

NORTHEASTERN BOUNDARY.

MESSAGE

FROM

THE PRESIDENT OF THE UNITED STATES,

TRANSMITTING

A copy of the report of the commissioners for the exploration and survey of the Northeastern Boundary, &c. &c.

FEBRUARY 12, 1841.

Referred to the Committee on Foreign Affairs.

To the Senate and House of Representatives of the United States :

I transmit herewith the copy of a report from the commissioners for the exploration and survey of the northeastern boundary, in addition to the documents sent to Congress with reference to a further appropriation for the completion of the duty intrusted to the commission.

M. VAN BUREN.

WASHINGTON, February 8, 1841.

Report of the commissioners appointed by the President of the United States, under the act of Congress of 20th July, 1840, for the purpose of exploring and surveying the boundary-line between the States of Maine and New Hampshire, and the British Provinces.

NEW YORK, January 6, 1841.

SIR: The commissioners having assembled in this city, in conformity with your orders under date of 29th of July, beg leave respectfully to report:

That the extent of country, and the great length of the boundary-line included in the objects of their commission, would have rendered it impossible to have completed the task assigned them within the limits of a single season. In addition to this physical impossibility, the work of the present year was entered upon under circumstances very unfavorable for making any great progress. The law under which they have acted, was passed at the last period of a protracted session, when nearly half of the season, during which working parties can be kept in the field, had elapsed; and although no delay took place in the appointment of commissioners to carry it into effect, the organization of the board was not effected, in consequence of the refusal of one of the commissioners and the agent to accept of their nomination. The commissioners, acting under these disadvantages, have done all that lay in

their power to accomplish the greatest practicable extent of work, and have obtained many results which cannot but be important in the examination of the vexed and important question which has been committed to them; but, after having fully and maturely considered the subject, and interchanged the results of their respective operations, they have come to the conclusion that it would be premature to embody the partial results which they have attained, in a general report, for the purpose of being laid before the political and scientific world. The meridian-line of the St. Croix has not been carried to a distance of more than fifty miles from the monument at the source of that river; and the operations of the other commissioners, although they have covered a wide extent of country, have fulfilled but one part of the duty assigned them—namely, that of exploration; while, even in the parts explored, actual surveys will be necessary for the purpose of presenting the question in such form as can admit of no cavil. In particular, the results of the examination of the most northern part of the line appear to differ, in some points, from the conclusions of the late British commission. Satisfied that the latter have been reached in too hasty a manner, and without a sufficient time having been expended upon comparative observations, they are cautioned by this example against committing a like error. In respect to the argumentative part of the report of the British commissioners, the duty of furnishing a prompt and immediate reply to such parts of it as rest upon the construction of treaties, and the acts of diplomacy, has been rendered far less important than it might at one time have appeared, by the publication of the more important parts of the argument laid before the King of the Netherlands, as umpire. This argument, the deliberate and studied work of men who well understood the subject, is a full exposition of the grounds on which the claim of the United States to the whole of the disputed territory rests. It has received the sanction of successive administrations, of opposite politics; and may, therefore, be considered, in addition to its original official character, as approved by the whole nation. To this publication your commission beg leave to refer, as embodying an argument which may be styled unanswerable.

The operations of the parties under the command of the several commissioners, were as follows:

The party under the direction of Professor Renwick, left Portland, in detachments, on the 26th and 27th of August. The place of general rendezvous was fixed at Woodstock, or, failing that, at the Grand Falls of the St. John's. The commissary of the party proceeded as speedily as possible to Oldtown, in order to procure boats and engage men. Professor Renwick passed by land through Brunswick, Gardiner, and Augusta. At the former place, barometer No. 1 was compared with that of Professor Cleaveland; at Gardiner, with that of Hallowell Gardiner, Esq.; and arrangements were made with them to keep registers, to be used as corresponding observations with those of the expedition. At Augusta, some additional articles of equipment were obtained from the authorities of the State; but the barometer which it had been hoped might have been procured, was found to be unfit for service. At Houlton, two tents and a number of knapsacks, with some gunpowder, were furnished, by the politeness of General Eustis, from the Government stores.

The boats and all the stores reached Woodstock on the 3d September; and all the party were collected, except one engineer, who had been left behind at Bangor, in the hopes of obtaining another barometer. A bateau

was therefore left to bring him on. The remainder of the boats were loaded, and the party embarked on the St. John's, on the morning of the 4th of September. This, the main body, reached the Grand Falls at noon on the 8th of September. The remaining bateau, with the engineer, arrived the next evening, having ascended the rapids of the St. John's in a time short beyond precedent. On its arrival, it was found that the barometer, on whose receipt reliance had been placed, had not been completed in time; and although, as was learned afterwards, it had been committed, as soon as finished by the maker, to the care of Major Graham, the other commissioners felt compelled to set out before he had joined them. The want of this barometer, in which defects observed in the others had been remedied, was of no little detriment.

A delay of eighteen days had occurred in Portland, in consequence of the refusal of Messrs. Cleaveland and Jarvis to accept their appointments; and it was known, from the experience of the commissioners sent out in 1838 by the State of Maine, that it would require at least three weeks to reach the line claimed by the United States, from Bangor. It was, therefore, imperative to push forward, unless the risk of having the whole of the operations of this party paralysed by the setting in of winter, was to be encountered. It was also ascertained at the Grand Falls, that the streams which were to be ascended were always shallow and rapid; and that at the moment, they were extremely low, so that the boats would not carry more stores than would be consumed within the time required to reach the region assigned to Professor Renwick, as his share of the duty, and return. It became therefore necessary, as it had been before feared it must, to be content with an exploration, instead of a close and accurate survey. Several of the men employed had been at the northern extremity of the meridian-line; but their knowledge was limited to that single object. Inquiry was carefully made for guides through the country between the sources of the Grande Fourche of Restigouche and of Tuladi, but none were to be found. One Indian only had passed from the head of Green river to the Grande Fourche, but his knowledge was limited to a single path, in a direction not likely to shed any light on the object of the commission; he was, however, engaged. The French hunters of Madawasca had never penetrated beyond the sources of Green river; and the Indians, who formerly resided on the upper waters of the St. John's, were said to have abandoned the country for more than twelve years.

The party was now divided into four detachments: the first to proceed down the Restigouche, to the tide of the bay of Chaleurs; the second to ascend the Grande Fourche of Restigouche to its source; the third to be stationed on Green river mountain; the fourth to convey the surplus stores and heavy baggage to Lake Temiscouata, and thence to ascend the Tuladi and Abagusquash, to the highest accessible point of the latter. It was resolved that the second and fourth detachments should endeavor to cross the country and meet each other, following, as far as possible, the height of land. A general rendezvous was again fixed at Lake Temiscouata.

In compliance with this plan, the first and second detachments ascended the Grand river together, crossed the Wagansis portage, and reached the confluence of the Grande Fourche and southwest branch of Restigouche.

The first detachment then descended the united stream, returned by the same course to the St. John's, and reached the portage at Temiscouata on the 7th October. All the intended objects of the detachment were happily accomplished.

The second detachment, under the personal direction of the commissioner, reached the junction of the north and south branches of the Grande Fourche on the 22d September. Two engineers, with two men to carry provisions, were then despatched to cross the country to the meridian-line, and thence to proceed westward to join the detachment at Kedgwick lake. This duty was performed, and many valuable observations obtained; but an accident, by which the barometer was broken, prevented all the anticipated objects of the mission from being accomplished.

All the stores which could possibly be spared were now placed in a depot at the junction of the south branch, and the commissioner proceeded with the boats thus lightened towards Kedgwick lake. The lightening of the boats was rendered necessary, in consequence of the diminution of the volume of the river, and the occurrence of falls, over which it would have been impossible to convey them when fully loaded. For want of a guide, a branch more western than that which issues from the lake was entered. One of the boats was, therefore, sent round into the lake, to await the return of the engineers despatched to the meridian-line. The stores, which were all that could be brought up, in the state of the waters, were now found to be wholly insufficient to allow of committing the party to the unexplored country between this stream and Tuladi. Even the four days which must intervene before the return of the engineers could be expected, would do much to exhaust them. The commissioner, therefore, resolved to proceed across the country, with no other companion than two men, carrying ten days' provisions. It was hoped that four or five days might suffice for the purpose; but ten, of great toil and difficulty, were spent before Lake Tuladi was reached. The remainder of the detachment, united by the return of the engineers, descended the north branch of the Grande Fourche to the junction of the south branch, ascended the latter, and made the portage to Green river. In this, the boats were completely worn out, and the last of their food exhausted just at the moment that supplies, sent up the Green river to meet them, arrived at their camp.

No arrangement which could have been made, would have sufficed to prevent the risk of famine which was thus encountered by the second detachment. A greater number of boats would have required more men, and these would have eaten all they could have carried. No other actual suffering, but great fatigue and anxiety were encountered; and it is now obvious that, had the rains, which were so abundant during the first week of October, been snow, (as they sometimes are in that climate,) there would have been a risk of the detachment perishing.

The third detachment reached their station, on Green river mountain, on the 13th of September, and continued there until the 12th of October. A full set of barometric observations was made; the latitude well determined by numerous altitudes, and the longitude approximately, by some lunar observations.

The fourth detachment, after depositing the stores intended for the return of the party in charge of the British commissary at Fort Ingall, who politely undertook the care of them, ascended the Tuladi, and, taking its northern branch, reached Lake Abagusquash. Here one of the engineers wounded himself severely, and was rendered unfit for duty. The commissary then proceeded a journey of five days towards the east, blazing a path, and making signals to guide the second detachment.

The difference between the country, as it actually exists, and as repre-

sented on any maps, prevented the commissioner from meeting this party. It found the source of the central or main branch of Tuladi to the north of that of the Abagusquash; and, following the height of land, reached the deep and narrow valley of the Rimouski, at the point where, on the British maps, that stream is represented as issuing from a ridge of mountains far north of the line offered to the King of the Netherlands as the bounds of the American claim. The commissary, therefore, found it impossible to ascend Rimouski to its source; and, crossing its valley, found himself again on a dividing ridge, where he soon struck a stream running to the southeast. This, from a comparison of courses and distances, is believed to be the source of the main branch of the Grande Fourche of Restigouche; and thus the second and fourth detachments had reached points within a very short distance of each other. The greater breadth of the dividing ridge has thus been explored; but it will remain to trace the limits of the valley of the Rimouski, which will form a deep indenture in the boundary-line. This line having been explored, a party was formed, after the assemblage of the several divisions at Temiscouata, for the purpose of levelling it with a barometer; but the expedition was frustrated by a heavy snow-storm, which set in on the 12th of October. This, the most important part of the whole northern line, therefore remains for future investigation. It can only be stated, that strong grounds exist for the belief that its summits are not only higher than any point which has been measured, but that, although cut by the Rimouski, it exceeds, in average elevation, any part of the disputed territory.

The levelling of the Temiscouata portage appeared to be an object of great importance, not only on its own account, but as furnishing a base for future operations. As soon as a sufficient force had been assembled at Lake Temiscouata, a party was, therefore, formed to survey the portage with a theodolite. Orders were also given by the commissioner, that the first barometer which should be returned should be carried over the portage. It was believed that this double provision would have secured the examination of this point, beyond the chance of failure. A snow storm, however, (the same which interrupted the last operation referred to,) set in after the level had been run to the mountain of Biort; and one of the laboring men, worn out by his preceding fatigues, fell sick. The party being thus rendered insufficient, the engineer in command found himself compelled to return. The contemplated operation with the barometer was also frustrated; for, on examination at Temiscouata, it was found that all were unfit for further service. In order that the desired object might be accomplished, a new expedition was despatched from New York, on the 12th of November, furnished with four barometers. This party, by great exertions, reached St. André, on the St. Lawrence, on the eighth day, and accomplished the object of its mission. The operation was rendered possible, at this inclement season, by its being confined to a beaten road, and in the vicinity of human habitations.

The country which has been the object of this reconnoissance, is, as may already be understood, of very difficult access from the settled parts of the State of Maine. It is also, at best, almost impenetrable, except by the water-courses. It furnishes no supplies, except fish and small game; nor can these be obtained by a surveying party, which cannot be strong enough to allow for hunters and fishermen as a constituent part. The third detachment alone derived any important benefit from these sources. The best

mode of supplying a party moving on the eastern section, would be to draw provisions and stores from the St. Lawrence. It is, indeed, now obvious, although it is contrary to the belief of any of the persons professing to be acquainted with the subject, that, had the commissioner proceeded from New York, by the way of Montreal and Quebec, he might have reached the district assigned to him a fortnight earlier, and have accomplished twice as much work as his party was able to perform.

Although much remains to be done in this region, an extensive knowledge of a country hitherto unknown and unexplored has been obtained; and this not only sheds much light upon the boundary question in its present state, but will be of permanent service in case of a further *ex parte* examination, or of a joint commission being agreed upon by the Governments of Great Britain and the United States.

The season was too late for any efficient work, as the line to be explored was not reached before the 22d of September. Not only were the rivers at their lowest ebb, but ice was met, in the progress of the parties, as early as the 12th of September, and snow fell on the 21st and 22d of September. The actual setting in of winter, which sometimes occurs in the first week of October, was therefore to be dreaded. From this time, the country becomes unfit for travelling of any description, until the streams are bound with solid ice, and a crust formed on the snow of sufficient firmness to make it passable on snow-shoes. The only road is that along the St. John's river; and it would be almost impossible for a party, distant more than ten or twelve miles from that stream, to extricate itself after the winter begins.

No duty could be well imagined more likely to be disagreeable than that assigned to Professor Renwick. The only feasible modes of approach lay, for hundreds of miles, through the acknowledged limits of the British territory; and the line he was directed to explore was included within the military posts of that nation. It may be likened to the entry upon the land of a neighbor for the purpose of inquiring into his title. Under these circumstances of anticipated difficulty, it becomes his duty, as well as his pleasure, to acknowledge the uniform attention and civilities he experienced from all parties, whether in official or in private stations. All possibility of interruption by the local authorities was prevented by a proclamation of his excellency Sir John Harvey, K. C. B., Lieutenant Governor of the Province of New Brunswick; and the British warden, Colonel McLaughlin, was personally instrumental in promoting the comforts of the commissioner and his assistants. Similar attentions were received from the officers of the garrison at Fort Ingall, the commandant of the citadel of Quebec, and from his excellency the Governor General. Even the private persons, whose property might be affected by the acknowledgment of the American claim, exhibited a generous hospitality.

The party under the direction of Captain Talcott left the settlements on Hall's stream on the 6th of September. The main branch of this was followed to its source in a swamp, in which a branch of the St. Francis also had its origin. From this point, the party followed the ridge dividing the Atlantic from the St. Lawrence waters, until it was supposed that all the branches of Indian stream had been headed. In this work the party was employed until the 14th September. It had now arrived at a point where the Megalloway river should be found to the left, according to the most authentic map of the country; especially that prepared by the New Hampshire commissioner, appointed in 1836 to explore the boundary of that

State, and accompanying that report.* The party, accordingly, bore well north, to avoid being led from the true "height of land" by the dividing ridge between the Connecticut and Androscoggin rivers. After crossing several small streams, it came, on the afternoon of the 15th, to a rivulet, about 12 feet wide, running to the east, which was supposed to be the main Megalloway: the 16th was spent in exploring it to its source. The next day it was discovered that what had been taken for the Megalloway was a tributary of Salmon river, a large branch of the St. Francis; and, consequently, the party was considerably to the north of the boundary.

The supply of provisions did not allow the party to retrace its steps to the point where it had diverged from the true dividing ridge. The course was therefore changed, until it bore a little south; but it was not until the 22d that the party found itself again on the dividing ridge, and then upon the waters of the Megalloway.

The party reached Arnold river, or Chaudiere, above Lake Megantic, on the 24th September. After having recruited, and taken a fresh supply of provisions from the depot established there, the party was divided into two detachments. One returned westward, to find the corner of the State of New Hampshire, as marked by the commission in 1789 appointed to trace the boundary-line.

It was there ascertained that the corner was on the true dividing ridge, and not from eight to ten miles south, as has been erroneously reported by the surveyor employed by the New Hampshire commissioners in 1836, and reiterated in several official papers. From the State corner, the dividing ridge was followed to where it had been previously explored by the party. Thence a course was taken to the northeast, so as to reach the head of Lake Megantic, and thence to Lake Magaumac, where, on the 8th October, the two detachments were again united. The detachment led by the assistant, Mr. Cutts, had successfully followed the dividing ridge from the camp of the 24th, on Arnold river, to this place.

It was now ascertained that the provisions remaining were not sufficient to subsist all of the company until the Kennebec road could be reached by following the *height of land*. It was thought advisable again to separate into detachments—one to follow the ridge, supplied with provisions for twenty days; and the other to strike for the nearest settlement, which, it was supposed, could be reached in four or five days. This movement commenced on the 10th October, and the detachment, following the high land, reached the Kennebec road on the 23d; and on the following day, provisions for the party for fifteen days were placed there, and a like quantity at the mouth of the Metjarmette. It was intended that the two detachments should move, simultaneously, from these two points, on the 26th, to explore the boundary-line as far as Lake Etchemin. A deep snow, which commenced falling on the night of the 25th, compelled the commissioner to abandon further explorations at that time; and there was not the slightest probability that they could be resumed before another year.

The result of these explorations may be stated as follows:

About 160 miles of country along or near the "*height of land*" have been traversed, the travelled distances carefully estimated, and the courses measured with a compass. Barometrical observations were made as often as necessary for giving a profile of the route from the head of Hall's stream to

* Also, see Rep. No. 176, Ho. Reps., 3d session, 25th Congress.

Arnold's, or the Chaudiere river, and thence to Lake Magaumac, via the corner of the State of New Hampshire. Some further barometrical observations were made between this lake and the Kennebec road ; but, for a portion of that distance, the barometer was unserviceable, in consequence of air having entered the tube. Astronomical observations were made as often as there was an opportunity, but, owing to the prevalence of clouds, not as often as was desirable. They will serve for correcting the courses and estimated distances as travelled. Barometrical observations for comparison were made at the intersection of the Kennebec road and height of land, hourly, from 7 A. M., to 5 P. M., while the parties were on the dividing ridge.

The only discovery of interest made by this party, is, that the Magalloway river does not head any of the branches of the Connecticut, as it was generally believed it did ; and, consequently, our claim to Hall's stream is deprived of the support it would have had, from the fact that *all* the other branches were headed by an Atlantic river, and, consequently, could not be reached by the line along the height of land from the northwest angle of Nova Scotia.

The other commissioner (Major J. D. Graham) did not receive his appointment until 16th August, to fill the place left vacant by the non-acceptance of Professor Cleaveland ; and to him was assigned the survey and examination of the due-north line, commencing at the source of the river St. Croix, and extending to the highlands which divide the waters that flow into the river St. Lawrence, from those which flow into the Atlantic ocean.

Immediately after receiving his appointment, he took the necessary steps for organizing his party ; and, in addition to two officers of the corps of topographical engineers, assigned to him by the commandant of the corps for this service, he called to his aid two civil engineers, possessing the requisite qualifications for the duties to be performed. So soon as the requisite instruments could be procured and put in proper order, he left New York for Portland, Maine, where he arrived on the 5th of September, expecting there to join his colleagues of the commission. They had, however, proceeded to the points designated for the commencement of their respective duties; the season being too far advanced to justify their incurring any further delay.

At Portland, a short conference was had with Mr. Stubbs, the agent of the State Department, who furnished the necessary means for procuring an outfit for the party, in provisions, camp equipage, &c.

The party then proceeded to Bangor, where it was occupied until the 12th in procuring the necessary supplies of provisions, camp equipage, transportation, &c., to enable it to take the field ; and a few astronomical observations were made here, for the purpose of testing the rates of the chronometers which were to be used upon this service, as well as of obtaining additional data for computing the longitude of this place, which, together with the latitude, had been determined by the commissioner, by a very near approximation, in the summer of 1838, while occupied upon the military reconnoissances of the northeastern frontier.

On the 12th the party left Bangor for Houlton, where it arrived on the evening of the 13th. A depôt of provisions was established here, for supplying the line of their future operations ; and the services of the requisite number of men, as axemen, chain-bearers, instrument carriers, &c., were engaged.

Pending these preparations, and the time necessarily occupied in cutting

a roadway through the forest from a convenient point on the Calais road, to the monument at the source of the river St. Croix, a series of astronomical observations was made, both by day and by night, by which the latitude and longitude of Houlton were satisfactorily determined, and the rates of the chronometers further tested.

By the 24th of September, the roadway was sufficiently open to permit a camp to be established upon the experimental meridian-line traced by the United States and British surveyors in the year 1817, when an attempt was made to mark this portion of the boundary between the two countries, agreeably to the provisions of the treaty of Ghent of 1815.

The provisions and camp equipage were transported upon a strong but roughly-constructed sled, drawn by horses, whilst the instruments were carried by hand; the surface of the country over which this road-way was opened being too rough for any wheeled vehicle to pass.

The point decided upon as the true source of the river St. Croix, by the United States and British commissioners appointed for that purpose, under the 5th article of the treaty of 1794, was found and identified, both by the inscriptions upon the monument erected there to mark the spot, and also by the testimony of a living witness of high respectability, who has known the locality since it was first designated by the commissioners under the treaty of 1794.

The avenue, which had been cleared through a dense forest, from the monument to a distance of 12 miles north of it, by the surveyors in 1817, was easily recognised by the new and thick growth of young timber which, having a width of from 40 to 50 feet, now occupied it. Axemen were at once set at work to re-open this avenue, under the supposition that the due-north line would at least fall within its borders for a distance of 12 miles. In the mean time, the first astronomical station and camp were established, and the transit instrument set up at a distance of 4,578 feet north of the monument, upon an eminence $45\frac{1}{2}$ feet above the level of its base. This position commanded a distant view of the monument to the south, and of the whole line to the north, for a distance of 11 miles, reaching to Park's hill. Whilst the work of clearing the line of its young growth of timber was progressing, a series of astronomical observations was commenced at this first camp, and continued both day and night without intermission, (except when interrupted by unfavorable weather,) with the sextants, the repeating circle of reflection, and the transit instrument, until the latitude and longitude of the monument and of this first camp were satisfactorily ascertained, and also the direction of the true meridian from the said monument, established. For this latter purpose, several observations were in the first place made upon the polar star (*Alpha Ursæ Minoris*,) when at its greatest eastern diurnal elongation; and the direction thus obtained was afterwards verified and further corrected, by numerous transit observations upon stars passing the meridian at various altitudes both north and south of the zenith. These were multiplied with every degree of care, and with the aid of four excellent chronometers, whose rates were constantly tested, not only by the transit observations, but also by equal altitudes of the sun in the day, to correct the time at noon and midnight, and by observed altitudes of east and west stars, for correcting the same at various hours of the night.

The direction of this true meridian, as thus established by the commissioner, was found to vary from the experimental line traced by the survey-

ors of 1817, by running in the first place to the west of their line, then crossing it, and afterwards deviating considerably to the east of it.

At the second principal station erected by the party, distant 6 miles and 3,952 feet north of the first camp, or 7 miles and 3,240 feet north of the monument, it found itself 60 feet to the west of the line of 1817. This appeared to be the maximum deviation to the west of that line, as near as its trace could be identified, which was only marked by permanent objects recognised by the party, at the termination of each mile from the monument. Soon after passing this station, the line of 1817 was crossed; and the party did not afterwards touch it, but deviated more and more to the east of it as it progressed north, but by an irregular proportion to the distance advanced.

In order to obtain a correct profile or vertical section along the whole extent of this meridian line, in the hope of furnishing data for accurate comparisons of elevations, so far as they might be considered relevant to the subject in dispute between the two Governments, and also to afford an accurate base of comparison for the barometers along an extended line, which must traverse many ridges that will be objects of minute exploration for many miles of lateral extent, an officer was detailed to trace a line of levels from the base of the monument marking the source of the river St. Croix, to tide-water, at Calais in Maine; by which means the elevation of the base of the monument above the planes of mean low and mean high water, and also the elevations of several intermediate points of the river St. Croix, on its expanded lake surface, have been accurately ascertained.

Another officer was, at the same time, charged with tracing a line of levels from the base of the same monument, along the due-north line, as marked by the commissioner, by which it is intended that every undulation, with the absolute heights above the plane of mean low water at Calais, shall be shown along the whole extent of that line.

At Park's hill, distant nearly 12 miles from the monument, a second station for astronomical observations was established, and a camp suitable for that purpose was formed. On the 26th day of October, whilst occupied in completing the prolongation of the meridian-line to that point, and in establishing a camp there, the party was visited by a snow storm, which covered the ground to a depth of four inches in the course of six hours. This was succeeded by six days of dark, stormy weather, which entirely interrupted all progress, and terminated by a rain, with a change to a milder temperature, which cleared away the snow. During this untoward event, the parties made themselves as comfortable as practicable in their tents, and were occupied in computing many of the astronomical and other observations previously made.

On the 2d of November, the weather became clear, and the necessary astronomical observations were immediately commenced at Park's hill. From this elevated point, the first station could be distinctly seen by means of small heliotropes during the day, and bright lights erected upon it at night. Its direction, with that of several intermediate stations due south of Park's hill, was verified by a new series of transit observations upon high and low stars, both north and south of the zenith. By the same means, the line was prolonged to the north.

In one week after commencing the observations at Park's hill, the weather became again unfavorable; the sky was so constantly overcast as to preclude all astronomical observations, and the atmosphere so thick as to prevent a view to the north, which would permit new stations to be established with

sufficient accuracy in that direction. Unwilling to quit the field while there was a prospect of the weather becoming sufficiently favorable to enable the party to reach the latitude of Mars hill, or even proceed beyond it, it was determined that some of the party should continue in the tents, and there occupy themselves with such calculations as ought to be made before quitting the field. The officers charged with the line of levels, and with the reconnoissances in advance for the selection of new positions for stations, continued their labors in the field, notwithstanding they were frequently exposed to slight rain and snow storms, as these portions of the work could go on without a clear sky.

On the 13th of November a severe snow storm occurred, which, in a single night and a portion of the following morning, covered the surface of the whole country, and the roofs of the tents, to a depth of sixteen inches. The northern extremity of the avenue which had been cleared by the surveyors of 1817, was now reached, and, in addition to the young growth which had sprung up since that period upon the previous part of the line, several miles had been cleared through the dense forest of heavy timber, in order to proceed with the line of levels, which had reached nearly to the Meduxnakeag. The depth of snow now upon the ground rendered it impracticable to continue the levelling, with the requisite accuracy, any farther; and that part of the work was accordingly suspended for the season. The thermometer had long since assumed a range extending during the night, and frequently during a great portion of the day, to many degrees below the freezing point.

The highlands bordering on the Aroostook, distant 40 miles to the north of the party, were distinctly seen from an elevated position, whenever the atmosphere was clear; and a long extent of intermediate country, of inferior elevation to the position then occupied, presented itself to the view, with the two peaks of Mars hill rising abruptly above the general surface which surrounded their base. The eastern extremity of the base of the easternmost peak was nearly two degrees of arc, or nine-tenths of a mile in space, to the west of the line as it passed the same latitude.

To erect stations opposite to the base of Mars hill, and upon the heights of the Aroostook, in order to obtain exact comparisons with the old line at these points, were considered objects of so much importance, as to determine the commissioner to continue the operations in the field to the latest practicable period, in hopes of accomplishing these ends.

On the 18th day of November, the party succeeded in erecting a station opposite Mars hill, and very near the meridian-line. It was thus proved that the line would pass from nine-tenths of a mile to one mile east of the eastern extremity of the base of the northeasternmost peak of Mars hill.

On the 30th of November, a series of signals was commenced to be interchanged at night, between the position of the transit instrument on Park's hill, and the highlands of the Aroostook. These were continued at intervals, whenever the weather was sufficiently clear, until, by successive approximations, a station was, on the 9th of December, established on the heights one mile south of that river and on the meridian-line. The point thus reached is more than 50 miles from the monument at the source of the St. Croix, as ascertained from the land surveys made under the authority of the States of Maine and Massachusetts. The measurements of the party could not be extended to this last point, owing to the depth of the snow which lay upon the ground since the middle of November; but the distance

derived from the land surveys must be a very near approximation to the truth. A permanent station was erected at the position established on the Aroostook heights, and a measurement made from it, due west to the experimental or exploring line of 1817, by which the party found itself 2,400 feet to the east of that line.

Between the 1st and 15th of December, the observations were carried on almost exclusively during the night, and frequently with the thermometer from 0 to 10 and 12 degrees below that point by Fahrenheit's scale. Although frequently exposed to this temperature, in the performance of their duties in the open air at night, and to within a few degrees of that temperature during the hours of sleep, with no other protection than the tents and camp-beds commonly used in the army, the whole party, both officers and men, enjoyed excellent health.

During the day, the tents, in which the astronomical computations were carried on, were rendered quite comfortable by means of small stoves; but, at night, the fire would become extinguished, and the temperature reduced to within a few degrees of that of the outward air. Within the observatory tent, the comfort of a fire could not be indulged in, in consequence of the too great liability to produce serious errors of observation by the smoke passing the field of the telescope. The astronomical observations were therefore always made in the open air, or in a tent open to the heavens at top during the hours of observation, and without a fire.

On the 16th of December the tents were struck, and this party retired from the field for the season; there being then more than two feet of snow on the ground. To the unremitting zeal, amidst severe exposures, and to the scientific and practical attainments of the officers, both civil and military, who served under the orders of the commissioner on this duty, he acknowledges himself in a great measure indebted for the progress that he was enabled to make, notwithstanding the many difficulties encountered.

Observations were made, during portions of three lunations, of the transit of the moon's bright limb, and of such tabulated stars as differed but little in right ascension and declination from the moon, in order to obtain additional data to those furnished by chronometrical comparisons with the meridian of Boston, for computing the longitude of this meridian-line.

At the first station, 4,578 feet north of the monument, and also at the Park's hill station, the dip of the magnetic needle was ascertained by a series of observations: in the one case upon two, and in the other upon three separate needles. The horizontal declination was also ascertained, at both these stations, by a full set of observations upon six different needles.

The details of these, and of all the astronomical observations alluded to, will be prepared as soon as practicable for the use of the commission, should they be required. To his excellency Major General Sir John Harvey, K. C. B., Lieutenant Governor of the Province of New Brunswick, Major Graham acknowledges himself greatly indebted, for having, in the most obliging manner, extended to him every facility within his power for prosecuting the examinations. From Mr. Connell, of Woodstock, a member of the Colonial Parliament, and from Lieutenant Colonel McLaughlin, the British land agent, very kind attentions were received.

Major Graham has also great pleasure in acknowledging his obligations to General Eustis, commandant of the Eastern Department; to Colonel Pierce, commanding the garrison at Houlton, and to his officers; and also to Major Ripley, of the ordnance department, commanding the arsenal at

Augusta, for the prompt and obliging manner in which they supplied many articles useful in the prosecution of the labors of his party.

The transit instrument, with which the meridian-line was traced, had been loaned to the commission by the Hon. William A. Duer, president of Columbia college, New York; and the commissioners feel bound to return their acknowledgments for the liberality with which the use of this astronomical instrument was granted, at a time when it would have been difficult, and perhaps impossible, to have procured one as well suited to the object.

All which is respectfully submitted.

JAMES RENWICK,
JAMES D. GRAHAM, } *Commissioners.*
A. TALCOTT,

Hon. JOHN FORSYTH,
Secretary of State.