.7	—	—	—	186	171	—	—	W b S	S 33 W	W	1.2	1.0	1.5	0.51	0.90	0.2		
27	100	015	089	37.4	38.07	+12.78	163	223	204	200	—	—	W b S	S 33 W	W	1.5	11.0	1.5	8.86	5.15	0.10		
28	136	232	319	24.08	33.8	29.1	27.8	29.85	-3.47	173	111	126	136	W b S	S 33 W	W	8.29	8.62	—	—	—	...	
29	291	213	170	2075	24.8	24.1	21.70	-3.17	103	075	088	089	W b S	S 33 W	W	2.5	17.4	3.5	8.29	8.62	0.1		
30	101	165	2137	23.6	23.7	21.2	23.02	-2.15	119	138	059	105	W b N	N 75 W	W	11.2	15.5	9.2	10.26	11.41	0.3		
31	529	614	6430	12.5	20.1	15.1	15.00	-10.15	062	091	065	069	W b N	N 75 W	W	7.0	13.0	13.2	7.46	7.90	...		
M	29.5989	29.4871	29.5432	29.5198	22.75	27.83	24.27	24.66	-2.49	121	127	119	121	88	76	82	82	7.92	12.88	10.20	9.93	0.613	27.1

REMARKS ON TORONTO METEOROLOGICAL REGISTER FOR DECEMBER, 1864.

Notes.—The monthly means do not include Sunday observations. The daily means, excepting those that relate to the wind, are derived from six observations daily, namely at 6 A.M., 8 A.M., 2 P.M., 4 P.M., 10 P.M., and midnight. The means and resultants for the wind are from hourly observations.

Highest Barometer..... 30.327 at 10 a.m. on 9th } Monthly range =  
 Lowest Barometer..... 29.854 at 4 p.m. on 21st } 1.473 inches.  
 { Maximum Temperature ..... 50°4 on p.m. of 3rd } Monthly range =  
 { Minimum Temperature ..... -10°4 on a.m. of 23rd } 60°8  
 { Mean maximum Temperature ..... 32°23 } Mean daily range =  
 { Mean minimum Temperature ..... 19°71 } 12°52  
 { Greatest daily range ..... 31°4 from a.m. to p.m. of 23rd.  
 { Least daily range ..... 5°0 from a.m. to p.m. of 26th.  
 Warmest day ..... 3rd. Mean temperature..... 41°48 } Difference = 40°08.  
 Coldest day ..... 22nd. Mean temperature ..... 1°40 }  
 Maximum Solar Radiation ..... 94°5 on p.m. of 19th } Monthly range =  
 Minimum Solar Radiation ..... 94°5 on p.m. of 19th } 112°0  
 Aurora observed on 0 nights.  
 Possible to see Aurora on 12 nights; impossible on 21 nights.  
 Snowing on 18 days; depth 2.71 inches; duration of fall, 68.2 hours.  
 Raining on 9 days; depth 2.945 inches; duration of fall 36.5 hours.  
 Mean of cloudiness = 0.80; above average + 0.05.  
 Most cloudy hour observed, 2 p.m.; mean = 0.90; least cloudy hour observed,  
 midnight; mean, = 0.70.

Sums of the components of the Atmospheric Current, expressed in miles.

North.	South.	East.	West.
1359.44	1862.89	1212.54	4855.22
Resultant direction S. 89° W.; Resultant velocity 4.94 miles per hour.			
Mean velocity ..... 3.98 miles per hour.			
Maximum velocity ..... 34.4 miles, from 11 a.m. to noon on 8th.			
Most windy day ..... 8th. Mean velocity, 22.67 miles per hour. } Difference =			
Least windy day ..... 29th. Mean velocity, 0.69 ditto } 21.77 miles			
Most windy hour ..... 2 to 3 p.m. Mean velocity, 12.83 ditto. } Difference =			
Least windy hour ..... 4 to 5 a.m. Mean velocity, 7.23 ditto. } 5.60 miles.			

1st. Solar halo at 9 p.m.—3<sup>rd</sup>. Dense Fog 6 and 8 a.m.—4th. Solar halo 2 and 3 p.m.—8th. Solar parhelic 3<sup>rd</sup> p.m.; very stormy day.—10th. Lunar halo 10 p.m. and midnight.—12th. Lunar halo at 10 p.m.—15th. Lunar halo at 6 a.m.; solar halo at 11 a.m.—17th. Dense fog 7 a.m. to noon.—21st. Severe storm of wind and snow continuing all day.—27th. Fog 6 and 8 a.m.

The month of December, 1864, was comparatively cold, wet, windy and cloudy;

COMPARATIVE TABLE FOR DECEMBER.

Year.	TEMPERATURE.				RAIN.		SNOW.		WIND.		
	Mean.	Excess above average (29°)	Max. observed.	Min. observed.	Range.	No. of days.	Inches.	No. of Inches.	Direction.	Resultant.	Force or Velocity.
1840	24.3	-1.9	41.0	-9.4	50.4	3	Inap.	18	...	...	1.53 lbs.
1841	28.7	+2.5	45.5	+2.4	43.1	7	0.006	5	...	...	0.61
1842	24.7	+3.8	40.3	+2.9	36.5	3	0.880	17	...	...	0.63
1843	30.0	+2.0	48.9	-0.8	49.7	6	1.050	8	8.1	...	0.40
1844	28.2	+5.1	37.6	-2.7	40.3	2	Inap.	6	4.2	...	0.70
1845	21.1	+1.3	49.2	+3.7	45.5	5	1.273	9	6.0	...	0.57
1846	27.5	+3.9	50.0	+0.6	48.5	7	1.153	8	6.8	...	0.35
1847	30.1	+2.0	49.1	+0.6	48.5	5	0.840	12	16.5	S 83° W	1.12 5.4 mls.
1848	26.5	+4.5	43.3	-0.7	46.5	2	0.194	18	29.5	N 89° W	2.56 6.23
1849	26.5	+4.5	43.3	-0.7	46.5	2	0.194	18	29.5	N 89° W	2.58 7.40
1850	21.7	+4.7	45.8	-10.5	54.3	6	1.076	15	10.7	N 46° W	2.93 7.37
1851	21.5	+5.7	51.0	+13.9	37.1	7	3.991	10	20.1	S 69° W	1.03 6.54
1852	25.3	+0.9	42.2	-5.9	47.4	4	0.624	13	22.3	N 33° W	2.38 4.88
1853	25.3	+0.9	42.2	-5.9	47.4	4	0.624	13	22.3	N 33° W	2.38 4.88
1854	21.9	+4.3	41.8	-5.9	47.7	5	0.594	12	17.2	N 44° W	4.30 8.56
1855	26.3	+0.0	45.3	-2.1	48.0	6	1.850	10	29.5	S 89° W	5.29 11.56
1856	22.9	+3.3	41.2	-9.1	50.3	6	1.780	20	16.3	S 87° W	4.62 11.56
1857	31.9	+1.7	45.6	+5.7	39.9	7	3.203	14	9.0	N 89° W	3.51 6.84
1858	27.4	+2.1	43.6	-0.0	39.0	11	1.057	18	10.4	N 78° W	1.66 9.36
1859	17.9	+8.3	54.8	-3.3	58.1	3	1.083	23	37.4	N 53° W	4.20 10.77
1860	24.0	+2.2	38.5	-7.0	46.5	3	1.362	21	13.5	N 63° W	4.66 10.14
1861	31.1	+4.0	55.1	+5.7	49.4	0	0.504	8	6.8	N 73° W	3.50 7.96
1862	28.8	+2.6	50.0	-2.3	52.3	5	1.944	8	10.4	N 75° W	3.17 7.58
1863	27.0	+0.8	51.5	+1.0	50.5	10	2.968	17	7.1	N 41° W	1.61 9.40
1864	24.7	+1.5	46.8	-2.3	49.1	9	2.045	18	27.1	S 82° W	4.94 9.93
1865	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1866	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1867	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1868	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1869	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1870	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1871	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1872	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1873	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1874	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1875	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1876	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1877	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1878	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1879	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1880	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1881	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1882	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1883	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1884	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1885	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1886	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1887	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1888	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1889	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1890	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1891	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1892	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1893	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1894	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1895	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1896	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1897	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1898	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1899	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32
1900	26.20	...	45.76	-0.78	48.54	5.6	1.641	13.1	14.69	N 71° W	2.97 8.32

MONTHLY METEOROLOGICAL REGISTER, AT THE PROVINCIAL MAGNETICAL OBSERVATORY, TORONTO, CANADA WEST.—JANUARY, 1865.  
 Latitude—43 deg 38.4 min. North. Longitude—76 m. 33 s. West. Elevation above Lake Ontario, 108 feet.

Day.	Barom. at temp. of 32°.			Temp. of the Air.			Excess of mean above Normal.			Tens. of Vapour.			Humidity of Air.			Direction of Wind.			Velocity of Wind.			Result. Direction.	Rain in inches.	Snow in inches.	
	6 A.M.	3 P.M.	10 P.M.	6 A.M.	3 P.M.	10 P.M.	6 A.M.	3 P.M.	10 P.M.	6 A.M.	3 P.M.	10 P.M.	6 A.M.	3 P.M.	10 P.M.	6 A.M.	3 P.M.	10 P.M.	6 A.M.	2 P.M.	10 P.M.				Re. sult.
1	29.820	29.776	—	5.3	17.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2	30.000	29.860	29.720	21.5	28.4	10.0	0.21	6.5	3.55	1.03	0.54	0.85	0.86	89	53	70	92	70	7.07	14.2	4.6	7.07	8.38	—	—
3	30.081	29.937	29.793	9.3	25.0	24.8	0.96	11.1	5.84	0.96	1.11	1.05	0.83	84	81	79	80	78	14.4	14.2	4.6	7.07	8.38	—	—
4	30.162	29.918	29.774	10.5	26.2	26.0	1.13	5.8	6.04	0.74	0.52	0.33	0.53	67	63	88	73	80	19.5	0.0	6.5	4.90	5.38	—	—
5	30.243	29.999	29.855	20.5	34.1	35.6	3.22	5.5	7.42	1.18	1.32	1.79	1.44	86	65	85	77	83	11.0	19.0	1.3	7.10	10.01	—	—
6	30.324	30.180	30.036	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
7	30.405	30.201	30.057	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
8	30.486	30.282	30.138	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
9	30.567	30.363	30.219	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
10	30.648	30.444	30.300	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
11	30.729	30.525	30.381	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
12	30.810	30.606	30.458	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
13	30.891	30.687	30.545	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
14	30.972	30.768	30.626	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
15	31.053	30.849	30.707	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
16	31.134	30.930	30.788	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
17	31.215	31.011	30.869	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
18	31.296	31.092	30.950	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
19	31.377	31.173	31.031	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
20	31.458	31.254	31.112	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
21	31.539	31.335	31.189	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
22	31.620	31.416	31.270	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
23	31.701	31.497	31.357	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
24	31.782	31.578	31.434	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
25	31.863	31.659	31.515	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
26	31.944	31.740	31.596	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
27	32.025	31.821	31.677	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
28	32.106	31.902	31.758	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
29	32.187	31.983	31.839	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
30	32.268	32.064	31.920	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
31	32.349	32.145	32.001	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
32	32.430	32.226	32.082	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
33	32.511	32.307	32.163	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
34	32.592	32.388	32.244	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
35	32.673	32.469	32.325	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
36	32.754	32.550	32.406	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
37	32.835	32.631	32.487	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
38	32.916	32.712	32.568	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
39	32.997	32.793	32.649	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
40	33.078	32.874	32.730	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
41	33.159	32.955	32.811	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
42	33.240	33.036	32.892	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
43	33.321	33.117	32.973	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
44	33.402	33.198	33.054	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
45	33.483	33.279	33.135	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
46	33.564	33.360	33.216	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
47	33.645	33.441	33.297	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
48	33.726	33.522	33.378	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
49	33.807	33.603	33.459	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
50	33.888	33.684	33.540	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
51	33.969	33.765	33.621	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
52	34.050	33.846	33.702	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9.44	9.76	—	—
53	34.131	33.927	33.783	35.2	40.2	40.0	5.99	3.3	8.80	2.22	2.36	3.24	2.89	71	78	77	77	83	3.5	19.0	8.5	9			



REMARKS ON TORONTO METEOROLOGICAL REGISTER FOR JANUARY, 1865.

COMPARATIVE TABLE FOR JANUARY.

YEAR.	TEMPERATURE.			RAIN.		SNOW.		WIND.		Mean Force or Velocity	
	Mean.	Maximum (Average).	Minimum observed.	Range.	Inches.	No. of days.	Inches.	No. of days.	Resultant Direction.		
1840	27.6	40.6	-13.8	54.4	1.395	11	...	...	...	0.36 lbs	
1841	25.6	41.7	4.1	45.8	2.150	14	...	...	...	0.78 "	
1842	27.9	43.5	1.3	44.5	1.700	9	...	...	...	0.69 "	
1843	28.7	44.4	1.5	52.9	4.295	6	...	...	...	0.70 "	
1844	20.2	34.4	7.7	52.3	3.065	11	24.9	...	...	0.70 "	
1845	26.5	43.0	3.4	46.4	Imp.	9	22.7	...	...	0.55 "	
1846	26.7	41.2	0.3	49.3	2.335	10	6.0	...	...	1.09 "	
1847	23.3	42.6	2.2	44.8	2.135	5	7.5	...	...	5.82 ms	
1848	28.7	51.5	12.0	63.5	1.174	10	9.2	...	...	6.71 "	
1849	18.5	40.1	15.2	55.3	2.215	8	7.1	N 82 W	2.03	5.80 "	
1850	29.7	46.3	10.6	35.7	1.256	5	...	N 63 W	3.06	7.69 "	
1851	25.5	42.2	7.0	44.3	1.274	10	7.8	S 37 W	0.69	5.80 "	
1852	13.4	37.3	12.8	56.0	4.4	10	7.8	S 77 W	3.26	7.69 "	
1853	23.6	40.9	6.6	47.5	1.020	6	7.5	S 27 W	2.52	6.34 "	
1854	23.6	40.9	4.3	49.5	1.270	11	7.5	S 77 W	2.44	6.91 "	
1855	25.9	45.2	4.7	52.0	0.825	13	23.3	S 73 W	1.91	7.26 "	
1856	16.0	33.1	-12.1	46.2	0.000	14	13.6	S 70 W	5.24	10.69 "	
1857	12.8	34.6	-20.1	54.7	Imp.	16	21.8	S 70 W	4.06	10.31 "	
1858	30.0	45.8	7.5	38.3	1.152	11	4.0	N 71 W	2.33	7.40 "	
1859	26.4	41.5	26.5	68.0	6	1	44.9	S 81 W	3.17	8.76 "	
1860	23.4	45.4	5.1	50.5	6	7.0	16	S 80 W	6.09	9.37 "	
1861	19.9	34.5	7.0	44.5	0.653	23	27.6	S 26 W	2.69	8.83 "	
1862	21.7	42.8	1.9	44.7	5	0.115	19	S 26 W	2.69	8.83 "	
1863	28.1	44.6	11.2	55.8	10	1.122	17	S 61 W	1.13	7.23 "	
1864	22.8	42.5	6.6	49.1	5	1.165	14	S 73 W	6.00	10.22 "	
1865	17.7	35.6	6.2	41.8	1	0.440	18	S 85 W	4.80	9.39 "	
Results to 1864.	23.61	42.86	-6.52	49.38	4.61	1.331	12.0	15.15	N 77 W	2.92	S 02
Exc. for 1865.	-5.86	-7.28	+0.32	-7.58	3.81	0.891	5.4	0.36	...	...	+1.37

Notes.—The monthly means do not include Sunday observations. The daily means, excepting those that relate to the wind, are derived from six observations daily, namely, at 6 A.M., 8 A.M., 2 P.M., 4 P.M., 8 P.M., and midnight. The monthly means for the wind are from hourly observations.

Highest Barometer . . . . . 30.191 at 10 30 a.m. on 30th } Monthly range =  
 Lowest Barometer . . . . . 29.114 at 6 a.m. on 11th } 1.077 inches.  
 Maximum temperature . . . . . 37.52 on p.m. of 5th } Monthly range =  
 Minimum temperature . . . . . -9.70 on a.m. of 15th. } 46.2  
 Mean maximum temperature . . . . . 27.0 } Mean daily range = 14.52  
 Mean minimum temperature . . . . . 10.6 }  
 Greatest daily range . . . . . 31.4 from a.m. to p.m. of 5th.  
 Least daily range . . . . . 2.4 from a.m. to p.m. of 26th.  
 Warmest day . . . . . 5th. Mean Temperature . . . . . 32.55 }  
 Coldest day . . . . . 17th. Mean Temperature . . . . . 17.7 } Difference = 30.78  
 Maximum Solar (Vacuum) . . . . . 93.9 on 24th }  
 Radiation Terrestrial . . . . . 18.52 on 18th } Monthly range =  
 Aurora observed on 3 nights, viz.—on 17th, 19th, and 20th. }  
 Possible to see Aurora on 15 nights; impossible on 18 nights.  
 Snowing on 18 days; depth 14.8 inches; duration of fall, 68.8 hours.  
 Raining on 1 day; depth 0.440 inches; duration of fall, 10.6 hours.  
 Mean of cloudiness = 0.70; below average. } Most cloudy hour observed, 2 p.m.  
 mean = 0.79; least cloudy hour observed, 10 p.m.; mean = 0.62.  
 Sums of the components of the Atmospheric Current, expressed in Miles.

North. South. East. West.  
 2221.06 1906.66 651.63 4206.33  
 Resultant direction, N. 85° W.; Resultant Velocity, 4.50 miles per hour.  
 Mean velocity 2.39 miles per hour.  
 Maximum velocity 25.0 miles, from 1 to 2 p.m. on 24th.  
 Most windy day 24th—Mean velocity 18.13 miles per hour.  
 Least windy day 13th—Mean velocity 3.99 miles per hour. } Difference 14.14  
 Most windy hour, 1 to 2 p.m.—Mean velocity, 11.72 miles per hour. }  
 Least windy hour, mid 20 a.m.—Mean velocity, 7.57 miles per hour. } 4.15 miles.  
 4th. Lunar halo from 7.30 p.m.  
 7th. Col. windy day.  
 10th. Heavy snow storm; stormy day.  
 12th. Lunar halo from 10 p.m.  
 13th. Solar halo at noon.  
 17th. Very cold day; auroral light from 7 p.m.  
 19th. Auroral light 10 p.m. and midnight.  
 22nd. Rain, sleet, and snow most of the day; foggy and damp 9 p.m.  
 29th. Auroral light and arch from 8 p.m. }  
 30th. Foggy at 8 a.m.

The month of January, 1865, was very cold and dry, and comparatively mild.