DOCUMENTS

PRINTED BY

DIRECTION OF THE GOVERNOR,

AND BY

ORDER OF THE LEGISLATURE,

FOR THE YEAR A. D. 1839.

VOL. 1.

AUGUSTA:
SMITH & ROBINSON, PRINTERS TO THE STATE.

1839.

THIRD

ANNUAL REPORT

ON THE

GEOLOGY

OF THE

STATE OF MAINE.

BY

CHARLES T. JACKSON, M. D.,

Member of the Geological Soc. of France; of the Imperial Mineralogical Society, St. Petersburg; of the Boston Soc. Nat. Hist., and Cor. Memb. Acad. Nat. Sciences of Phila.; Lyceum Nat. Hist., N. Y.; Albany Inst.; Nat. Hist. Soc., Montreal; Prov. Frank. Soc.; Prov. Nat. Hist. Society; Amer. Acad. Arts and Sciences; Hon. Memb. Maine Inst. Nat. Sciences;

GEOLOGIST TO THE STATE OF MAINE.

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STATE OF MAINE.

RESOLVE AUTHORIZING THE CONTINUATION OF THE GEOLOGICAL SURVEY OF THE STATE.

RESOLVED, That the Governor with the advice and consent of Council is hereby authorized to employ some suitable person or persons, to continue the Geological Survey of the State at a salary not exceeding Fifteen Hundred Dollars per annum.

RESOLVED, That the sum appropriated for this purpose shall be subject to the discretion of the Governor and Council, and be expended in continuing said Survey.

RESOLVED, That it shall be the duty of the Governor and Council to lay before the Legislature at its next annual session a detailed account of the progress of the survey together with the expenditures in prosecuting the same.

STATE OF MAINE.

IN COUNCIL, April 21, 1838.

CHARLES T. JACKSON, M. D., of Boston, Mass., was by the Governor, with the advice and consent of Council, appointed Geologist, and SAMUEL L. STEPHENSON, of Portland, Assistant, to continue the Geological Survey of the State, agreeably to the provisions of "Resolves authorizing the continuation of the Geological survey of the State," passed March 23, 1838.

Attest: SAM'L P. BENSON, Secretary of State.

STATE OF MAINE.

IN COUNCIL, April 26, 1838.

ARIEL WALL, of Hallowell, in the County of Kennebec, was by the Governor, with the advice and consent of the Council, appointed Additional Assistant to attend Dr. Charles T. Jackson, in the Geological Survey of the State, and to procure a horse and covered waggon for the purpose of conveyance, under Report of Council accepted on the 25th instant.

Attest: SAM'L P. BENSON, Secretary of State.

To the Senate and
House of Representatives:

"The Third Annual Report on the Geology of Maine," by Doct. Charles T. Jackson, having been laid before the Governor and Council, the same is herewith transmitted to the two branches of the Legislature, with the letter of Doct. Jackson, accompanying said Report.

JOHN FAIRFIELD.

COUNCIL CHAMBER,
February 13, 1839.

INTRODUCTION.

"Geology is now so generally cultivated by all civilized people, that the degree of attention paid to it, is almost a sure criterion of national intelligence and prosperity." If this is the case, it must be that this science reveals something important to mankind, and no man need long remain in doubt as to the nature of the facts and principles which are its subjects. For Geology unfolds the structure and composition of our globe, and reveals to us the efficient causes that have been in operation during the successive epochs of creation. It delves into the recesses of the earth, and brings forth its hidden treasures, and by its light, the situations in which are found various useful mineral substances, are fully exposed. Certain rocks abound in metaliferous veins and beds, others contain combustibles, and the latter are never found in conjunction with the former. Limestones, of various ages, possessing peculiar properties, are discovered, and their composition is learned by chemical analysis, by which we know how they will work in the arts. Some are found suitable for making lime for cement, or for agriculture ; others are incapable of making lime that will slake, but furnish a valuable hydraulic cement. One class of limestones is remarkable for the veins of lead and silver ores it contains—another never contains any metallic ores, excepting iron. Coal is never found in that group of rocks called primary, nor in any of the older stratified rocks ; hence our attention is turned away from researches in such strata for coal mines, and directed to those groups of strata in which they may occur. Iron ores belong to several distinct species of rocks, and there are also alluvial deposits of bog iron ore. In the ancient rock formations, are found the magnetic and specular iron, while the calciferous slate rocks more frequently contain the compact red oxide, or hæmatitic iron ores. Certain varieties of pyritiferous slate are valuable for the purpose of making alum—others, containing magnesia, are unsuitable for that purpose. Serpentine rocks are valuable, both for marble and for the manufacture of Epsom salts and carbonate of magnesia. Certain varieties of limestone are more valuable for marble, than for making lime ; and some kinds of limestone are found to make a good lime for cement, while they do not furnish so good an article for agriculture. Building stones are liable to be contaminated by the presence of pyrites and protoxide of iron, both which substances greatly injure the quality of the stone, and not only produce unsightly stains, but also cause it to decompose and crumble into a brown powder, and thus impair the strength of the material. Some kinds of building stones are liable to the infiltration of water, and crumble readily in our cold climate by the action of frost, while they might answer for permanent architecture in milder climes.

Agriculture draws most largely on the science of Geology, for the elucidation of the origin, distribution and composition of soils; and the amendments required being determined, we have to ascertain whether the required materials occur in the vicinity where they are wanted. For it would be of no use to the farmer, to inform him that the substances required, occurred a hundred miles off, for the large quantity of matter required, would forbid the expense of distant transportation.

A Geological Survey embraces all the above mentioned topics; and the actual state of the country, with its available resources, are only to be developed by such researches. Idle and fraudulent speculations, originating from self delusion and imposture, are thoroughly checked, and erroneous opinions concerning minerals, supposed by those ignorant of science to be very valuable, are corrected, and vast sums of time and money have thus been actually saved to the State every year during our labors. A handful of iron ore is no longer liable to be mistaken for an inexhaustible and valuable mine, nor are the people anxious to set up costly furnaces to work such trifling deposits, but those which are really valuable are fully explored and described, and the exact quantity that may be depended upon for the supply of the furnaces, is known. No longer are hand specimens of granite received as inexhaustible quarries of building stone, or polished masses of greenstone trap sold for marble, but the situation, extent and value, of every available quarry, is described, and the quality of the rock tested.

The slate quarries of Maine are capable of producing many millions of dollars revenue to the State, and the public is now learning from the Geological Reports, their situation, extent and value. Liberal encouragement should be given to individuals or companies, who may invest their labor or capital in this productive industry, for the commerce of the State, by enlightened policy, may be quadrupled in a few years. A trifling bounty of fifty cents per ton on slates wrought from the quarries of Maine, and as much per ton on every ton of iron manufactured from raw materials found in this State, and ten cents per hundred square feet on glass made in Maine, would at once set all the wheels of industry in motion, and the resources of the country would no longer remain as they now are, idle and unproductive. Nothing is wanted so much in this State, as stimulus to enterprise, and a feeling of confidence in the protection of the Legislature.

The mere indication of a wish to encourage productive industry would do much towards its promotion, and slight special bounties are better than exemption from taxation, since the bounty depending upon the quantity of the manufactured article produced, would stimulate the exertions of manufacturers to produce more than they otherwise would; and there is no danger of over-stocking the market with such articles as I have mentioned, since they are in such universal demand, that all the supply would be readily taken up by purchasers. If we could but estimate the amount of money paid out by Maine for iron and glass alone, and should then learn how easily those articles might be wrought in Maine from her own soil, we should be astonished at the fact, that there is but one small blast furnace in the State, and not an ounce of glass is made here, although the raw materials are abundant and every natural facility is afforded for its manufacture.

Slates may be obtained in Maine of better quality than those of Wales, and yet our houses continue to be covered with the foreign article. It may be seen by a simple calculation, that a most profitable and thriving business might be carried on in this department, and that the population of whole towns might be supported by the profits arising from the labor. In order, however, to effect this, a liberal policy must be adopted, for a large capital is required for such an investment, to render the work profitable. A rail road from Bangor to the Piscataquis, and from thence to the navigable waters of the Kennebec, would pass through some of the most fertile regions of the State, and would bring the Mineral, Agricultural and manufactured produce to market, and afford a ready communication with Bangor. Such a route is feasible and it will ultimately be constructed. Why not do it as soon as possible and avail yourselves of the advantages that are sure to arise from such a work?

The Geological Survey of Maine, if rightly improved, will become one of the most profitable investments ever made by the State, and will compare in utility with any similar work in any part of the world. The natural resources of the country will be fully unfolded, and Maine will hold a conspicuous rank among her sister States. Possessing a most extensive sea-coast, indented with numerous good harbors, while the country is intersected by a great number of large rivers and streams, capable of furnishing adequate water power for any machinery, blessed with an abundant supply of the most useful minerals and rocks, valuable in the arts, and with a soil, in many districts, unusually productive, she ought to rank high in the manufacturing arts. It is, however, unfortunately the case, that too many of her enterprising citizens are engaged in the more precarious and less useful business of the lumber trade, and I am of opinion that a detachment from that business could be advantageously employed in works of more permanent utility. Whoever looks into the productive industry of Massachusetts, New-Hampshire, Vermont, or Connecticut, will find that the greatest amount of value is from manufacturing establishments, and from agricultural business ; and let them apply their estimates to the probable capacity of Maine, and see how great and favorable a change may be effected in the business of the community. Mineral wealth is too frequently under-valued, unless it be the working of mines for the precious metals, the most unproductive of all mineral substances.

Whoever examines the structure, composition and order of superposition of rocks forming the visible crust of the globe, will discover that there are great and distinct natural groups, which may be studied in a perfectly systematic manner, independent of all theoretical considerations. Such is the nature of positive geology, which forms the leading features of a Geological Survey. Thus we have described all the rocks exactly as we saw them, and the annual reports must be regarded as the mere field notes that may serve for a more thoroughly rational system, illuminated by a comparison of the results with each other, and with the great rock formations of foreign countries, with the application of economical considerations which may result from a more complete knowledge of the resources of the State.

Thus in my final Report, I propose to bring all our observations to general results, applying the laws of induction or of analysis, as the case may require. Statistical views sought out in the workshops, furnaces, and chemical laboratories, comparisons of natural resources of the various parts of our country, now actually engaged in geological surveys, are subjects of immense importance, and are now placed almost within our reach by the liberal policy of the different States where such surveys have been ordered, and are now in successful progress, under the superintendance of many learned Geologists. The geological maps of the various States, when put together, will form a stupendous monument of scientific labor, honorable alike to the surveyors, and to the whole country where they have been supported in their researches. On such Geological maps, the boundaries of all the great rock formations are to be portrayed, and sectional views or profiles, shewing the order of superposition of strata, their dip, direction, and relative age. Such plans, however, are never drawn up as final results, until the completion of a survey, and they will then constitute the most important documents, and serve as the keys to the resources of the States. I trust that the map of Maine will not be allowed to remain blank in the geological map of the Union.

Rocks are divided into two grand natural groups, the stratified and the unstratified, or those which are in thin sheets or layers, and those that are not so formed, but are aggregates of mineral substances mingled together, as if they were shot out or segregated during the cooling of a molten mass. Those rocks which exist in strata, all Geologists agree in considering as sedimentary deposits from water, and the strata were gradually deposited in regular layers in a horizontal manner. Since their deposition, they have been lifted up so as to incline at various angles from the original horizontal line, and the lower layers of the strata have undergone chemical changes or metamorphosis, evincing the effects of intense heat.

Whoever studies the unstratified rocks, and compares them with modern volcanic productions, and notes the analagous effects produced at their lines of junction with stratified rocks, will soon discover the reasons why all geological writers describe them as resulting from igneous fusion and protrusion from below. Maine presents admirable instances illustrative of the foregoing observations, and even her granitic mountains have a strong family likeness to volcanoes.

The more ancient fissures through which molten rocks were thrown up, have a north and south direction, or the line is more frequently to the west of north and east of south, while those of more recent origin, verge more and more to the east and west direction, and this result, obtained by an immense number of observations, has already been fully substantiated in my former

Reports, where the relative ages of these important land marks for the Geologist, are fully recorded.

It would be improper for me yet to generalize the whole mass of facts relating to the ages of the rocks of Maine, or to draw up a full description of their boundaries, for but two thirds of our map is colored with the outlines of the great rock formations, and there may be other data yet required to be entered into the evidence which is to form the basis of our general theories.

Enough already has been recorded to give us a proximate view of the results anticipated as forthcoming, and the economical results are more fully reported than mere theoretical considerations. The work is however still imperfect, and must be so until the results are brought together in a single point of view.

Primary rocks. The primary or primitive formation, is so called from the opinion long since entertained, that the rocks of that series were the first created, and preceded the existence of organized beings. This is highly probable, but no one now supposes that the granite mountains were *thrown up* anterior to the deposition of strata, which are filled with myriads of shell fish and moluscous animals, and marine plants. Nor do I think that there is any reason to believe that all the upheavings took place at the same epoch. The Swiss Alps were evidently thrown up posterior to the deposition of the fossiliferous jura limestone, and in some places in Germany, it is evident that granite rocks were elevated since the deposition of chalk, the newest deposit of the secondary formation. In Maine, however, the epoch of elevation of her granite mountains, appears to have been vastly more remote, and took place immediately after the deposition of the older transition slate rocks. Their time worn escarpments bear testimony to the same fact, and if the country was raised above the sea anterior to certain members of the upper secondary formations, then they would naturally be found wanting. We therefore find but limited patches of secondary limestone, and new red sand stone, all of which were deposited subsequent to the eruption of the granite mountains.

The GNEISS, or stratified granite, is merely a metamorphic variety of the mica slate, more charged with felspar, from its contiguity to the granite.

MICA SLATE is a stratified rock having plates of mica alternating with grains of quartz in parallel layers, more or less contorted, according to the movements to which it was subjected while still plastic from heat. The only matter of supposed organic origin contained in it, is plumbago or graphite, which is nearly pure carbon, and may have originated from vegetable matter altered by heat. It abounds in Maine, and is highly valued for flagging stones.

TALCOSE SLATE is like the mica slate, but contains *talc* instead of mica, and is of course a magnesian rock. It is very abundant in Maine.

ARGILLACEOUS SLATE is found passing by imperceptible shades into micaceous and talcose slate, and is sometimes so highly charged with silex, as to become properly a blue quartz rock. It is also frequently impregnated so strongly with pyrites or bi-sulphuret of iron, as to form a pyritiferous slate, which is advantageously converted into copperas and alum.

TRANSITION ROCKS. This great formation is well characterized, and abounds in Maine, forming huge bands of parallel strata, broken open by protruded rocks. Various slates, lime stones, fine grauwacke and coarse conglomerate with shells, belong to this group. The characteristic fossils are those strange crustaceans of the trilobite family, and numerous species of terebratulæ and spiriferæ.

Some of the most abundant fossiliferous strata may be seen on the borders of Cobiscook bay, and also on that great belt of grauwacke that extends from the banks of the Aroostook to the Canada road west of Moose Head Lake.

Specimens of the latter rock, with its fossil shells, have been so liberally distributed by a diluvial current, that they may be found almost every where between the Kennebec and Penobscot rivers, laying loose in the soil, where they were deposited by the ancient current from the north.

Huge boulders of the conglomerate belonging to the same formation, also abound, and were driven southwardly from the group of conical peaks, Mars Hill and Sugar Loaf Mountain, on the Seboois river.

Secondary rocks are characterized by their resting upon the transition and by their fossil contents and mineral composition.

Certain groups of limestone and sandstone are the only rocks of this series that occur in Maine, and they may be seen at Machias, on the sea coast at Starbord's creek, and on the shores of Perry, upon the St. Croix river.

Limestones of the same class also occur upon the Aroostook, Seboois and Tobique rivers, the latter river being however beyond the limits of Maine. In the secondary, and even as low as the grauwacke rock formations, we frequently find valuable beds of coal, the Bituminous kind being found in the secondary, and the Anthracite in the transition formations.

We are never to look for that combustible lower down in the series than the newer transition, nor above the secondary. Hence the absurdity of searching in granite and mica slate rocks, for beds of coal, and the mistakes arising from the occurrence of lignite in the tertiary clay—both common and fatal errors to those who engage in such absurd enterprises.

Tertiary formation. This is always found in Maine to be composed of two great beds of clay or clay marl, filled with marine shells of various recent and extinct species. It never was much elevated after its deposition, and now is rarely found more than 150 feet above the present sea level. Nearly all the valleys lower than this point are filled with marine deposits and abound with marine shells. I have collected a numerous series of the different fossils of this deposit, and shall present drawings of them in my final Report.

Diluvial deposit. This formation I have already discussed in the former and in the present report, and it is only necessary to add, that there are abundant proofs of such a cataclysm in every part of Maine. It is evident that the current of waters came from the North and rushed towards the South, sweeping with it all loose materials in its way, and depositing them far from their parent beds.

The reader is invited to note the great number of curious facts we have collected on this subject, and to mark them as he journeys through the State.

The record is so legibly written that "he who runs may read."

REPORT.

His Excellency JOHN FAIRFIELD,
Governor of Maine:

SIR:—I have the honor herewith to lay before you my Third Annual Report on the Geological Survey of Maine, containing an account of the Geological and Agricultural researches which I have made during the past season, in the regular progress of the work which it was my duty to perform. The amount of valuable information contained in its several departments, I shall leave for the Government to judge.

In a survey of this character, it cannot be expected that Annual Reports of its progress should assume that systematic form which belongs to a full and complete Report. The facts collected are different parts of the frame work, which will form a complete edifice, when duly arranged and put together; but such a construction can be made only when *all* the parts are duly prepared.

In order to render subsequent operations more easy, and the work more comprehensible, the data are arranged, so far as practicable, in a systematic form which necessarily follows the regular order in which they have been collected, and must vary more or less as I am called off from my regular sectional lines.

It has been my earnest desire while engaged in the survey, besides keeping up a regular and scientific system of operations, to render it of immediate practical utility; and thus it occasionally becomes necessary for me to leave for a time those researches which were necessary to fix the order of superposition of the rocks, for the sake of exploring the situation, extent and value of certain rocks or minerals valuable to the farmer or manufacturer. Hence it will be discovered that our attention is occasionally called off from sectional measurements, and devoted to the running out of some beds of limestone, and the exploration of the extent of deposits of iron ore, substances of immense value to the State, and calculated to render the agricultural and manufacturing interests of the country of much greater importance. It has been our good fortune to discover, by geological and chemical researches, immense and incalculable quantities of limestone suitable for agricultural and other ordinary uses. Some of the limestones being nearly pure, and others slightly colored by foreign matters. All of them have been analyzed in my laboratory, and their exact value will be found recorded in the present Report.

Besides making chemical analyses of the limestone, I have actually burned nearly every variety which we have described, and ascertained how they will behave in the fire, the color, power of slacking, strength of the mortar, and all other practical operations for which they are required, so that I am able to speak positively as to the precise qualities of the lime, and to direct the lime-burner in his operations.

The citizens of Maine, wherever we have been, will fully appreciate the value of such researches, and will rejoice in the fact that by our labors immense resources are opened to the enterprising agriculturist. Where the great expense of transportation from the sea coast forbade the free use of lime, great and inexhaustible beds of excellent limestone have been discovered; and where lime cost from two to four dollars per cask, we have shown that it can be made for from twenty-five to fifty cents! Hence a vast amount of labor, time and money is saved to the farmer, while he holds in his possession the means of enriching his soil, by which his agricultural produce may be increased from fifty to an hundred per cent., as has been done by similar means in other countries, and in some parts of our own. And it is evident that if the farmer can raise his bread cheaper, he can afford to sell it lower also, and hence every citizen of the State will receive his share of the benefit resulting.

While the farmer, enabled to obtain larger crops from a given area of land, is in a measure relieved of his burthen, and instead of being obliged to labor incessantly in the gleaning of immense tracts of soil, he has time to render his farm neat and elegant, or finds time for intellectual improvement by study.

By the chemical analysis of soils, we are enabled to point out to the farmer their capabilities, and the improvements which are to be made in their cultivation. General rules derived from foreign experience have so often failed in producing the promised results, that the farmer is justly suspicious of such directions, and decries farming by books, declaring that he has tried certain experiments which proved total failures, and that he has no faith in them.

The root of the difficulty lies in the fact that an experiment may prove successful on one soil, and a total failure on another of different composition and under a different latitude. And the only way to overcome this difficulty, is to make chemical examinations of the soils in question, and then only can we know what it is proper to place upon them as amendments, aliments, or stimuli.

The enormous amount of labor required in the analysis of soils, precludes the busy farmer from attempting the task, allowing that he possessed the requisite instruments and skill. Hence we are enabled to render him a most acceptable service.

The present Report contains an account of the analysis of soils, some of which are very minute, while in all the essential or peculiar principles are most accurately ascertained. It is evident, that alone, with the most indefatigable exertions, I could not, during the space of three months, have performed so much chemical labor, and I beg leave to state that I have been most efficiently aided in the work by my worthy pupil, Master John Chandler, Jr. of Augusta, who has during the whole winter assisted me and performed under my immediate direction, a large number of the proximate analyses. While in the field, Master Chandler was allowed his expenses, by permission of the Governor, but for the laboratory work he receives no compensation. Provision ought to be made for an assistant in the chemical department, since so vast an amount of labor is there to be performed.

Besides the analysis of soils, we have made chemical examinations of limestones and iron ores, the results of which are herewith communicated, and will show the actual respective value of each specimen in the collection, while the Report exhibits an account of the quantity that may be obtained. In each analysis great care was taken to select such as were fair average specimens, in order to present results that could be depended upon in actual working.

Among the important researches, may be ranked the discovery of an inexhaustible locality of Hydraulic limestone, suitable for sub-aqueous constructions, such as canal locks, dams, cisterns, drains, culverts, water proof cellars, &c. The discovery of the capacity of a rock for such uses, could only have been made in a chemical laboratory, where the power of the combinations is ascertained.

The discovery of the extent and value of certain deposits of iron ore, before neglected, for want of information as to their extent, has given an immense value to swamps and bogs before worthless.

Black oxide of manganese, a substance required in the manufacture of bleaching powder, I have discovered in immense beds at Dover, upon the Piscataquis river, and when factories are established in that vicinity they will be favored with an abundance of matter required for disengaging chlorine, and with lime for the combination producing the chloride of lime above mentioned.

At Dexter I also found an abundance of excellent limestone, and examined, chemically, the ore lately extracted from a small vein in the slate rocks, discovering by analysis that the ore in question is rich in silver, but as yet there have not been found veins of sufficient magnitude to warrant mining. It is proper under such circumstances to warn the people against wasting their money, where we can prove by calculation it would not prove a profitable investment, and to turn their attention to those things of real value.

By their limestone, more silver may be earned than could be excavated from much larger veins than those described, and hence the limestone was earnestly recommended for burning into lime, since the saving to the citizens of the town would be no less than two dollars per cask on every cask of lime used.

The saving of time, labor and expense in vain researches for the precious metals, and for coal, in districts where such substances never occur, would annually amount to more than the cost of the Geological Survey of the State; and the destruction of credit, following close upon the steps of idle or fraudulent speculations, is entirely arrested by the survey in which we are engaged.

Those who will look into the history and the operation of this system, will at once perceive that since the Geological survey began, speculations in mineral substances have been thoroughly checked; a triumphant fact to disprove the opinions of those who feared that the survey would produce speculation. In fact it is clearly evident that where the whole community possess the same sources of information, that one man cannot practice upon the ignorance or credulity of another. Nor can any one want such information as is required to point out whether a substance is valuable or not, and if it exist in sufficient quantity, for I have always held myself ready to inform the *owners of the soil* as to the exact nature of the case, while I always refuse giving prior information, to those who are not owners of the soil, where substances of value occur. By such a system the truly valuable resources of the country become available, while public confidence is restored, knowing that what we state is strictly true, and that the State has instituted such a survey to obtain and diffuse correct information.

Such I know were the views of Governor Dunlap when he originally recommended the Geological Survey of the entire State, and those views have been most strictly carried out in our labors. How much the resources of Maine have risen in the estimation of her sister States, and in the view of the General Government, we cannot say; but those who have an opportunity of knowing, declare that the result thus far has been most satisfactory.

I beg leave to call your attention to the Geological Cabinet, which is arranged in the State House, for the information of those who may feel a desire to know what mineral substances are found in Maine. That collection now numbers no less than 1,600 handsome specimens of rocks, minerals, and soils of the State, all arranged, labelled, numbered and described in a complete catalogue.

In addition to this collection, we have made ten others, for the colleges, academies and societies, provided for by law. The smaller institutions were provided with specimens of every mineral substance occurring in the State; but it was not thought needful to send specimens from every locality, since they are often identical as to their characters, and it is supposed that the academical collections are to be used for instruction of pupils.

The State Cabinet has become one of the most interesting objects to citizens, and strangers who visit Augusta, and presents at once the means of judging respecting the relative value of any important minerals of the State, and may become the means of settling questions concerning acts of incorporation for working mines and quarries, since the Committees may be at once referred to specimens in the Cabinet, by which they will perceive whether there is any well founded reason for the granting a charter. Considered as a source of rational amusement, the geological collection offers many curious specimens, showing the history of the world while preparing for the residence of man, as well as many others illustrating chemical and physical changes which began with creation's dawn.

Those collections furnished to colleges and academies, will serve to create a taste for the study of mineralogy and geology in various parts of the State, and who will venture to predict the results which may follow from the development of many acute intellects that may hereafter enter the field of science?

A Geological Survey of the Public Lands had been formerly recommended by the Land Agent, Dr. Rose; but the proposal was not supported by the Legislature, until a Geological Survey of the entire State was proposed. Massachusetts, holding an interest in the Public Lands, only as State property, without any right of jurisdiction, desired only a reconnoissance of those tracts of land which border upon the great Rivers, and by consent between the Executives of the two States, such a survey was instituted, and has been completed, so far as is desirable in the present state of the country in question.

The lines of our survey followed the St. Croix to its sources, and continued north by Houlton, along the St. John river to the Madawaska. Thence returning by the Military road from Houlton to Bangor. This section having been explored in the year 1836.

During the next season, a more thorough and extended survey was made by myself and assistant, one section having been surveyed by him from Bangor by a due north line to the shores of the St. Lawrence, thence returning by the St. Francis and down the St. John.

The Assistant returning met me at Bangor, by agreement, and after making a minute examination of certain portions of the settled parts of the State, the results of which are embraced in the second Annual Report on the Geology of Maine, I joined with him in the exploration of the West branch of Penobscot river, to Mt. Ktaadn; then ascending the East branch and the Seboois, crossed over to the Aroostook river, which was explored from near its sources at La Pompique, to its confluence with the St. John. The Aroostook river at that time was but little known, but very few persons having navigated its waters or explored its banks. Hence, when it came to be publicly known, through our second Annual Report upon the Public Lands, (which is a sequel to the Report last mentioned,) attention was awakened to the vast agricultural resources which it afforded, and many people whom the severity of the times had thrown out of employ, and who were about to emigrate to the western States, were induced to look at the Aroostook country.

The results of their examinations confirmed most fully the statements which I had made, and the tide of emigration turned eastward. The land law enacted by the last Legislature afforded great facilities to actual settlers, and the banks of the Aroostook soon resounded to the axe of the enterprising pioneer. A demand for the lands in that region was created, and the average sales as reported in the returns of the worthy Land Agent, E. L. Hamlin, Esq. far exceeded the minimum price fixed by law, and the State has realized $9,428.27 from the sales of 12,827 acres of Aroostook land. With the opening of the new road, now in progress, the settlements will be augmented by emigration thither from other States, and my predictions with regard to the territory in question, will be fully realized.

Not only has the State saved to herself a number of her citizens who would otherwise have emigrated to the West, but she has also *secured the possession* of a valuable tract of country unjustly claimed from her by a foreign power.

Farther explorations upon the tributary waters of this river were recommended, and my scientific friend, Dr. Ezekiel Holmes, was appointed to the task. The results of his agricultural researches, as I understand, coincide with the observations recorded by me, and he has been enabled to give additional information of value, an account of which will be laid before you.

It becomes us to state that the Geological Survey, so far as it has been prosecuted, has been a most profitable investment. The Public Lands have been augmented in value, by spreading information abroad respecting their nature and capability of cultivation. The value of individual property, the aggregate of which forms the sum of the State wealth, has been greatly increased; new resources have been discovered, and the extent and value of those but little known, have been ascertained and reported. Mines and minerals which, when wrought, will bring a large capital into the State, will serve to relieve the community generally, by creating more taxable property, and thus removing a share of the public burthen from the shoulders of every individual.

Materials now imported at a high cost, will be produced at a cheaper rate within the limits of the State, and domestic industry, skill and capital, will be brought forward. Iron and glass may be manufactured advantageously in Maine, and these two articles are of more general use, and require more expenditure, than any others imported into the State. It will be hereafter a matter of astonishment that Maine ever had to import her iron and glass, as much so as that she formerly did not supply her citizens with bread. Slate quarries, equal if not superior to those of Wales, have lain neglected in Maine for ages, while the houses of Portland, Bangor, and even the State House itself, are covered with foreign slate.

The immense deposits of roofing slate upon the Piscataquis river, at Williamsburg, Brownville, Barnard and Foxcroft, will now be wrought, and from the statistics obtained respecting the slate quarries of Wales, which have lately been examined by Captain Isaac Gage, of Augusta, there can be no doubt that profitable investments may be made in the slate quarries of Maine.

Since a new demand for lime has been created for agricultural use, it became very important to know whether the interior of the State possessed valuable beds of limestone, for it is evident that the farmers could not use lime extensively on their soil, unless it could be obtained at a low price. We are enabled to point out immense and inexhaustible supplies of this useful substance, in the very regions where it is most required, and to demonstrate its capability of answering for every ordinary use.

I have been busily engaged in drawing up a geological map of the State, on which the various rocks and mines will be represented by conventional colors, which will be explained by an index. The map will show the ground plan, and for a more full elucidation of the structure of the country, sectional profiles, shewing the dip and direction of the rocky strata and their order of superposition, are in course of preparation. Beautiful views of scenery, and sketches of peculiar geological formations, are also in progress, and all these plans and views must form an Atlas for the final and complete Report.

Maine has already gained great credit for her liberal views in undertaking a Geological Survey of the State, and so important has the work proved to the community generally, that it is to be hoped that she will carry it forward to its full completion.

Most respectfully,

Your obedient servant,

C. T. JACKSON.

THIRD

ANNUAL REPORT

ON THE

GEOLOGY OF MAINE.

1838.

Having prepared myself for the continuation of the Geological Survey of the State of Maine, I left Boston on the 21st of May, and proceeded directly to Augusta, where I obtained from Governor Kent such pecuniary means as were required for the survey of the first section. I then took passage in the steamboat for Portland, where I met my Assistant, Dr. S. L. Stephenson, and made arrangements for the service which we had engaged to perform. Rev. Solomon Adams, a gentleman who has on former occasions aided us in our barometrical measurements, again kindly volunteered to perform a similar task, and our instruments were most carefully compared side by side, and the slight difference was noted, as will be seen in our tables. In order to know the exact height above the sea level, at which Mr. Adams's barometer was placed, after measuring it by difference of atmospheric pressure, I requested Captain Hall to aid me in determining it precisely by the levelling instrument, which work he most readily and freely performed, and the difference between barometrical and the usual method of levelling was but 1.8 feet. Such an error arises from the difficulty in noting small differences in the height of the mercurial column, and would be no greater in the measurement of a mountain several thousand feet high. The results of our former operations confirm the correctness of this statement. After agreeing with Mr. Adams, as to the hours of observation, I visited Messrs. Lowell & Senter, and regulated a good chronometer watch to the mean time of Portland, by their transit observations; after which, the Assistant and myself set out for Augusta, where we met Mr. Wall, the additional Assistant, who had, under orders of the Governor and Council, procured for our use a good horse and covered waggon.

Equipped with the usual instruments, our party set out in company, for that portion of the section, which we intended to survey, between Augusta and the Canada Frontier. The immediate vicinity of Augusta having already been explored, we proceeded on our route towards Waterville, stopping to examine every rock that shewed itself above the surface on the way.

About half a mile north from the Augusta Bridge, we examined a ledge of rocks, where the quarrymen were engaged in obtaining rough stone for the dam. The rock is composed of strata of mica slate, which alternate with layers of impure limestone, and numerous veins of granite, containing crystals of black Tourmaline, cut across the strata. The mica slate runs N. E. and S. W. and dips 80° N. W., while the granite veins run N. 30° E., S. 30 W. This rock is suitable only for rude constructions, since it does not split into regular sheets. The soil, doubtless, is enriched by its decomposition, but it does not contain a sufficiency of lime for the kiln. There being but little of practical interest at this place, we continued our route to Sidney, where we examined the tertiary clay used for making bricks, and measured the direction and dip of all the rocky strata that crop out on the way.

WATERVILLE, situated upon the western banks of the Kennebec river, at Ticonic Falls, in latitude 44° 32^m 26^s north, and longitude 69° 37^m 45^s west from Greenwich meridian, according to the observations of Professor Keely, and 153 feet above the level of the sea, by our barometrical measurements, is an interesting region, which demanded a share of our labors. This beautiful village is the seat of Waterville College, an institution of the Baptist order, having several learned professors, whose aid in the survey we most thankfully acknowledge. Professor Keely, having a good barometer and all the requisite instruments, was requested to furnish a series of observations for the purpose of aiding in measuring a sectional line along the borders of the Kennebec, which service he most cheerfully performed, all the instruments having been duly compared, and their difference noted, as will appear in the tables which are contained in the present Report. This gentleman has also undertaken a series of observations on the variation of the magnetic meridian, which will be of great value to surveyors and engineers. In 1835, he ascertained the variation of the compass needle, at Waterville College, to be 12° 8^{m} west of the true meridian. But since the degree of variation is constantly changing, it will be of great interest to have a continued annual series of observations, and those made by Professor Keely will be exact. Whoever reflects of the difficulties that arise in running the boundaries of estates, and the troubles of litigation that follow, will rejoice in the prospect of having true records on this subject, and we have made arrangements to form a complete series of observations, to settle the magnetic variations on every parallel of latitude and longitude in the State.

Professors Adams and Loomis contributed their aid in the exploration of the geology of Waterville, as did also a number of gentlemen in the village, to whom we here present our grateful acknowledgments. Ticonic Falls first demanded our attention, on account of the discovery of the prints of fern leaves on the rocky strata at that place, which have been formerly noted. (Vide First Annual Report, p. 107.) We therefore proceeded thither, and made all the necessary researches. The Kennebec river is there observed rushing through a breach, which has been formed by the disruption of stratified argillaceous slate, the strata being turned up, so that on the western side of the river they dip to the N. W. 80°, while on the eastern side the inclination is to the S. E. 80°, the direction of the strata being N. 56° E., S. 56° W. by the magnetic needle. The fall of water is from a ledge of these rocks, and varies from eighteen to twenty feet, according to the state of the river. Near the bridge, on the eastern side of the stream, there are two beds or dykes of protogine rock cutting through the strata which have been distorted in a remarkable manner, shewing that they have been acted upon by the violent injection of this formerly molten rock. The strata of slate below the bridge, run N. 52° E. and dip 72° S. E., while the intruded protogine dykes run N. E. S. W., their line of bearing not coinciding exactly with the stratified rocks. The width of the dyke above the bridge was measured, and found to be ten feet.

Veins of yellow silicious limestone traverse the slate strata, but they are not of sufficient importance to prove valuable in the arts. Analyzed, this kind of limestone is found to contain

40	per cent of silex,
50	" " " carbonate of lime,
10	" " " oxide of iron.
100	

From its composition, it is evident that it will not answer for lime, since it would run into glass at a high temperature. It might, however, if in sufficient quantity, be advantageously used for making hydraulic cement, since it contains the proper materials, and in right proportions for such an article. I shall, however, have occasion to mention inexhaustible localities of this material higher up in this section, and merely note the composition of the present small veins, to cause attention to be paid to more extensive deposits, that may be hereafter discovered, by knowing the appearance of the mineral, specimens of which are easily obtained, they being used by the people for hones or whet-stones, owing to the silicious grit they contain.

After making a general exploration around the falls, we devoted a day to the searching for fossil impressions on the slate strata, and found a number of specimens on the western side of the river. They are very faint and shallow impressions of the stems and leaves of plants, allied to the genus of fossil ferns, called by Brogniart Odontopteris, and are evidently associated with more abundant remains of fuci or sea weeds. From the fact that all the fern leaf impressions are represented on the strata in drooping fronds, generally much distorted, and from their association with marine relics, I am satisfied that the ferns did not grow on the spot where we find them, but were brought down by some ancient river, from higher land, at the time when the present slate rocks formed the clayey bottom of an ancient sea. Hence the strange occurrence of land plants in so ancient a deposit as the Waterville slate, which does not belong to the coal formation, but reposes directly on the primary rocks, and is itself of the elder transition formation. This conclusion was subsequently proved by our researches farther up the great Kennebec section.

During our stay at Waterville, we also visited numerous other localities which I shall now describe. Several gentlemen having given their opinions in favor of the occurrence of limestone in West Waterville, I proceeded to explore every locality where there was any probability of its occurrence.

On the estate of Mr. Baxter Crowell in West Waterville, near the outlet of Snow's Pond, 5 miles W. S. W. from Waterville Colleges, there occurs an important deposit of limestone, suitable for agricultural use and for ordinary mortar. The limestone exists in regular strata alternating with argillaceous passing into micaceous slate, and the strata are nearly equally divided by the rock, so that the limestone is easily separated from it. The direction of the strata was measured, and found to be N. 52° E., S. 52° W. and the dip is 80° N. W. The width of the calciferous strata is not less than 66 feet, while their length is of unknown but great extent. Having satisfied myself as to the quantity of limestone, I obtained a set of specimens for the institutions provided for by law, and since that time I have made a chemical analysis of the rock, and have ascertained that it will burn and slake sufficiently well for the uses designated.

ANALYSIS. 100 grains of Crowell's limestone consist of,

Carbonate of lime, - - -	89.8
Carbonate of iron, - - - -	1.2
Insoluble slaty matter, - -	9.0
	100.0

It contains then 50.54 per cent. of pure lime, and as anticipated from the analysis, I find that it burns well without melting, and makes a light brown lime, which slakes perfectly into a nearly white hydrate, making good and strong mortar. It is evidently a valuable material for agriculture, and the soil in the vicinity requires liming to a considerable extent, since it is diluvial and nearly destitute of lime.

The rocks at West Waterville Falls are composed of strata of blue limestone and argillaceous slate alternating with each other, but separating easily when struck with the hammer. The quantity of good limestone that will answer for agriculture, is immense, and the following analysis, which I have made since the field services closed, shows its value.

Carbonate of lime, - - -	73.8
Carbonate of iron, - - - -	1.4
Insoluble slate, - - - -	24.8
	100.0

It will bear a full red heat, and forms a brown colored lime that will answer for ordinary uses, and will prove an excellent dressing to the neighboring granite soils.

It is evident from the foregoing remarks that there is an ample supply of good agricultural limestone at Waterville, and that since the quality of the rock is now ascertained, it may be safe to erect kilns for converting it into lime for the amelioration of soils. The comparatively low price of wood in the vicinity will enable the people to make their own lime much cheaper than it can be obtained from the localities now wrought on the sea coast.

Returning to the village of Waterville, we observed several naked ledges of slate distinctly marked with diluvial scratches, which run N. 5° E. by the magnetic needle. They occur in the vicinity of Crowell's farm, in West Waterville.

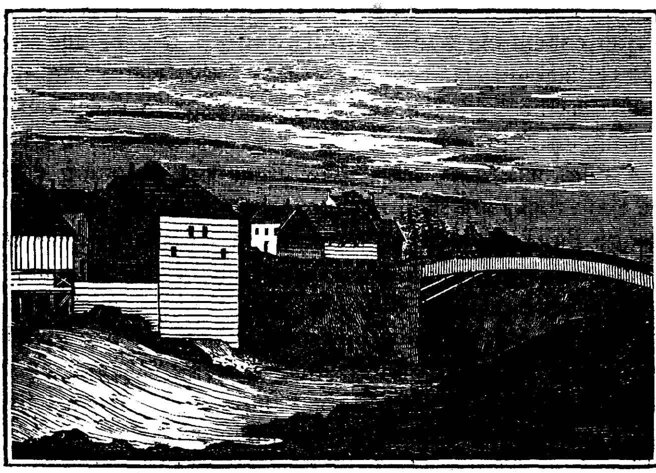
After examining a number of localities of poor limestone, and argillaceous slate, on each side of the Kennebec river, at Waterville and its immediate vicinity, we set out for Skowhegan Falls, exploring the rocks along the road and river side, wherever they shew their out-cropping edges. The slate rocks are seen in numerous places along the route through Fairfield, and at Skowhegan Falls large quantities of limestone occur, imbedded in the slate. At Bloomfield, we became acquainted with Mr. E. Weston, who shewed us a number of specimens of limestone, which he had found in that region. Since we intended to return to that place, but little time was then spent in the examination of the ledges, but subsequently we explored them more minutely.

There are extensive beds of limestone at Skowhegan, fair specimens of which were collected for the State Cabinet, and an average suite were subjected to chemical analysis, which furnished the following results:

Carbonate of lime, . . .	53.8
Carbonate of iron, . . .	7.6
Insoluble mica and slate, . .	38.6
	100.0

From this analysis, it appears that the limestone is not rich, or suitable for plastering, but will answer for a dressing to soils. Some specimens prove much richer in calcareous matter, than this variety, but we had not specimens of them in season for analysis in the laboratory. Owing to the low price of wood at Skowhegan—($1 per cord)—it will be economical to burn this limestone, especially since the Thomaston lime costs the people from $2.25 to $3 per cask, owing to the expense of transportation.

Skowhegan Falls are produced by the falling of the Kennebec over a rocky ledge to the distance of from ten to twelve feet. The village is picturesque, and it is an enterprising and flourishing town. The following sketch of the Falls was taken by the draftsman, (G. T. Devereux,) during our stay at Skowhegan.



Skowhegan Falls.

During the fatal campaign of Arnold, his army encamped upon an island near the Falls, and occasional relics of the encampment are now found, such as pipes, coins, &c.

From Skowhegan we proceeded to Norridgewock, where we found several beds of good limestone, the strata of which are included in those of argillaceous slate, and run N. 52° E. and S. 52° W., dipping to the N. W. 65°. The locality where these observations were made, is one fourth of a mile N. W. from Pike's Hotel.

A specimen from the estate of S. Sylvester, of Norridgewock, submitted to chemical analysis, gave the following results :

100 grains analysed—

Carbonate of lime, . . .	88.2
Carbonate of iron, . . .	1.2
Insoluble (mica and silex) . .	10.6
	100.0

It is evidently a good limestone, and will average better than the specimens above analyzed, since it contains veins of pure calcareous spar, which were excluded in the analysis. In order to ascertain how it would behave in the kiln, I burned a large specimen, and found that it would bear a full red heat, without melting in the least, and that it came out of the furnance a mass of solid and good lime, of a light brown color, slaking completely with water, and making a good strong mortar. In slaking, it gains 40 per cent. weight of water, which indicates its capacity of bearing as full a proportion of sand as any lime in use. The low price of wood, and the expense of carting lime from the sea coast, are sufficient inducements for the inhabitants of Norridgewock to make their own lime from this rock. The soil of that town, as will be seen in our analyses, is deficient in lime, and the great benefit arising from its use, is now too fully appreciated by the farmers, to allow the locality to be neglected.

At Norridgewock Falls, the Kennebec river precipitates itself about ten feet, over ledges of hard argillaceous slate passing into mica slate and a fine grained grau-wacke containing crystals of pyrites and specks of iron ore. The stratified rocks dip to the N. W. 80°, and run N. 70° E., S. 70° W. On these Falls there is a large mill for grinding wheat, a clothing and a saw mill.

Returning from the Falls, we next visited the farm of Mr. Wetherell, who informs us that his soil produces an average crop of 15 bushels of wheat to the acre, and 200 bushels of potatoes, and 40 of corn. The soil is a loose yellow loam. The rocks around are slaty limestone and mica slate. Lime and gypsum mixed are used by him for a manure, which has had a good effect, even in the small proportion of one cask to the acre.

The farm of Dr. Bates was also examined, and specimens of the soil were taken for analysis.

Leaving Norridgewock, we visited Mercer and New Sharon on our way to Farmington, where some days were spent in the examination of the country.

Farmington, the shiretown of Franklin County, is situated, according to our observations, in the latitude 44° 37^{m} 30^{s} N. It is a large and enterprising village, the inhabitants depending mainly upon their rich alluvial soil, for support. The Sandy river, bordered with rich farms, producing an abundance of grass and grain, gives a pleasing aspect to the country. In this town, we met several active and intelligent gentlemen, who generously devoted their time and attention, during our stay, to the objects which it was our duty to explore. Dr. J. Prescott, Hon. Hiram Belcher, and several others, devoted to us a large share of their time, and rendered efficient services. Limestone being a great desideratum with the farmers, I examined every locality where it might be expected to occur, and found several beds which will answer for the purposes of agriculture. Visiting a locality called Stoyel's pasture, belonging to Mr. H. Titcomb, a little eastward from the village, we found the limestone strata running N. 30 to N. 40° E. and dipping N. W. 78°.

Another locality near by, on the land of J. Coney, was also examined, where a limestone of good quality was found, composed as follows—In 100 grains,

Carb. lime, - - -	84.4
Oxide of iron, - - -	1.2
Mica slate, - - -	14.4
	100.0

This rock burns well at a full red heat, and slakes perfectly into a light brownish white lime. It will make a strong mortar, and is suitable for agricultural purposes. Its abundance offers inexhaustible sources of valuable matter for the enterprising farmer.

Norton's Ledge, in Farmington, presents many interesting phenomena. It is a hill, composed of mica slate, containing an enormous quantity of iron pyrites, and rising abruptly to the height of 380 feet above the plain. The soil having been swept from the summit of the hill, presents an infinite number of well characterized diluvial markings or furrows, which run nearly North and South, while the strata of the rock have a N. E. and S. W. direction.

So distinctly are these scratches worn in the ledge, that they will remain clearly visible for ages, and bear testimony that a great current of waters once passed over the surface, and carried along with it huge masses of granite, which left their marks on the rocks as they glided over.

This rock, from the quantity of pyrites it contains, may be used in the manufacture of copperas, or sulphate of iron; but large quantities will not be required, until manufacturing establishments are erected in the neighborhood; for it is a low priced and cumbersome article, which would not give sufficient profit, if carried to the sea-coast, to be shipped to other States.

In order to correct the topography of our maps, I took a set of bearings and altitudes of some mountains, from this hill.

Mt. Blue bears N. 66° W. Angle of elevation, 2° 24m.

Bald Mt. bears N. 95° 30m W. Angle of elevation above horizon, 1° 12m.

Centre of Mt. Abraham, N. 15° W.

Dead River Mt. (east of Mt. Abraham) N. 12° W. Angle of elevation, 1° 19m.

Saddleback Mt, N. 34° W. Angle of elevation, 1° 55m.

Comparing these observations with others, which we shall present, the true places of the mountains in question will be fixed, by the intersections of the lines of bearing, and knowing their distances, the angles of elevation will give their height.

Another point, in Farmington, afforded us a station for additional observations; but the base is not sufficiently long for a final triangulation.

Powder House Hill, is the point in question. Measured barometrically, it is 208 feet above the plain of Farmington. From this hill, Mt. Blue bears N. 59° W. Mt. Abraham, N. 12° W.; angle of elevation, 1°, 30m.

Powder House Hill is composed, like Norton's Ledge, of pyritiferous mica slate; the strata run N. E., S. W. and dip nearly vertical. Diluvial marks are very abundant, and are deeply cut over the whole ledge. They run N. 10° W.

The decomposition of pyrites produces sulphate of iron, which is dissolved by water, and carried down into the meadows and bogs, and there the per oxide of iron is abundantly deposited, owing to decomposition of the sulphate by vegetable matters, and lime contained in the soil. Thus, as expected, a considerable quantity of bog iron has been formed around the hills of Farmington.

A specimen of this ore, presented to me by Dr. Prescott, contains in 100 grains:

Water, . .	7.0
Silica, . .	17.5
Per oxide iron, .	64.5
Vegetable matter—(Ulmine,) and manganese	11.0
	100.0

Such ores are stated to be abundant in the low grounds, but owing to the quantity of water in the bogs, we were unable to make the necessary explorations. So good an ore as this, if it really is abundant, will prove a valuable article to the inhabitants, for it will yield 44 per cent. of iron.

When the most important minerals of Farmington had been examined, we set out on an excursion to Mt. Blue, a number of gentleman from the village accompanying us. Our objects were to measure the altitude of the mountain, and to obtain bearings of important points, for the purpose of correcting the Map of the State. The rocks and minerals were all duly examined of course.

By a great number of observations, we first ascertained the height of Farmington, then of Avon, and afterwards that of Phillips; and from these points we were enabled to prove the correctness of the barometrical measurements, by means of triangulation with the azmuth and altitude instrument.

Strong. In this town we examined the farm of Thomas Stephens, called the Eaton farm, where there occurs a mineral spring, charged with sulphuretted hydrogen, which has considerable celebrity for its medicinal virtues in the treatment of cutaneous diseases. The water is free from mineral substances, and is extremely soft, communicating a smoothness to the skin, which is quite remarkable. Chalybeate springs also abound, and are highly charged with the carbonate of iron.

On the road side, there occur great masses of rocks, composed of garnets cemented together by a granitic paste, some of the boulders weighing twenty or thirty tons. These erratic blocks came from some mountain, not far to the north, and were removed from their native beds and swept southwardly by a powerful diluvial current.

In the town of Avon, there lies on the left hand side of the road, as you enter the town from Strong, a granite boulder which measures $30 \times 20 \times 15$ feet, equal to 9000 cubic feet, or 643 tons. This granite block is evidently out of place, and was brought several miles by the above mentioned current, it probably having been driven by ice and water from the granite mountains of the Mt. Abraham range. Mt. Abraham is seen from this point, rearing itself majestically in the north, while Sandy River, with its verdant banks, relieves the savageness of the mountain scenery.

After dining at Bates's Tavern, in Avon, we set out for Mt. Blue, and reached its base at 6, P. M.

At the house of R. Worthley, near the base of Mt. Blue, June 12th, 6½ P. M., barometer 28.530, T. 70°. From this station we set out to ascend the mountain immediately. Travelling through a forest of maples, birch and beech, we came next to a dense small spruce growth, more difficult to penetrate. Struggling through this tangled forest, over irregular heaps of moss grown blocks of granite and mica slate, we attained a region destitute of forest trees, and marched more freely over the naked rocks to the summit of the mountain, which we reached at 8 h. 20^m P. M. At 8 h. 30^m P. M., barometer 27.03, T. 68° F.

Night now closed upon us, and we hastened to collect fuel for our camp fire, and pitched a tent on the summit of the mountain, beside a huge rock to shelter us from the wind, while the dense smoke of the fire brought tears into our eyes, but kept the swarms of mosquitoes at bay. Under such circumstances, and while our tent was continually flapping its half tied wings, sleep was almost out of the question ;

so we most cordially saluted the rising sun. June 13th, 5 A. M., the barometer stood 27.00, T. 60° F. temp. of air 60° F. Calculating our observations, it appears that Mt. Blue is 2421 feet above Bates's tavern, in Avon, and 2804 feet above the level of the sea.

When light appeared on the world below, we prepared for a series of trigonometrical measurements, which were made with Kater's circle. 7 A. M., 13th June, barometer 27.00, T. 63, temp. of air 63°.

The centre of Webb's Pond below horizon, 4° 40^{m} N. 106° W.

Saddleback Mountain, N. 19° W.

Mt. Abraham, eastern Peak, N. 20° E. Angle elevation, 16^{m}.

Central Peak Mt. Abraham,	N. 17° E.	
Western Peak,	N. 14° E.	
Phillips Village, (lower vill.)	N. 10° E.	
Farmington Village,	S. 56° E.	Angle depress. 3°.
Wilmington Village,	S. 20° E.	" " 2° 42^{m}.

9 A. M., barometer 27.04, T. 64° F. t′ 17° cent.

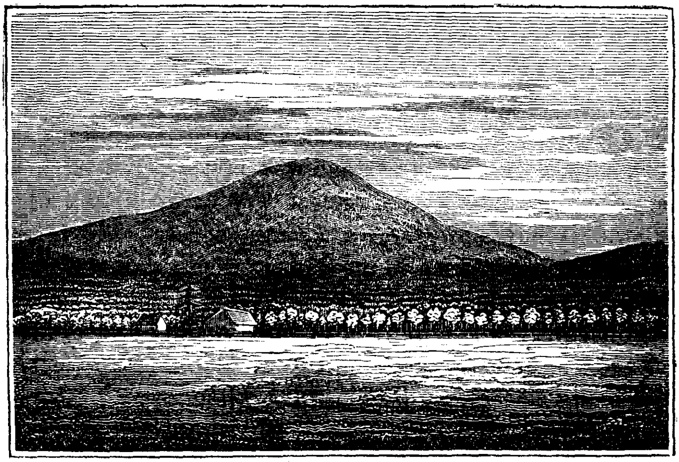
10 A. M. After examining all the surface of the mountain which was accessible, we found it to be a barren mass of gneiss and mica slate, containing a few crystals of staurotide, but destitute of other interesting minerals; and since but little was to be learned by remaining longer on its summit, we descended; and on reaching the mountain's base, stopped to dine at the house of Mr. Ingraham. At noon, barometer h. 28.600, T. 73, t. 23½ cent. Continuing our descent, we reached the house of Mr. Dow, when barometer 28.730, T. 88°.

On our way to Phillips, we examined the peat bogs of Mr. Ichabod Foster, where there were five or six acres of excellent peat, of a remarkable character, it being in part bituminized by the process of decomposition. The peat may be advantageously used for making compost, since it is in the state of a very fine pulp, and very soluble.

The diluvial and alluvial soil in the vicinity, are rich and productive, but subject to early frost. Beds of plastic clay, also occur near the peat bog.

Phillips. We reached this pretty village, 5 P. M., and took lodgings at Whitney's Hotel.

June 13th, 5½ P. M., barometer 29.680, T. 80° F. From our observations, the height of Mt. Blue above Phillips, is 2067 feet.



View of Mt. Blue from the village of Phillips.

14th, 7½ A. M., we set out on an excursion in company with Dr. Blake and several gentlemen of the village. Phillips is situated amid an amphitheatre of large mountains of primary formation, while the rocks in the town are of the metamorphic varieties of micaceous and argillaceous slate, containing numerous and powerful beds of limestone. The intervale soils, on the Sandy River, which passes through the town, are very rich and fertile, repaying amply the labors of the husbandman. The state of vegetation may be understood by the fact that on the 14th of June, peas were in full blossom in the gardens, and the young corn was three or four inches high in the fields.

There are many beds of limestone within the limits of the town, but I shall describe those of the greatest value only. The first which we examined, is one mile north by west from the village, on the estate of Mr. Joel Whitney. The rock is a greyish white, and a bluish variety of granular carbonate of lime, and occurs between the strata of mica slate, the course of the bed being with the strata nearly east and west, while its dip is towards the north 60°. The limestone bed is 40 feet wide; or rather there are two beds side by side—one 10 feet and the other 30 feet wide; beside which there are several smaller lateral beds. It immediately occurred to me that the limestone extended much farther than the owners had imagined, and I succeeded in tracing it to the eastward continuously for the distance of 1200 feet. The hill is at least 150 feet high, and presents an abrupt precipitous side to the west, where the limestone was first discovered many years since, and abandoned after a very careless trial of its quality. It may, however, be advantageously wrought, and it is of great importance to the farmers that it should be used, as a dressing to the soil.

Allowing that the lime rock of good quality extends 1000 feet, and that it may be wrought to the depth of 100 feet, its width being 40 feet, we have—1000 length,

40 width,

40,000

100 depth,

4,000,000 cubic feet,

Or, if but 50 feet depth be allowed, we shall have—

1,000

40

40,000

50

2,000,000 cubic feet.

Hence, we may safely calculate, that no less than one million casks of lime are contained in this hill.

Since lime is so valuable to the farmer, and wood is cheap, there can be no difficulty in making the business of burning lime at this place profitable. It is true, that more care must be taken in burning it, than is required at the Thomaston kilns, but with a little experience, it may be readily accomplished.

The limestone from Whitney's ledge, is composed in 100 grains, of

Carb. lime, - - -	65. grs.
Ox. Iron, - - - -	0.4 gr.
Insoluble silica, - -	34.6 grs.

It requires less heat for burning than pure limestone, but if slowly heated to full redness, will make good lime. Persons interested, will also remember, that at one trial, when their wood had been wet with rain, and burned indifferently, that a good kiln of lime resulted, and that the lime was then used in building and plastering the church at Phillips, and answered very well for the purpose. Why the burning of it was abandoned, does not appear; but it may have arisen from a deficient demand, as lime was not then known in the art of agriculture. It will now probably be again wrought.

There are two large beds of limestone on the west side of Sandy River, and a number on its eastern side, where the county road to Freeman cuts through the top soil, and exposes them to view.

A specimen from the county road, is composed in 100 grains, of

Carb. lime, - - - - - -	67.
Silica, - - - - - -	28.8
Ox. iron, - - - - - -	5.6

Boulders of novaculite occur in the bed of the river, in company with argillaceous slate, greenstone trap and granite. But the most remarkable boulders, are those of diluvial deposition, which occur on the hills around. One of those presented to us, was an enormous rounded and water-worn mass of pure magnetic iron ore, exactly like that found in the iron mines of Troy, Vermont. Its origin was, at first, difficult to ascertain, but some information obtained on a second visit to Phillips, reveals a portion of its secret history. It now appears that this boulder was found on the estate of Mr. Joel Whitney, one mile north, a little east from the village. Other masses, still more curious, have been found by the enterprising young gentlemen of Phillips, since our first visit. Some of the veins are contained in their native rock, which is granite, worn in the same manner as the larger mass above mentioned, thus showing in what kind of rock we may expect to find the parent vein or bed.

The large mass is now much smaller than when it was at first discovered, for considerable portions, equal to one-third its weight, have been removed. It measures one foot eight inches long, one foot wide, seven inches thick, and is irregularly rounded by attrition and the action of water. It weighs now 174 pounds, and is five times heavier than its bulk of water.

The masses included in the matrix, were found on French's mountain, at the elevation of 849 feet above Sandy River. On examining this hill, which is composed of mica slate, there are observed an infinity of deeply worn diluvial furrows, which run N. 50° W., S. 50° E., and all point directly to Saddleback mountain. The loose boulders on the hill are chiefly granite, although a different rock from that on which they now repose.

Here then we have several remarkable phenomena. First, the occurrence of diluvial markings, which do not coincide with the direction formerly noted, as the general bearing. Secondly, the occurrence of extremely heavy masses of iron ore of foreign origin, and granite rocks also erratic, poised upon the summit of an insulated hill. The questions that naturally arise are, first—how came these scratches on the surface of the ledge? And secondly—why, if they owe their origin to causes I have formerly assigned, do they vary in their course?

The answer to the first question, has long since been given, viz: that every portion of Maine bears ample testimony to the fact, that a great rush of waters has in former times, since the consolidation of all the rocks, and since the deposition of the tertiary clays, been poured over the surface of the earth, and has transported by its power large masses of rocks far from their parent ledges, and deposited them in distant regions; and that as they passed along, they wore deep grooves in the rocks over which they travelled. This conclusion, no man of common sense will deny, after exploring the mountains of Maine—for the characters are too legible and too universal to be slighted or misunderstood.

Secondly, this apparent anomaly in the direction of the diluvial scratches, is a most striking and wonderful confirmation of the theory which we have enunciated; because the shape of the country, as is evident to any observer, would have caused the precise deflection observed in this case; for Mt. Abraham arrested the current on the north and turned it into Sandy River valley on the west, from which deflection it struck against the Mt. Saddleback range, continued to Mt. Blue, and by Saddleback was reflected, precisely according to the well known laws of physics, towards French's Mountain; and thus the marks coincide with the direction of the two forces. It moreover proves incontestably that the current did not set in from the S. E., for the course would have been at right angles with the present markings. The nature of the accompanying boulders, also proves the current to have come in from above Saddleback Mountain. Hence if the marks are diluvial, and the boulders were brought along by the aqueous current, it is evident that the magnetic iron ore could have been brought thither by the same power. The immense weight and density of the ore, particularly the latter, is the greatest difficulty; but the masses shew too evidently that they have been worn, to leave a doubt that their gravity struggled powerfully against the current.

Whence came the ore? is the most important question. This is the more difficult to answer, especially since we have not yet all the requisite data. The direction of Troy is not that of the course made good of the diluvial current; but if we could learn the direction of the Troy vein or bed, then it could be seen whether it would cross our diluvial line; and in such case, the line of bearing of the Vermont ore, intersected by the diluvial line, would be the point in question. The general direction of such beds is N. E., S. W., and hence may cross the corner of Maine a little above the sources of Sandy River, from whence the ore may have been brought. Or it may be that a similar bed occurs on the Saddleback Mountain.

EXCURSION TO MOUNT ABRAHAM.

This mountain is one of the most conspicuous eminences in the State, and presents its lofty peaks to view from the country far around. It became important, therefore, to ascend to its summit, not only for the purpose of examining its geological structure, but also for the purpose of measuring its height and fixing its true place on the map of the State. The extensive view of the surrounding country, also afforded us an opportunity of taking a great number of bearings, and also gave a general view of the geological and topographical contour of the neighboring mountain ranges. It was therefore decided to visit the town of North Salem, at its base, from which its height and distance were triangulated, and then to ascend the mountain.

On the 15th June, we arrived at North Salem, and met several gentlemen who were desirous of accompanying us to the mountain. At the house of Mr. Heath we made the preparatory observations, 15th June, 1½ P.M., barometer 29,400, T. 82°.

Measured a base line from Mr. Heath's to Captain Hammond's house, 3294 feet, N. 80° E.

From Heath's, the Eastern peak of Mt. Abraham bears North. Angle of elevation 10° 2^{m}.

Western peak, N. 6° west. Angle elevation 10° 8^{m}.

From Hammond's, Eastern peak N. 14° W. Angle of elevation 9° 58^{m}.

Western peak, N. 20° W. Angle elevation 9° 49^{m}.

These angles calculated, give the height and distance of Eastern peak Mt. Abraham, from Heath's. Distance 13680 feet; height 2470 feet.

A second operation was performed by measuring a line 1000 feet directly towards the mountain.

1st station, Eastern peak—Angle elevation 9° 58^{m}.

Advancing 500 feet, it was 10° 2^{m}.

At the forward or third station, its angle elevation 10° 43^{m}.

This triangulation was made as a check on our other operations. Height 2470 feet.

On the 16th June, at Heath's $5\frac{1}{2}$ A. M., barometer 29.323, T. 69° F., air 70° F.; light N. W. breeze.

Heavy cumulus clouds rest on the mountain's top and conceal it from view.

7 A. M., barometer 29.390, T. 70°, t. 70°.

Having now several good observations made at the hours agreed upon at the other stations, we set out for the mountain. At its immediate base, we took observations at 8 h. 20^{m} A. M. in the shade of Mr. Robinson's barn—barometer h. 29.032, T. 74°. Marching up the very steep flank, amid an open growth of hard wood trees, when it was thought we had attained half way up, took another observation—barometer 27.520, T. 73° F. On the summit of the Western peak, the barometer stood at 26.780, T. 66° F., air 18° cent. The Eastern peak is still more elevated, and after making our geological examination of the mica slate rocks, which form the top of the peak, we descended into the valley filled with cedar trees, which lies between them, and forms a thick but stinted forest. Although the weather was extremely warm, we obtained an abundance of ice in this mountainous swamp, where it was still solid beneath the covering of rocks and moss. At $11\frac{1}{2}$ A. M., we reached the highest pinnacle of the Eastern peak, and there took observations, with all due precautions, to ensure accuracy. The barometer and free thermometer were hung on the shady side of an old stump, and then the preparations were made to take a meridianal altitude of the sun, by the azmuth and altitude instrument. The sun's lower limb was found to be, when at meridian, 68° 42^{m}. Barometer 26.650, T. 68° F. t. 18° c. Latitude calculated from this observation is N. 44° 56^{m}.

The following bearings were then taken:

Mt. Blue, S. 22° 30^{m} W.

Mount Bigelow, N. 12° E. (central peak,) angle elevation 17^{m}.

Village of Strong, S. 9° E.

Centre of Porter's Pond, S. 25° E.

Berlin Village, S. 50° W.

Phillips Village, S. 34° W.

Farmington, S. 7° E. (powder house hill ?)
Mt. Ktaadn ? N. 65° 30m E.
Moose Head Lake, N. 40° E.

Numerous mountain streams, and lakes and villages, are also seen from this mountain ; but since we did not feel certain as to their names, it is thought unnecessary to mention their bearings.

The mountain itself appears to be almost entirely composed of mica slate, although its sides are covered with myriads of large blocks of porphyritic granite, which has been brought from the high mountains to the northward. Diluvial scratches are very distinctly seen on the top of Mt. Abraham, and run in a N. W. and S. E. direction, owing to the deflection of the current occasioned by the Bald Mountain, immediately north of its summit.

At 3 P. M. the barometer was again observed, and found to stand at 26.660, T. 72° air 70°.

Calculating our observations, we find that the highest peak of Mt. Abraham is 2466 feet above the ground at Heath's, in North Salem, and 2240.1 feet above the immediate base at Robinson's barn. Heath's is 921.5 feet above sea. While from direct calculation from the distant stations, where observations were made at the same time with ours, it is 3387.6 feet above the level of the sea. By a comparison of our different levels, we find the work to be accurate within six feet, which is the sum of error, half which may be allowed as the probable error.

Should the inhabitants of North Salem clear a good path upon the mountain's side, there can be no doubt that travellers would frequently ascend to its summit, for the purpose of enjoying the beauties of the landscape, while it would prove advantageous to the village, should the tide of travel turn thither.

Descending Mt. Abraham, the tube of my barometer was unluckily broken by the shocks to which it was unavoidably exposed in gliding from rock to rock. It was however easily repaired again, since it broke off close to the cistern.

On the road from North Salem to Strong, there may be seen some curious diluvial grooves on the slate rocks, the scratches running N. 46° W., S. 46° E., while the strata of rock run N. 70° E., and dip northwardly. This ledge is on a hill directly south from Mt. Abraham, and there can be no doubt but that mountain range caused a deflection of the diluvial waters. Near the village of Strong, at the Falls, there occurs a blue limestone with veins of calcareous spar. The strata run N. 50° E., S. 50° W., and dip S. E. Receding from the influence of the mountains, the diluvial marks now take their usual course, and in the vicinity of Farmington, run N. 10° W. as usual, over the ledges throughout that town.

18th June, left Farmington for Vienna, by the way of Chesterville Mills, and on our way examined an extensive ledge of white granite, which presents a good opportunity for quarrying stone, to be used in the neighboring towns. The rock splits well, and is free from impurities. Plastic clay and peat abound in Chesterville, some of the bogs having, as I was informed, no less than twenty feet thickness of this valuable substance. It occurs on the estates of Messrs. Keith, Hamblin and Norcross. The rocks are generally mica slate, strata dipping to the northwest, and this rock continues to shew itself until we reach Vienna.

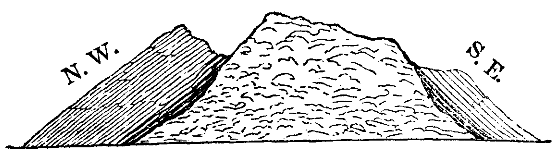
Vienna. In the southwest part of this town, near the Chesterville line, there are beds of limestone which occur in mica slate rocks, and have been wrought to some extent. They occur on the south side of the McGurdy river, and are now owned by Mr. Orrin Brown. There are two distinct beds of limestone at this place; one runs N. 39° E., S. 39° W., and dips to the N. W. 70 to 80°, and is fifteen feet wide. The other runs N. 40° E., S. 40° W., and is nine feet wide. The quarries can be easily drained to the depth of fifteen feet. There is also another bed, disclosed by the digging of a cellar, at Mr. Lyman Wheeler's house.

The price of wood is only fifty cents per cord, and eighteen cords are required to burn a kiln of lime containing one hundred casks. Lime casks cost from twenty-five to thirty cents on the spot, and the lime sells for one dollar twenty-five cents per cask, or for one dollar per cask, in bulk. The road to the kiln is however now so bad, that people do not so readily go there for lime as they otherwise would; but this difficulty is easily remedied.

Mt. Vernon. A quarry of limestone is found in Mt. Vernon, upon the estate of Mr. James Chaptman, three quarters of a mile N. E. from the village. It is a bed in mica slate, and runs N. 30° E., S. 30° W. and dips N. W. 70°. It makes a brown lime, sufficiently good for agriculture, and for ordinary mortar.

On the estate of Dr. Dexter Baldwin, in Mt. Vernon, there is also a quarry of granite, of considerable value to the inhabitants. It is a huge vein in the mica slate, and is ninety feet wide, and runs for an unknown extent with the stratified rock, the strata of which it has broken through and distorted in a remarkable manner, evincing the action of heat by the chemical effects which it has produced.

The strata of mica slate run N. E., S. W., and dip in opposite directions on each side of the granite, thus:



shewing the manner in which the strata were disrupted by the intrusion of the unstratified rock.

There are a few specks of pyrites in the stone upon its eastern side, while that on the west appears to be free from any impurities, and is of good quality, splitting well into the forms desired. The rough split stone sells for four cents per cubic foot, on the spot. The whole surface of this granite is covered with scratches, which run N. 10° W., and the surface of the rock has been polished by the attrition of diluvial gravel.

On the road to Readfield, we noted many instances where diluvial marks occur on the rocks. Near the white house belonging to Dr. Hubbard, we observed them on the west side of the road, running N. 5° E. to N. 8° E. and S. 5° W. to S. 8° W. They are very distinctly cut to the depth of half an inch, and are occasionally one and a half inches wide. I have taken especial care to collect every instance of variation from the usual course, as anomalous facts are frequently guides to discovery.

After reaching Augusta, I directed the Assistants to explore the Cobiseconte stream to Winthrop, and on the 21st June took passage to Boston, in order to have the broken barometer repaired.

26th. Returned to Augusta, and recommenced our Kennebec section, having in the mean time made arrangements to meet General Wool, at Moose Head Lake, on the 4th of July, for the purpose of joining with him in the survey of Moose Head Lake and Moose River.

28th June, we measured the height of the tertiary deposits, which form the substratum of a large portion of the valley of Augusta, and found that formation to be from eighty-eight to one hundred feet above the level of high water on the Kennebec river, at Augusta.

During the past year, I had an opportunity of collecting the fossil shells of marine origin, that were disclosed by digging a well in Oak street, and I now found by measurement that the top of the soil at that well, is one hundred and two feet above the river, and since the marine shells were found twenty feet below the surface of the soil, imbedded in marine clay, it follows that the stratum in question is eighty-two feet above the river level. The clay of Gardiner and Hallowell belongs to the same formation, and in the former town, Mrs. Allen has collected a great number of marine shells, large barnacles, &c., specimens of which she has kindly furnished for the State Cabinet.

29th June. Returning to our section, we revisited Waterville, Fairfield and Skowhegan, examining all those localities, that were passed over before in a cursory manner. In Bloomfield, we were interested by observing the rapid formation of gypsum in the soil, by the decomposition of pyritiferous slate containing limestone. The most remarkable locality is the hill on the road side, in Bloomfield, near the Fairfield line. It will there be remarked that the pyrites, or sulphuret of iron, is decomposed by the action of air and water. Sulphate of iron is formed, which is instantly decomposed by the carbonate of lime, and sulphate of lime and carbonate of iron result. Indeed crystalized gypsum, thus formed, abounds in the crevices of the rock, while large portions of it are washed away and deposited on the soil in the low lands around. Small beds of bog iron, are here observed in the act of formation, the water depositing it over the meadow below.

30th June. At Somerset House, Skowhegan—noon—barometer h. 30.230, T. 73° F. Continued our route to Cornville, where we found the rocks to consist of sound argillaceous slate, which may probably be advantageously quarried, but no openings disclosed its workable quality. The strata run N. E., S. W., and dip to the N. W. 80°. Beds of limestone, from six to ten feet wide, also occur. The surface of the slate is cut by an infinity of well defined diluvial scratches, running N. 6° W. They may be seen along the whole extent of the road, where new excavations have brought them to light.

Rounded masses of fine grauwacke, filled with impressions of marine shells belonging to the genus terebratula, are also abundant, and the Cabinet has already been enriched with a magnificent specimen, of large dimensions, through the kindness of Mr. McDaniel of Cornville. All the boulders of this shell rock, as I have long since intimated, came from the north of the spots where we now find them scattered, and I shall presently describe the parent bed from whence all of them originated, and from whence they have been driven, to the distance of more than one hundred miles, by the great rush of waters before mentioned.

Continuing our route to Athens, we found abundant localities of limestone rocks. On the East branch of the Wesseronset stream, upon the estate of Mr. John Ware, there occurs a bed of limestone of considerable importance. It forms the bank of the stream, and is overlaid by a hard kind of porphyry rock, that has been thrown up through the limestone, and has produced much distortion in the strata. Diluvial scratches are abundant in this town, and pursue the same course as those last noted. Boulders of granite rock, and grauwacke, containing terebratulæ, abound on the surface, but no such rocks occur *in place* in the town.

Passing over Lord's Hill, the highest rise of land crossed by the road, from whence Saddleback, Mt. Abraham and Mt. Bigelow, may be seen, we reached Harmony, where we spent the night.

Harmony. Limestone occurs abundantly in this town, on the Higgins stream, near Bartlett's Hotel. The strata run N. 60° E., S. 60° W., and dip S. E. 80°. The limestone beds are included in slate, and vary from four to six feet in width. Veins and nodules of calcareous spar also abound. On the estate of Mr. Norrod Herd, I learned that wheat grew in great luxuriance, the land having been burnt over, but not manured. From three bushels of wheat sowed, he raised seventy-five bushels of good sound grain.

Parkman. Passing through this town, we observed that the rocks were wholly of argillaceous slate, the strata of which run E. N. E., W. S. W., and dip S. E. 80°. Diluvial marks are seen on all the rocks, where they have been recently uncovered, and they run north and south. Numerous round blocks and smaller boulders of erratic rocks, such as porphyritic granite, blue quartz rock and flinty slate, abound in the soil, but no such rocks occur *in place* in the town.

Abbot, on the banks of the Piscataquis, is underlaid with argillaceous slate, which may be seen cropping out in nearly vertical strata on the banks of the river and along the road side. Diluvial marks, pursuing the above mentioned direction, abound, and may be seen in numerous places on the road to Monson.

Owing to our engagements, we were obliged to pass over the last mentioned towns more rapidly than I could have desired; but I secured all the facts which I was able to obtain in so cursory an examination. The data are all that are required in a mere outline sketch, and the filling up must be done at another time. In sectional outlines it is always more easy to keep up a connected view, by tracing thus rapidly our line of march, for the attention is confined to the most important features, and not distracted by thousands of minute particulars, which find their place in the subsequent details of the complete survey.

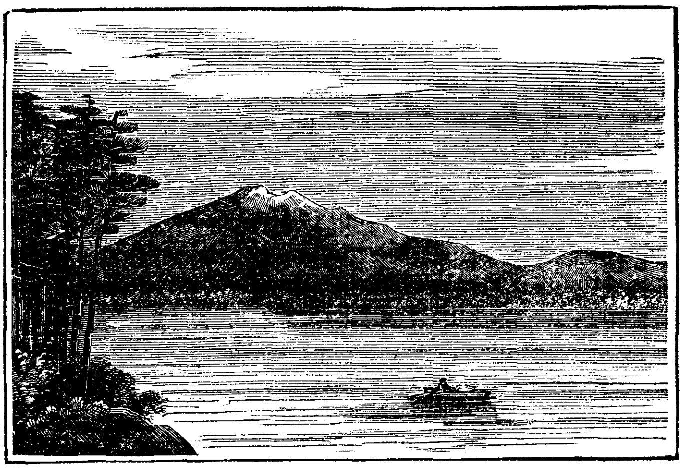
Arriving at Monson, we stopped for the night at Rice's tavern, where, at 5 P. M. July 1st, barometer h. 29.450, T. 65°. Next morning, July 2d, set out for Moose Head Lake, travelling over a miserable winter road, made up of mud, logs and water, which made the travelling very troublesome. This road has, however, a good hard bottom, and could be easily turnpiked and made suitable for carriages. Should this be done, Moose Head Lake would soon become a favorite place of resort. At present it is only passable for travellers on foot or on horseback, excepting in winter, when the snow furnishes a universal rail-road over the roads of Maine.

The only rocks on the road are argillaceous slate, which stand in nearly perpendicular sheets, and are scratched by diluvial marks over its edges, nearly at right angles with the strata.

After travelling over such an unpromising road, the traveller is delighted to find, on the shores of the lake, the spacious and excellent hotel, kept by Mr. Gore, whose attentions are always polite towards his guests, and his accommodations ample and good.

The plantation at the foot of Moose Head Lake, is called Greenville, and is yet almost an unbroken wilderness, excepting the tract of land cultivated by Messrs. Gore. The beautiful Moose Head Lake will ere long become a favorite place of resort for the citizens of Bangor, and for travellers who have time to spare for their amusement or improvement in health. With the clearing away of the forests, the black flies and mosquitoes that now annoy us, will disappear, and there will be nothing to alloy the pleasures of this beautiful watering place.

By observations with Kater's circle, I find the latitude of Gore's Hotel to be N. 45° 23m 49s—variation of the compass 11° W. The military gentlemen whom we intended to meet, not yet arriving, on the 3d July we took a boat and made excursions to a ledge called Burnt Jacket, on the eastern shores of the lake. Passing an archipelago of small but picturesque islands, we soon came in view of the majestic Squaw mountain, which rises boldly more than one thousand feet from the lake level, and is surrounded by many smaller mountains.



View of Squaw Mountain from Lily Bay.

Landed upon Ledge Island, which is composed of granite rocks, and is covered with spruce trees and small underbrush. After taking some bearings and sketches from this island, we rowed up to Burnt Jacket, which is a precipitous mass of gneiss with granite veins, rising one hundred feet perpendicularly, containing black tourmalines and andalusite crystals. From this ledge numerous sketches and bearings were obtained.

The shores of the lake, far as we could see, were covered with a dense forest of spruce pine, maple and birch trees, the black growth, as it is called, being most abundant. The scenery is picturesque, but an *amateur* of fine views would find it yet too wild, and not relieved by the habitations of man; an evil which time will remedy.

Returning to Gore's, I took a careful set of observations to determine the altitude of the Lake above the sea level, and upon the mean of many exact measurement, made under the most favorable circumstances, I find it to be exactly 960 feet above the high water mark of Portland harbor.

4th July, General Wool; Maj. Graham and Lieut. Johnson arrived, and having engaged the use of the steamboat for their excursion, politely invited us to accompany them around the Lake, for the purpose of making a general reconnoisance. This invitation was gladly accepted, since it gave us an opportunity of effecting our objects in much less time than it would otherwise have required, and also afforded us an opportunity of obtaining much valuable information from those distinguished gentlemen. The additional Assistant and Master Chandler, were sent to meet us with the waggons at Moose River, while Dr. Stephenson and myself, with two boatmen, joined the party in the steamboat. Cruising around the shores of Moose Head Lake, we took cursory views of the country, and made sketches of the scenery. On the shores of Northwest Bay, we examined ledges of green calciferous slate, which runs E. and W. and dips N. 60°.

From this point, Spencer Mountain bears S. 35° E. Squaw Mountain S. 23° E. Mt. Kineo, Jr. S. 18° E.

July 5th, at noon, Barometer 29.090, T. 75° F. In the afternoon, we took a boat and ran up a small sluggish stream, for the distance of quarter of a mile, when we came to the new road which it was contemplated to fortify. This road has been cut through a dense forest of pine, spruce and birch trees, which have been cut close to the soil, so that it is a good winter road. The soil is a light yellow loam, containing fragments of green slate, but no rocks in place were observed. We walked up this road three quarters of a mile, and then returned to the steamboat, the General having made up his mind that he should not recommend a fortification there at present. We then ran down to Moose River, and as the weather was rainy, had no opportunity of making any more observations until we left the Lake.

6th. Leaving the steamer, we took our battaux, and set out for a cruise up Moose River, to the Canada Road. For the first two or three miles of this stream, the water is sluggish and deep; we then came to rapids, produced by the rushing of the waters over siliceous slate ledges containing veins of quartz. After passing four or five similar rapids, we came to Brassau Pond, the shores of which are composed of grauwacke slate, containing obscure remains of shells. The strata dip S. E. 50° or 60°. Numerous boulders of greenstone trap also occur. The Eastern shore is composed of granite rocks, and is covered with a dense growth of small poplar trees and white birch, which indicate a poor soil. Farther up the Lake, we came to dense forests of cedar, spruce, birch, maple and pine trees, and the rocks are grauwacke slate.

July 6th. Barometer 29.024, T. 80°.

After dining on the shores of the Lake, we continued our voyage along its eastern side, against a brisk northwest wind, that nearly filled our boat with water, and required no small labor to bail it out. The forests here begin to become more luxuriant, and Norway and Sapling pines, of good size for timber, abound. The rocks continue of the same character, being grauwacke strata, which run for some distance nearly in the direction of our course.

Moose River opens into the southwest side of this Lake, and we soon entered its waters and ran up to rapids, where we left the boats to be carried by, and walked along a logging road in the forest beside the stream, for the distance of three miles—when we encamped just below the Great Rapids. Already, our faces were so bitten by the immense swarms of black flies, mosquitoes and midges, which were unusually abundant and venomous, that it was more difficult to open than to close our eyes, and we slept easily by our camp fires, the smoke of which defended us from further annoyance from these troublesome insects.

July 7th. This morning walked two miles above the Falls while the boats were hauled over—then took the passage on Long Pond, which is but an expansion of Moose River, and is eight miles long.

7th, at noon, on Long Pond, Barometer 20.950, T. 75°.

The shores of this Lake are of flinty slate, greenstone trap and quartz rock, the strata continuing to the head of Long Pond—which Lake is eight miles in extent in an east and west direction. Ledges of argillaceous slate, which dip N. W. 60°, present themselves. On the West side of the Pond, there is a fine timber lot, belonging to Mr. Coburn, of Skowhegan. Two cleared spots were covered with an abundant crop of oats and grass. On the south side of the Pond, cedar and pines abound.

Mr. Coburn informs me that his lot lies between Long Pond and the Canada Road; that it cost him two dollars per acre, and since he came in possession of it, he has cleared the wood from twenty-five acres, at the cost of twelve dollars per acre, or 300 dollars. On the first year after clearing, he raised on the land hay and grain, which he soldfor 600 dollars, and for two years following he sold the produce for 250 dollars per annum. Exclusive of the cost of cutting, his hay sold for 25 dollars per ton. The land, at the time we were there, was covered with oats and grass, which were in thriving condition. From this statement, it would appear that good investments may be made by clearing farms on this river.

A road ought also to be made from near Moose River Bridge to Moose Head Lake, since it would become the most direct route from Bangor to Quebec, and would run through a country that will soon be settled, since the soil is luxuriant. Moose River may hereafter be made navigable, by canals around the Falls, and it can easily be done at little cost, when the settlements require it.

After examining the country, as well as we could in our rapid mode of travelling, we continued our voyage to Moose River bridge, where there are settlements. Thus far our voyage on the river has been 30 miles, and still I was informed by the boatmen, that we could run 40 miles further up this stream, in a westerly direction from the bridge. So remarkable a stream as this, ought to attract more attention, for by very little expense, it may be made navigable to tow-boats, the river's banks furnishing a very good tow-path, and there being but few rapids—while for the greater part of the way the water is quite sluggish and deep.

Leaving the boats at the bridge, we went to the house of Jacob Lowell, where we remained for several days engaged in the requisite operations of the survey. Lowell keeps the Custom House, which is fourteen miles south of the Canada lines, and one and a quarter miles north from the bridge on Moose River. The latitude of this spot, according to Maj. Graham's observations, is 45° 39^m 4^s; and longitude 70° 14^m 45^s West from Greenwich. Barometer 28.918, T. 73, t. 73° F.

July 9th. Leaving the Custom House, near Moose River bridge, we travelled up the road to the height of land dividing Maine and Canada. For the first three miles the slate ledges present themselves, inclining to the northwest. The forests are composed of a mixed growth of yellow birch, spruce, pine and beech trees; then we come to an abundant hard wood growth of sugar maples, yellow birch and beech—indicating a good soil, which being examined, was found to consist of a yellow loam, resting on a substratum of clay. The rocks are calciferous slate, which is stratified and runs N. 76° E., S. 76° W. and dips N.60° W. Approaching the house of Mr. Hilton, the soil becomes of a darker brown color, and is still clothed with maple trees. At this place, the slate strata are reversed in their inclination, and dip S. 10° E. 70°. Diluvial marks abound and run N. 46° W., S. 46° E., Bald Mountain having reflected the course of the current from the north to the eastward.

Hilton's house is situated close to the West branch of the Penobscot river, which is here a small brook, the stream taking its rise four and a half miles from this place, between the "Height of Land" and Sandy Stream Mountain. Measured barometrically, the West branch of the Penobscot, at Hilton's, is 1660 feet above the sea level.

From Hilton's we ascended to the high-land which divides the Canadas from Maine. On the hill there is a new cottage, formerly kept as a tavern by a French creole, by the name of De Longe. A large sign is here erected upon a post, on the dividing line, the British armorial bearings being painted on the north side of it, and those of the United States on the south. From this eminence, there is a most extensive view of the country to the north and south, the eye reaching over a long vista towards the St. Lawrence, the slope being quite rapid on that side of the line. A conical peak is seen at a great distance, bearing N. 56° W. and 15^{m} below the horizontal level. On the S. 59° E., in Maine, Bald Mountain rises far above the point where the road crosses the high lands. On the West, there is a high mountain rising at an angle of 1° 39^{m} from this spot. The direction of these mountain ridges is from N. W. to S. E. and their sides are composed of argillaceous slate, while granite rocks probably form their central mass.

July 9th. The barometer placed at the side of the monument above described, and protected from the sun's rays, stood at 2½ P. M. 27.860, T. 74°, F. t. 22° cent. The instrument was allowed to remain one hour, and was again noted. It stood at 27.880, T. 54° F., t. 24° cent. The weather was fair and serene, and the barometer remained constant. Calculated from the mean height of the mercurial column, with all the due corrections for temperature, curvature of the earth in the latitude given, &c., and comparing with all the line of stations where observations were made for the survey, we ascertain that the Canada road, where it crosses the frontier, is precisely 2000 feet above the high water mark in Portland harbor. The latitude and longitude of this spot were measured by Maj. Graham and Lieut. Johnson, and found to be—lat. N. 45° 48^{m} 31^{s}; long. 70° 22^{m} 54^{s} West from Greenwich meridian This point in our boundary having been accurately determined, it will be more easy to ascertain the remaining chain of unmeasured dividing highlands.

Returning on our section, I measured the fall of land for every ten miles, from the frontier upon the Canada line to the level of the sea, in the direction following a line parallel to the course of the Kennebec river, for the purpose of making a profile view of the structure of the country and its exterior contour. The latitudes on many of its points were accurately taken, and as near an approximation to the true longitude as can be obtained with a chronometer watch by the meridinal passage of stars. This section will be presented, but ought to be printed on stone or copper plate, with the remaining sections, views, and the geological map, which will be reported at the close of the survey.

The soil at the Moose River settlement is generally good, and produces ample crops of wheat and other grain, the average yield of wheat being fifteen bushels to the acre, on un-manured uplands.

On the west side of the Canada Road, about half a mile north from the Custom House, on No. 5, 2d Range, Messrs. J. P. Dennis, Hyde, Mitchell & Co. have effected the clearing of a valuable farm, which has been successfully cultivated under the direction of Mr. Dennis. Mr. Hyde informs me that "on fifty acres of this soil, they raised 1065 bushels of good wheat during the past season, and that the average crop is twenty-one bushels to the acre. On another spot they raised rye, which gave on forty acres, 450 bushels of that grain. Sixty acres planted with oats, yielded a crop of 500 bushels. One hundred and fifty acres are now laid down to herd's grass, clover and red top; fifteen acres are planted with winter rye.

On this farm, a very large and commodious barn has been erected, 100 feet long and 50 feet wide, and is handsomely finished and glazed. An excellent Flour Mill, having cleansers and bolts, with room also for saw-mill, has been erected upon the Sandy stream, three quarters of a mile northwest from the Custom House, and is capable of grinding 150 bushels of wheat in twenty-four hours."

From the above statements, it is evident that the soil in this region is rich and well adapted to cultivation, and that profitable investments may be made, by clearing and cultivating farms on the Canada Road. The nature of the soil, as indicated by the forest trees, is evidently strong and good in many other parts of this section, and when the United States erect fortifications and quarter troops on this frontier, there will be a ready demand for the agricultural produce that may be raised on the neighboring farms.

10th July. Leaving Moose River, we travelled on towards the Forks of the Kennebec river. At Capt. Jackman's, ten miles from Moose River Bridge, 6½ P. M., barometer 28.020, T. 70°, fair. Four miles south from this place, at Mr. Boise's house, 8¾ P. M., barometer 28.350, T. 68°, fair.

11th, at Boise's house, 5½ A. M., barometer 28.220, T. 68° F.; at 7 A. M., 28.230, T. 71° F., t. 21° c., fair.

Boise's farm is near Parlin Pond. The soil is composed of a white siliceous substratum, with a thin layer of yellow loam, and is not very productive. Between Jackman's and Boise's farms, on the side of the road, half a mile north of Parlin Pond, I discovered a huge bed of fine grauwacke, filled with an immense number and variety of fossil shell impressions. The rock is of a fine siliceous variety, extremely compact where the shells do not abound, but presenting the most perfect casts of marine shells that I have ever seen. The width of the bed could not be exactly determined, as it is in part concealed by the soil; but I measured it for fifty rods, which is but a small part of its width. Among the fossils I obtained the following genera terebratulæ, spiriferæ lutrunæ and turritellæ, beside which there are several other indistinct or broken fossils, which it is more difficult to determine. From the direction of this rock, it evidently crosses Moose River and the head of Moose Head Lake, and extends to the banks of the Aroostook, where we discovered it last year, and from it came all those numerous boulders and erratic blocks containing fossil shells, which we find scattered so profusely over the country, from the line above mentioned, to the outer islands of the Penobscot bay, and at the mouth of the Kennebec river. The distance to which masses, six or eight inches in diameter, have been transported, is no less than 126 miles in a right line, while there are immense numbers of larger size found scattered over the intervening space, and they become larger as we approach this their parent bed.

No fossiliferous rock of the kind, occurs in the area between this locality and the spots where are found the diluvial boulders noticed; the marks on the surface of the ledges, have long ago indicated to me that the parent bed of these fossils was to be sought inland, farther to the north than where they are found loose in the soil. We consider this discovery of the most conclusive kind, and one of great importance in the theory of diluvial transportation, both of minerals and soils.

By knowing the direction from whence the scattered fragments came, we can trace rocks and minerals to their native beds, and we can predict and account for the distribution and qualities of soils, which would be wholly obscure without the above considerations. Thus, since all the diluvial soils have been moved southwardly, it is evident that the soil from one rock overlaps that of another, and so far as I have observed, the soils resting on a rock are rarely derived from its decomposition, but from those to the north. This rule indicates their treatment, for their mineral ingredients denote the amendments required. Thus persons who believed the soils of Thomaston to be the result of the decomposition of the rocks immediately below, would be apt to think that they must contain much lime, but they do not, and originated from granitic and mica slate diluvium—and experience, since we have urged the trial, demonstrates that the soil of that town needs liming to a great extent. Hundreds of other instances of the kind, I have recorded, but let this suffice for the present.

Parlin Pond is three miles long, and is supplied by Boise's Stream, which descends from Bald Mountain. There is a stream arising from this Pond twelve miles in length, and communicates with Long Pond. There are numerous falls upon it, which Mr. Boise informs me amount in all to seventy feet fall. Logs are run down this stream to Long Pond.

Attean Pond is eight miles west from Boise's, and is said to be from six to eight miles in length and three miles wide. It empties into Holob Pond, and into Moose River above the bridge.

Between Attean and Parlin Ponds, there are an abundance of large Norway pines, spruce and larch trees.

Mr. Boise makes his own sugar from the maple sap, and says that he obtains eight pounds of good sugar from a barrel of sap on the first tapping, while the next year, a barrel of sap gives nine pounds of sugar, from the same trees. The quality of the juice increases, while its quantity diminishes by tapping.

From Boise's to the Forks, the rocks are found to consist of argillaceous and calciferous slate, with numerous beds of fine grained grauwacke.

At the house of J. B. Smith, three miles above the Forks of Kennebec, 1¼ P. M., 11th July, barometer 28.790, T. 82°. The road gradually descends over a series of rounded hills, covered with mixed hard and soft wood forest trees. A small deposit of bog iron ore occurs on the right hand side of the road.

11th, 2½ P. M., Forks of Kennebec, Burnham's tavern, barometer h. 29.264, T. 82°, t. 27° cent.

When we had completed our measurements, I was called to examine a ledge of rocks one hundred rods east of Burnham's hotel, belonging to Charles B. Foster, Esq. This ledge has for a long time furnished the people with whet-stones and owing to the fineness of the grit, it answers very well for that purpose. On examining the rock, however, we found that it effervesced freely with acids, indicating a large proportion of carbonate of lime. The hill is about one hundred feet high—presents an abrupt precipice, composed of alternating strata of buff colored limestone and green calciferous slate. The limestone alternates with the latter rock in strata from half an inch to a foot in thickness, and forms nearly one tenth of the mass of the hill. The strata fall asunder when broken out, so that there is no difficulty in separating them. Mr. Foster has obtained slabs nine feet square and one foot thick, with great ease.

It was at first supposed, from the effervescence of the rock with acids, that it could be burned for lime; but on making a chemical analysis of it, I found that although it contains lime enough for that purpose, it also contains ingredients that will run into glass at a white heat, and hence foresaw that it could not be readily made into lime. The most calcareous portions, if carefully burned, will slake into a brown lime; but I should not recommend it to be used for that purpose, since it is so much more valuable for another article, which I have discovered could be easily made of it.

Immediately after my return to Boston, I made the following analysis of this stone.

Analysis, of 100 grains:

Silica, - - - -	27.0
Alumina, - - - -	8.4
Magnesia, - - - -	9.0
Carb. iron, - - - -	2.8
Ox. iron and manganese, -	2.4
Carbonate lime, - - -	50.0
	99.6

When burned at a red heat, it does not slag, but beyond this temperature, runs into a dark green glass. Burned at red heat, it does not slake with water, but when ground to powder, makes with sand a cement that hardens under water. By mixing fifteen per cent. of clay and ten of manganese, the cement becomes fully equal to the hydraulic cement imported from England, which sells at from six to eight dollars per cask, in Boston. This substance is now in such universal demand for making water proof canal locks, dams, culverts, cisterns, cellars and aqueducts, that it cannot fail to become a most important discovery to the people of Maine, to find so good a cement in the State.

Having in my last annual Report, predicted the occurrence of roofing slate near the north line of Moscow, such having been the direction of the Barnard and Piscataquis slate as to cause it to strike the Kennebec river near that point, I inquired during the present survey whether any such slates had been found, and was informed that they occured on the western side of the river, near that point. I was also shown several good writing slates that had been obtained there. Subsequently I sent two assistants to explore that locality more minutely than we could have done without abandoning our section, and they report that they find an abundance of good roofing slate upon the estate of Moses D. Townsend, Esq. near the north part of No. 1, 2d Range, and that the strata run N. 30° E., S. 30° W. and dip N. W. 80°. Since quarries have not been opened, it was difficult to ascertain how large sheets could be obtained; but they are of opinion, that the slates could be easily split out from three to six feet square. The land being high, the drainage is easily effected to the requisite depth for working quarries.

On the estate of Mr. Joseph Young, good roofing slate is also found, and one was obtained having upon it the impression of a fern. The surface of the slate at the last mentioned locality, is stated to be a little stained by oxide of iron, but it may be only superficial. The hill of slate is eight hundred feet high, so that drainage is easily effected. The course of the strata is N. 30° E. and S. 30° W., and dip N. W. 80°. From the above data, it will appear that the disruption of the Kennebec slate is in a different line from that on the Piscataquis, which runs nearly E. and W., but it probably belongs to the same formation.

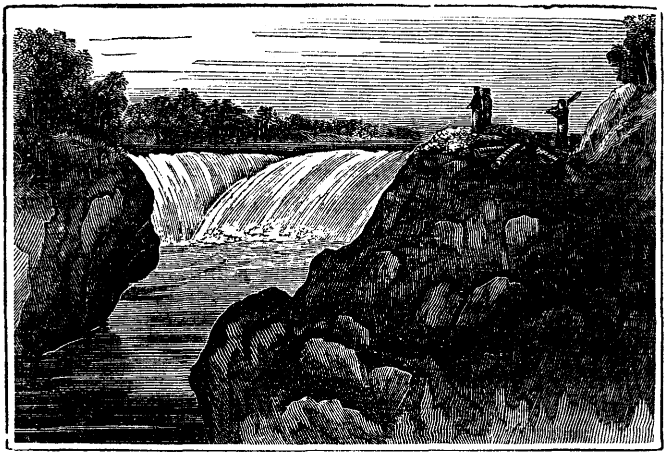
Slates also occur in Bingham, four miles east of the village, and the assistant reports that they are intersected by quartz veins, so that the strata break out in pyramidal blocks, one foot wide at the top and six feet at the bottom. There is one place where slates may be split off ten feet square, and six or eight inches thick, and grave stones may be made of it, but it is said not to answer for roofing. The course of the strata is N. E., S. W., dip 80° N. W., and the hill fifty or sixty feet high. This locality is on the estate of Mr. Seldon of Norridgewock.

Visited the Saw Mills, half a mile above Bingham, where there exists a bed of blue limestone, containing small veins of galena, or sulphuret of lead, and blende, or sulphuret of zinc. The rock also contains an abundance of massive pyrites, or sulphuret of iron. The limestone strata run N. 50° E., S. 50° W., dip N. W. 60°, and are cut by numerous veins of quartz. Returning to Bingham, I took a meridian altitude of the sun, and calculated the latitude of Bingham to be N. 45° 01^{m} 10^{s}.

Mr. L. G. Fletcher, of Bingham, and several other gentlemen, contributed their aid in the promotion of our work, and to Mr. Fletcher I am indebted for some valuable statistics on the subject of maple sugar, which will be presented in this Report.

Concord, on the west side of the Kennebec river, opposite Bingham, was partially examined at this time, and subsequently we revisited it, while engaged on that side of the river. The Old Bluff on the borders of the Kennebec, in this town, is a precipitous hill of pyritiferous mica slate, so highly charged with pyrites as to form by natural decomposition, considerable quantities of copperas and oxide of iron. This hill, measured by the sextant, is three hundred and fifty feet high above the river's level. It is composed of compacted strata, which run N. 30° E., S. 30° W., and dip 70° or 80° N. W. Having examined its base, we ascended to its summit, from which there is a charming view of the Kennebec, with its green islands, surrounding hills, valleys and plains, covered with a luxuriant vegetation. The pretty village of Bingham, with its gaily painted houses and small gothic church, are seen below, on the opposite side of the river. On the north, Old Moxa Mountain rears itself in the distance, and a range of mountains stretch towards the south as far as the eye can reach. Having obtained specimens of all the rocks of Old Bluff, we returned to Bingham.

14th July, we set out for Solon, examining on our route some enormous blocks of mica slate, containing staurotides and macles. Visited Caritunk Falls, seven and a half miles below Bingham, and half a mile from Solon village, where the Kennebec dashes over hard quartz rock and mica slate ledges, which run N. E., S. W., and dip N. W. 60°. Measured barometrically the fall, which is sixteen feet perpendicular; but is said sometimes to be upwards of twenty feet. The gorge through which the waters pass is fifty feet wide.



View of Caritunk Falls.

ANSON is situated upon the borders of Seven Mile Brook, in latitude 44° 47^{m} 40^{s} north, by our observations. This town is quite distinguished for its agricultural enterprize and success in raising wheat, having actually produced more than is reported from any other town in the State. The amount set down in the wheat bounty returns to the Legislature, is 12,713 bushels; but Mr. Bryant, the town treasurer, informs me that the actual quantity raised was much greater, 400 bushels having been reported to the treasurer of New-Portland—200 bushels more was not reported, and he estimates that at least 500 bushels was raised on which no bounty was claimed. In order, then, to estimate the fertility of the soil, we have to add 1,100 to the returns, making in all 13,813 bushels. Calculating on the returns to the Legislature, and upon the number of acres of land upon which the crops were raised, we shall have 16⅛ bushels as the average yield per acre.

1837	Acres.	Seed planted.	Crop raised.
	789	1,387	12,713 reported. 1,100 not reported. 13,813 Total.
1836	Acres.	Seed planted.	Crop raised.
	unknown.	unknown.	8,196 bushels.

The above table will serve as a model for similar records, and the remarks on the mode of cultivation, manures, &c. could be inserted below, or in an additional side column. The name of the farmer ought also to be inserted against each crop which he reports. It is highly desirable that the State should establish agricultural societies, and employ some person to obtain the statistics of agriculture; for we could then easily learn the products of the various soils which are submitted to my analytical researches, and the facts would then become of greater value and of universal interest.

On the estate of Beza Bryant, Esq., very large crops of excellent wheat have been raised, and the yield has been forty bushels to the acre. I examined several of his fields, one of which produced a very fine crop of wheat last year, and was then laid down to herd's grass and clover, and which is very luxuriant and is estimated to yield at least two tons of hay to the acre. Another field, covered with a very fine crop of wheat, which, on the 14th July, was four feet three inches high, and in good condition. It was planted on the 11th of April, and sprung up in three weeks after planting, even though the ground had been frozen after the seed were planted. Owing to the forwardness of this wheat, it escaped the attacks of the weavel, and is also free from smut.

Barn yard manure has been used for a dressing, and the soil which is highly charged with carbonate of lime, according to my analysis. It effervesces freely with acids, shewing that the lime is combined with carbonic acid.

100 grains of soil from Mr. Bryant's wheat fields contain, after being dried at 300°:

Insoluble silica, - -	75 grs.
Soluble matter, - -	25 "
	100

100 grains of the soil contain :

Water, - - - - - -	7.6
Geine, (vegetable matter,) - -	5.6
Ox. iron, - - - - - -	6.1
Carbonate lime, - - -	4.6
Silicious matter, - - -	75.0
	98.9

In the meadows there are several deposits of bog iron ore, in quantities insufficient to supply a furnace. Yellow ochre abounds, and may be used for yellow or red paint. There are also several shallow peat bogs, which may be rendered available to the farmer for making compost manure.

The rocks in Anson, on Seven Mile Brook, are hard flinty slate, and are of little practical interest. They produce a considerable fall of water on the stream, which is available for mill privileges, and is in part used for that purpose.

16th July. Re-visiting Norridgewock, I had an opportunity of obtaining some information relating to the soils and their produce, which could not have been learned on my former visit.

The estate of Dr. Bates, on the south side Kennebec, one mile from the river, there is an extensive plain, which that gentleman has cultivated for nine years, breaking up about fifteen acres per annum. The soil is a yellow loam on the surface, and below it there is a sandy soil, beneath which, after passing through coarse gravel, we come to quicksand at the depth of eight feet, where there is a regular stratum of clay, serving to retain the water, so that wells sunk to that depth never fail. The soil was this year planted with wheat, oats and peas together, and potatoes. The wheat was forward in its growth, but had suffered materially from the Hessian fly and weavel, while some of it was quite smutty.

Dr. Bates is of opinion that the smut is principally from the suckers, and results from the destruction of the main stock, by a worm. Many examples taken in his field, seemed to verify this opinion—and on splitting open some yellow smutty stalks, we found small oval shaped larvæ of some insect, probably that of a fly. There appear to be two generations of these insects, according to the opinion of Dr. Bates. I took three specimens of this soil to examine—first, from the uncultivated plain—second, from the oats and peas—third, from the wheat field.

The following statistical observations have since been handed me by Dr. Bates:

"The field planted with peas and oats, yielded on eight acres, three hundred bushels—or 37½ bushels to the acre. The wheat field produced about seventeen bushels of wheat to the acre, and was much injured by the fly."

Analysis of the soils will be found in the agricultural section of this Report.

Returning to Augusta, we set out on an excursion to certain localities which had not been examined, on the eastern side of the Kennebec. The rocks which crop out on that side of the river, from Augusta to Dresden, are entirely of the primitive class—such as gneiss, with granite beds and veins, and mica slate.

Dresden, level of the Eastern river, near Mr. S. Alley's house, July 31st, barometer h. 30.000, T. 82°. The soil on the western side of the neck of land is sandy; while on its eastern side it is a clay loam, which near the stream is luxuriant in crops of grass and grain. Mr. Alley informed me that the average crop of wheat raised on this loam, is about fifteen bushels to the acre. No rocks crop out near this place, but farther on the road to Wiscasset, a granite ledge appears, the surface of which is water worn and scratched with diluvial marks, running N. 15° W., S. 15° E. I have since learned that beds of limestone are found near East River, which I have not yet examined.

Alna. On the estate of David Lowell, the soil appears to be good, and bears a grove of young maple and beech trees, there being about five acres of soil covered with them. A specimen of this soil was taken for chemical analysis. (See Agricultural Geology.)

WISCASSET, near Turner's hotel, 31st July, 7 P. M., barometer 29.950, T. 71° F. Aug. 1st, 9¾ A. M., barometer 29.930, T. 68° F. Examined the rocks in the vicinity of the town, which are composed of gneiss with granite veins. The strata of the gneiss dip nearly vertically. Diluvial marks run N. 10° E., S. 10° W. Wiscasset is a very beautiful village, situate upon the Sheepscot river, and remarkable for its deep and beautiful bay, which is open to navigation throughout the year. It affords an admirable situation for a naval depot, and has been surveyed by the United States Government for that purpose. The lofty rocks which flank the bay, offer every facility for successful defence from an attack by sea; while its secure harbor could contain a large maritime force. Situated so favorably, the town enjoys great commercial advantages, and a rapidly reviving trade manifests a spirit of industry and enterprise worthy of great praise. The first whale ship from Maine, sailed from this port, and thus far the business has proved lucrative to the owners of the ship. A large jaw of the spermaceti whale laid upon the wharf, and the owners kindly promised to send it as a specimen to the State Cabinet, it being the first trophy of the kind won by the whaling enterprise of the State. Large steam saw-mills are in operation in this town, and immense numbers of sugar boxes are sawed by machinery, and packed in shooks for the West India market.

Aug. 2d, 11½ A. M., Alna, head of tide, barometer 30.200, T. 72°, air t. 74° F. Damariscotta Mills, level of sea, 4 P. M., level of high water, barometer 30.217, T. 78° F. In company with Mr. Bryant, and several other gentlemen of Damariscotta, visited a remarkable deposit of oyster shells, on the west side of the river, upon the estate of Messrs. Samuel and Joseph Glidden, in the town of Newcastle. This locality is two miles from the Mills, and between that place and the Bridge village. The bed of oyster shells forms a cliff, which is, at its highest point, twenty-five feet above the sea level, and it slopes down to about six feet above high water mark, and extends one hundred and eight rods in length, and from eighty to one hundred rods in width. The shells are disposed in regular layers, and are very perfectly preserved, being whitened by the action of the weather; but where they are most exposed to the action of frost, they have been crumbled into a fine shell marl.

Various conjectures have been formed as to the origin of this deposit, and the general belief is, that the shells were heaped up there by the ancient Indian tribes who formerly frequented the spot. Their regular stratiform position, and the perfection of the shells, appear to oppose this theory, as also the rarity of living oysters in the neighboring waters. They are, however, of comparatively recent deposition, for they evidently rest on diluvial soil. It is said also that arrow heads, bone stilettoes and human bones, have been found in the bed of shells, near the surface; but a more careful examination should be made before the question is decided; and this will probably be done ere long, since the value of this deposit for enriching the land has been explained to the neighboring farmers.

From our measurements, it will appear that there are no less than 44,906,400 cubic feet of shells in this bed; and since they are generally of large size, they may be easily burned, and will make about ten million casks of lime. Hence it will appear that this bank may be drawn upon quite extensively without exhaustion, while the lime is a most valuable article for the improvement of soils. It will be easy also to grind the shells to fine powder, in mills—an operation which will answer better for agricultural purposes, since the amendment will remain more permanently in the soil. Good mill sites may be obtained, and if the shells are reduced to fine powder and packed in casks, it might be advantageously exported to other places for sale.

Near Damariscotta Mills there is a small island, composed of gneiss rocks, covered with a yellow loam mixed with fragments of oyster shells. It is called Tappan's Island, and is interesting as being an ancient burial place of the Monhegan Indians, whose skeletons are frequently exhumed by excavating the soil to the depth of from eighteen inches to two feet. This tribe of Indians appears to have long since become extinct, and no burials have taken place on the Island for nearly two hundred years—yet the bones which have been dug up are quite perfect. Dr. C. Ellis, who accompanied us, discovered and dug up in my presence, a nearly entire skeleton, which was found with the knees drawn up and the face turned eastward, or towards the rising sun, indicating a belief in the resurrection; and it is stated that this position was the uniform method of burying the dead, as shewn by the examinations which have been made upon this Island. Some of the skeletons, I was informed by Mr. Bryant, have sheets of copper placed over their heads, shewing that they were probably buried since the Europeans came to these shores. A copper knife blade, set in a bone handle, was also found.

Returning to the main land, we visited Bristol and Bremen and Pemmaquid Point, that section having been necessarily omitted in our exploration of the sea coast, on a former occasion. At the extremity of Pemmaquid Point, which is a long rocky promontory, there are some remarkable geological phenomena. The rocks are generally gneiss and mica slate, the strata running N. 43° E., S. 43° W., while the dip is N. W., or southeast, according to the lines of disruption and fracture produced by the upturning of strata, which was effected by huge beds and veins of granite rocks.

At the extreme point, below the light-house, may be seen a remarkable instance of this violent intrusion of a granite vein, the strata of mica slate having been turned completely over by the injected vein. Here we remark the contortions of the mica slate, and the curve where it was bent over by the upheaving and overturning vein of granite. The vein is from twelve to thirty feet wide, and runs N. 30° E., S. 30° W. On its eastern side, the strata of mica slate dip S. E. 60°, and on its western side N. W. 60°. Huge masses of the protruding granite have been broken off, and have been removed from thirty to fifty yards to the westward. One of these blocks measures eighteen feet square—another twenty-five feet long by eight feet wide—the former being thirty yards and the latter fifty yards from the parent vein.

Walking two or three miles to the northward, along the rocky ledges which form the eastern side of this promontory, we observed that the rocks consist of regular strata of mica slate, which is divided by huge beds of coarse white granite, with lateral veins from three to ten feet wide, striking across the strata in a N. W., S. E. direction. The mica slate is curled and broken from this disruption, shewing that it was rendered plastic by the heat of the intruded beds and veins.

The granite is made up chiefly of large crystals of white felspar, with a little grey mica and quartz, and is unfit for architectural purposes. The regularly stratified mica slate would answer for flagging stones, if quarries could be easily opened and wrought.

Five miles northwest from the light-house, near Pemmaquid landing, on the estate of Mr. William McCobb, we examined a deposit of bog iron ore, which exists in the state called pan ore. It covers an area of about half an acre of land, and is five feet thick. The ore is solid, and is coated with yellow ochre.

It contains, according to my analysis :

Water of composition, - -	22
Per oxide of iron, - - -	63
Insoluble silica, - - -	15
	100

During the roasting of this ore, a very faint trace of arsenial odor was perceived, but the quantity is evidently too small to injure the ore for making cast, although it might be injurious to the bar iron. The quantity of ore is insufficient to supply a blast furnace ; but it may be worth the labor of digging for exportation to iron works elsewhere on the coast.

Bristol. In this town there is a dyke of well characterized basalt, containing olivine and basaltic hornblende in grains and crystals. This dyke is found on the estate of Mr. Joshua House, in the north part of the town, near a granite quarry, and two miles from Damariscotta River. It runs N. 60° W., S. 60° E., and shews itself again on the southeast side of Biscay Pond. The basalt is columnar in its structure, the columns striking horizontally from the wall rock, which is granite—the width of the dyke varying from twelve to thirty feet. This being the first instance where we have discovered well characterized basalt in Maine, a large number of the columns were obtained for specimens.

The granite quarry, on the eastern side of the road, has been wrought to small extent, but the rock is of good quality, and splits well into the usual forms required.

Waldoborough. Visiting Waldoborough, we examined two important granite quarries, one of which is three quarters of a mile north, and the other half a mile northeast of the village. Feyler's quarry is a hill of granite, which by measurement, was found to be one hundred and thirty-six feet perpendicular altitude above the sea level. The openings which have been made, disclose the rock for the distance of one hundred yards. Blocks may be obtained eight feet in thickness, and thirty or forty feet long. The granite is a vein in mica slate, and runs N. 80° W., S. 80° E., cutting across the strata of mica slate, which run at the south extremity of the quarry N. W., S. E. The slope of the granite ledge is N. W. 10°.

The Ludwig quarry, three quarters of a mile north from the village, on a hill 144 feet above the level of high water at Waldoborough, has been wrought to some extent, openings having been made thirty-six yards square, and blocks of granite split out. The stone is a fine grained and light colored granite, composed of small crystaline grains of white felspar and white quartz, with specks of black mica interspersed. The largest blocks which may be obtained, are twenty feet long and five feet square, but common sized ashler stones are readily split out into the shape desired. It is a very handsome building stone, appearing at a distance like white marble. A beautiful cut obelisk, shewing its quality and appearance, may be seen in the burial ground of the village.

WARREN. This town is remarkable for its numerous and extensive quarries of white crystaline limestone, which are wrought for lime and for marble; the sound blocks of fine grain being selected for the latter purpose.

The principal quarries which have been opened, belong to the different members of the Starrett family, who have for a long time been engaged in quarrying and burning of limestone. The first quarry which I visited, belonged to Alexander Starrett, and is situated on the western side of the St. George river. There are two distinct beds on this estate, included between strata of gneiss and mica slate, the largest is 20 feet wide and runs N. 75° E. S. 75° W. and dips to the East 70°. The rock is of that variety called magnesian limestone, is largely crystaline, and contains disseminated in it numerous crystals of galena or lead ore, and blend of sulphuret of zinc.

There are numerous deep natural caverns, opened by excavating the rock, which appear as if produced by the action of water on the limestone.

Owing to the quantity of soil resting on this quarry, it is said to be more economical to bring the stone from the eastern side of the river, where it is more readily obtained close to its shore. At the quarry of David Starrett, this transportation is effected upon the ice during winter.

On the eastern side of the St. George, we examined the quarry of Mr. A. Starrett, where a bed of coarse white crystaline limestone is contained between strata of mica slate, the direction of the walls being N. N. E., S. S. W., and dip 61° E. S. E. This bed is ninety-nine feet wide, and is uncovered to the length of 150 feet.

John Starrett's quarry is a similar bed, but is 122 feet wide, and 300 feet long, where it has been opened. The including strata run N. 43½° E., S. 43½° W., and dip S. E. 55°.

Benjamin Starrett's quarry presents a similar limestone bed, 30 feet wide, and running in N. E. S. W. direction, with its dip to the S. E. 43°. Another bed occurs to the S. E. which has not been wrought.

Half a mile N. W. from A. Starretts, we came to David Starrett's quarry, which is important on account of its situation and the facility of working, since it is on the banks of the St. George, and forms an abrupt cliff, where it is easy to blast out the stone, while the drainage is complete. The cliff is 26 feet high, and is composed of white limestone, spotted and veined with blue colors.

The limestone bed runs N. 10° E., S. 10° W., dips to the eastward 80°, and may be traced one quarter of a mile towards the farm-house.

The lime made at Warren is generally carried to Thomaston for sale, by means of gondolas, upon the St. George stream, the distance being six or seven miles.

The price of wood is 1 dollar and 25 cents to 1 dollar and 50 cents per cord, and the lime sold last year from 95 cents to 1 dollar per cask.

For the purpose of making a continuous measured sectional view of the country, I proceeded to Thomaston, and examined all the limestone quarries for which that town is distinguished, taking the altitude of the various points above sea level. I was also desirous of making a minute examination of the remarkable soils of that vicinity, and collecting specimens of those which it was deemed necessary to analyze. The results which have been obtained, will be included in that section of the present Report, which is devoted to Agricultural Geology. I shall, however, state here, that the great mass of soil which lies upon the surface of the limestone at Thomaston, is evidently diluvial and alluvial, principally of the former class, and that it was derived from the decomposition and disintegration of granite, gneiss and mica rocks which lie to the northward of that town.

This fact accounts for the almost entire absence of carbonate of lime in the soil, and indicates at once to the farmer, that liming is there extensively required. The use of muscle bed mud has already been introduced with happy results, and its use depends upon these principles: First, a diluvial granitic soil is too permeable to water to retain well the requisite water and aliment for plants. Secondly, the soil needs lime; and muscle beds are full of the comminuted fragments of shells, which are composed of that substance. Where the soil is alluvial, it is generally very fine and does not need clay; and there, air slaked lime, which may be obtained cheaply from the refuse lime of the kilns, will answer admirably—giving to the soil the elements which it requires.

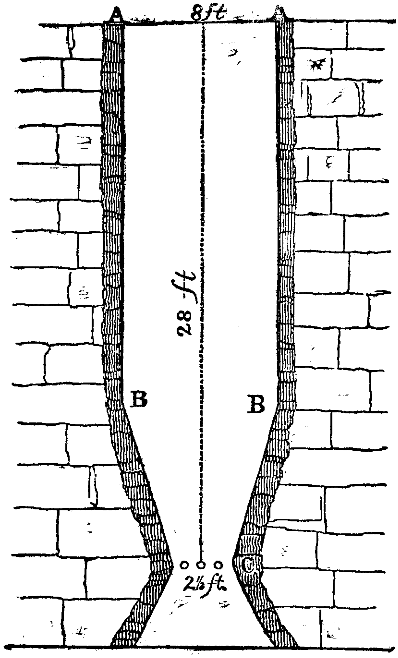
Near the marsh quarries, there is a large bog of peat, which I have described in a former Report, and which I now mention for the purpose of reminding the farmers that it may be made into a most valuable compost with lime and a small quantity of any animal manure.

The lime trade of Thomaston, has suffered from the general stagnation of business, during the past year, and but little lime would have been sold, had it not been for the new demand which has just arisen among agriculturalists in the other States, owing to the discovery made by their geological surveyors and chemists, that nearly all the soils on the sea coast from Virginia to Maine are wanting in calcareous matter. Thomaston and Camden being the most accessible ports, where a supply of this indispensable requisite to skilful farming may be obtained, it is evident that with the spreading of knowledge on this subject, will their trade revive and far exceed its usual prosperity; for the demand created by agriculture will be immensely greater than that, for architectural purposes. The introduction of the perpetual kiln, which was recommended for trial in my first Annual Report, has proved successful, and it is found that with refuse anthracite coal skreenings, lime may be burnt at a much lower rate than by the use of wood fuel. Thus the manufacturer can now afford to sell his lime at a much lower rate than formerly, and still maintain the same profit on his labor. There are now three perpetual kilns in Thomaston; one at the State Prison and two at the Shore Village, all of which have been and still are in successful operation.

The following measurements were made, of the dimensions of the State Prison kiln, which has a cylindrical body, and is contracted to an inverted cone at the bottom.

It is 8 feet wide at the top and through the body internally,
28 feet deep from top to hearth,

And $2\frac{1}{2}$ feet in diameter inside at the hearth.



Perpetual Lime Kiln, State Prison.

In this kiln the limestone and coal are laid in alternating layers, there being a fire kindled at the bottom, the whole mass of coal becomes gradually ignited, while the ingress of air is regulated at the hearth. Since the fuel burns out first at the lowest part, the lime comes down completely burned, and cold enough to handle, so that is immediately packed in casks, while new rock and coal are continually supplied above, as the charge is removed at the hearth. The latter operation is effected by withdrawing the iron bars at *o*, when the lime falls out gradually, it being supported by the Boshes B, B. The price of coal was stated to me to be $3.50 per ton, and their lime sells, packed handsomely in legal sized casks, at seventy-five cents per cask. Some lime of poorer quality, has been sold as low as sixty-five cents per cask.

The above prices are much below the actual cost of burning lime, by means of wood at $3.00 per cord, as may be seen in the statistics of my former reports; hence the perpetual kiln must eventually be adopted, since the price of wood upon the sea coast will be constantly rising. Perhaps there may be contrived some more economical methods of burning lime with wood fuel, and I formerly suggested the trial of a perpetual kiln for the purpose. If it can be so managed that the wood may be burned in separate arches, then all the ashes resulting may be saved, and will prove valuable for making potash, while the spent ashes resulting, will make an excellent dressing for the soils of Thomaston. Provided the flues of the arches communicate directly with the boshes of the kiln, the temperature produced will be amply sufficient for the burning of lime, since it only requires a full red heat of sufficient duration to penetrate the stone entirely.

In the burning of lime, there has been some difficulty in effecting a thorough and uniform calcination, without melting some of the rock, and this has been owing principally to the fact that the stone is purchased from different quarries, and used indiscriminately, while it is well known that one variety of limestone will bear more heat than another, and hence the most fusible pieces were melted into slag, if the heat was driven too far, and if not far enough then the purer rock was not thoroughly burnt, but had a core inside. This difficulty might be easily remedied by burning one kind of stone, and thus learning how high a temperature it would bear. By noting the degree of heat which each kind of limestone required, it would be easy for an intelligent workman to regulate his kilns so as to meet with uniform success.

There are several different varieties of limestone in the State Prison quarries which burn at different temperatures, and make lime of different qualities. The upper layers are striped with brown and white colors, and the brown streaks derive their colour from the presence of the carbonate of iron, which renders the lime brown when burned. The white portions are pure crystaline carbonate of lime.

It is customary now to reject the poor limestone, and to select the blue variety for burning, since that is more free from oxide of iron. The lower beds of the quarry furnish an abundance of good limestone of this kind, and it is therefore exclusively wrought at present. Having selected specimens of every variety of rock in the State Prison yard, I proceeded to re-examine the Beech-wood quarries which were formerly described. The upper strata of this limestone are colored brown and white, like those of the State Prison rock, while those lower down are blue and gray, the one being technically called hard and the other soft rock. Both these varieties make good lime, and for the purpose of making a chemical examination of such varieties as are familiarly known to the workmen, I requested one of the owners of the quarry to select the specimens for analysis.

The following results were obtained by analysis of the "hard rock."

100 grains contain,

Insoluble silica, - - -	2.8	grains.
Per oxide of iron, - -	1.2	"
Carb. magnesia, - - -	39.4	"
Carb. lime, - - -	55.6	"
	99.0	
Loss, - - - - -	1.0	
	100.0	

The manner in which the particles of limestone are aggregated, has a marked influence on the burning and slaking of the lime, for while a loose textured rock burns more easily than a compact variety, it is also liable to crumble in the fire (or burn fine as it called), and it also slakes quickly with water, which penetrates it readily. The fine grained or compact limestones burn with more difficulty, requiring a steadily continued heat, and when they are packed remain longer without crumbling. When slaked with water it penetrates more slowly, and the lime appears as if it was not sufficiently burned. In a short time, however, it begins to swell, and gradually falls into a perfectly fine powder.

The above peculiarities affect the value of lime for transportation, and the compact varieties should be selected for distant places, while that of more open texture will sell better where it is to be immediately used.

I will mention some examples of the compact limestone as illustrations.

The L'Etang N. B. rock is of this class, it being the finest grained variety that I have seen. When burned it retains its form perfectly, and for a great length of time. If moistened with water it remains for a long time cold, but after a while begins to swell and falls into a fine powder.

The compact limestone of Hope, called La Fayette lime, is of a similar character, and although pure, slakes very slowly. The dolomite limestone and the crystaline varieties are examples of the other kind, and are known under the name of hot lime.

I took the angle of direction of the limestone of the Beechwood quarry, and found the strata to run N. 65° E., S. 65° W. and dip N. W. 65°. Through the midst of this limestone there is a dyke of greenstone trap, which is two feet wide, and runs N. 60° W., S. 60° E., cutting across the strata of limestone. The strike of the columns of trap is horizontal, its cooling having been effected by the walls of limestone.

From the highest point on this quarry, I took the bearings of other localities. The great bed from the State Prison runs in a N. E. direction to Jameson's Point and Lime Island. The Meadow quarries lie to the E. N. E., two miles distant.

Goose river, in Camden, bears N. 60° E.

10th Aug. 11½ A. M., barometer 30.250, T. 74°. By two meridinal altitudes of the sun, I ascertained the latitude of West Thomaston (Mr. Ruggles' house) to be 43° 56^m 12^s N. Variation of compass 12° W. by sun's amplitude.

I revisited all the quarries at Blackington Corner, and at the Meadows, for the purpose of obtaining additional information and specimens for the institutions, provided for by law, since our first exploration of these localities. I also collected specimens of the soils for analysis, whenever it was thought the information would prove useful to the farmers of Thomaston.

One of the most luxuriant fields of wheat which I examined, belonged to Mr. Lincoln Levensaler, who informed me that he had dressed the soil with muscle mud, and about twelve loads of stable manure to the acre. For two years past, he had raised potatoes upon it, and this year had sowed it with tea wheat, two bushels to the acre. The measure of land sown was two and a half acres. The seed came from Union, and was planted the latter part of May. The crop looked extremely heavy, and since it was an example of a well cultivated soil, I took a specimen of it for analysis. (See Agricultural Geology.)

Specimens of soils were also obtained from the woods and from uncultivated fields in various parts of the town.

At Beech-wood quarries, it will be remarked that the strata of talcose slate rock, which include the limestone, dip to the N. W.; while south of Tollman's Pond, they dip to the S. E. Proceeding towards Camden, a mile from the latter place, the strata dip again to the N. W. Thus it appears that the stratified rocks of this town have been subject to various upturnings, and the appearances of the limestone shew the same effect.

On the Old Turnpike to Camden, we travel over talcose and plumbaginous and mica slate. A few diluvial scratches are seen on the recently exposed strata, and those measured run N. 5° E., S. 5° W., by the compass. In Lincolnville, there are extensive beds of good limestone, which were described in a former Report. Nine and a half miles from Belfast, we examined a hill of granite which projects through the surrounding slate rocks, but found the stone unfit for architecture.

Belfast. Latitude, by observation, 44° 26^m 7^s N. Variation of compass, 13° W. This town presents but few geological peculiarities, which have not been already described. It is founded upon that variety of argillaceous slate which is impregnated with plumbago, and is hence called plumbaginous slate. The strata of this rock have been remarkably disturbed by the upheaving forces which acted during the period of the eruption of granite. The rock forms by its decomposition a blue soil, full of small particles or scales of the slate. But the soil resting on its surface, is all of foreign origin, it being diluvial deposition, and having been swept to its present resting place from the north.

From Belfast I travelled up the Penobscot, and crossed the Ferry at Bucksport, it being my intention to examine the eastern side of the river, and to collect specimens of interesting soils and minerals.

Bucksport, situated on the eastern side of the Penobscot, is a most important point for the defence of Bangor, in case of war with any maritime power.

Having been informed that bog iron ore was found on the estate of Mr. Abner Kimball, near the north line of Orland, I subsequently examined the locality, but describe it here for the sake of order. This bog iron is a deposit of eighteen inches in thickness, resting upon a stratum of blue silicious clay. The ore is of good quality, and is in the form of pan and lump ore.

The composition of it is as follows, according to my analysis of 100 grains:

Water, - - -	17.8
Insoluble, - - -	4.0 silica.
Per Ox. iron, - -	78.2=Iron, 54 per ct.
	100.0

The quantity of ore is not sufficiently great to support a furnace, there being only an area of two rods square covered with it. It may, however, be worth the labor of digging, for transportation to some other place, where a furnace may be erected to work other ores.

The soil around the bog iron of Bucksport is charged with yellow ochre, and there is a strong chalybeate spring pouring its waters into the meadow in which the bog ore is constantly, but slowly collecting. From this ore red paint may be readily made, by heating it to redness in contact with the air, and then separating by washing and subsidence of the fine particles from water.

From Bucksport to Orrington, we pass over agillaceous slate rocks, dipping to the S. E., with valleys here and there filled with tertiary clay deposits. Next we come to strata of gneiss, dipping to the N. W. and veins of granite cutting through it, or included between the strata. On this route, we saw luxuriant fields of wheat, growing upon the clay loam of Orrington and Brewer. One of the most thrifty fields in the latter town, belonging to Mr. Thomas Barstow, attracted my attention from the uncommonly good condition of the grain; and on inquiry, I learned that the soil had been limed to some extent. The tertiary clay itself contains from five to ten per cent. of lime, and hence its fertility in crops of wheat.

EDDINGTON. Passing through this town, some interesting geological features were observed. The rocks are ledges of argillaceous slate, which is not fissile but stratified, running N. 50° E., S. 50° W., and dipping N. W. from 60 to 70°. On the surface of the rocks and in the soil, there occur boulders of conglomerate rock, or grauwacke, which I recognized as being identical with that variety which composes Peaked and Sugar Loaf Mountains, upon the Seboois river; and I have no doubt that they were brought down from those mountains, by a current of water and ice, that swept over the country in former times from north to south.

Having been informed that bog iron ore existed in the town of Argyle, and, as it was supposed, in considerable quantities, I visited that town and made the necessary examinations.

The locality in question is one and a half miles north from the house of Mr. Solomon Comstock, on a swampy tract of land granted to Waterville College, and near the Hemlock stream.

The bog iron ore, where it shews itself on the road through the swamp, is ten inches in thickness, and rests on a pan of blue clay. It is of good quality, but the quantity is too small to support a furnace, there being but a few square rods of ground containing it.

From the analysis which I have made of the specimens handed to me last year by Mr. James Childes, it appears that the ore yields,

Water, - - - - -	22	
Vegetable matter, - - -	6	
Insoluble silica, - - -	12	
Per. ox. iron, - - -	59=41 pr. cent. iron.	
	99	

Hoping that a larger deposit might be discovered, I requested Mr. Samuel Ramsdale, of Bangor, to accompany Mr. Childes, in a more extensive search of the neighboring bogs, but he informs me that he was unsuccessful.

Returning to Bangor, I made an excursion to the Pushaw Lake, where slate quarries were said to have been opened. On the farm of John Quanlan, openings had been made in two places, which disclosed the strata, which run N. 60° E., and dip N. W. 70°. The slates are not of good quality for roofing, since they split badly and are unsound.

Leaving Bangor, I travelled to Sebec, for the purpose of examining the soils, and exploring the extent and value of the Piscataquis slates. The road through Levant to Charleston, passes over one of those curious diluvial embankments called horsebacks, which extends four miles in a northern direction, coinciding exactly with that of the diluvial scratches which abound on the rocks. On each side, there are swamps filled with peat, and these low lands were doubtless ancient lakes, that have since been drained.

On the road to Foxcroft, we find huge blocks of granite, resting upon the ledges of argillaceous slate, while the surface of the latter rock is deeply cut with diluvial marks, which run N. 30° W., S. 30° E., the strata of the slate running N. 85° W., S. 85° E., and dipping S. 75°. The blocks of granite and the rounded boulders, appear to have been transported from the granite mountains, which are on the north side of Sebec Pond, for no such rock is in place between this locality and the lake.

Dover and Foxcroft, on the opposite sides of the Piscataquis river, are important and flourishing villages, both distinguished for agricultural and manufacturing enterprise. The soil is of excellent quality, bearing heavy crops of wheat and other grain, while their waterfalls drive a number of mills, which saw boards, grind wheat, and make kerseys.

In Dover, there are several valuable beds of bog iron ore of excellent quality, and I therefore spent several days in exploring their extent and in measuring the quantity, which could be depended upon to supply a furnace. On the land of Mr. Ashur Hinds, No. 4, 11th Range, three quarters of a mile south from Foxcroft Mills, and near the road, there occurs a considerable deposit of solid pan iron ore, which is from eighteen inches to two feet in thickness. It extends to the distance of 1102 feet in length.

726 " " width.

```
      6612
     2204
    7714
  -------
 2)800052 square feet area.
   400026
 ---------
Cubic feet, 1,200,078
```

This ore is composed, according to my analysis, of, in 100 grains:

Water, - -	20.	
Silica, - -	4.	
Per Ox. iron, -	73.	=50.5 per cent. iron.
	97	
	3	loss vegetable matter?
	100.	

A cubic foot of the ore will weigh about ninety-four pounds, and allowing one million cubic feet, there will be ninety-four million pounds of ore—which yielding fifty per cent., will give forty-seven million pounds of iron—or 23,500 tons. Hence this bed will furnish an ample supply to a furnace for many years.

Should this supply be deemed inadequate to warrant the erection of a blast furnace, we are enabled to point out another more extensive bed close at hand, upon the estate of Mr. Robert Rogers, of Dover, two miles west from Foxcroft Falls. This deposit occurs in a swamp, seventy rods in length and thirty-two in width, nearly the whole surface being composed of bog iron ore, covered here and there with a layer of black oxide of manganese. I traversed this swamp in several directions, and found the ore at nearly every point where we dug. It is at least two feet in thickness, but the water running into the holes while we were cutting through the pan, prevented our measuring it to a greater depth.

```
Allowing for length  1155  feet.
                      524  "  for width.
                     ----
                     4620
                    2310
                   5775
                   ------
                   605220  feet area.
                        2  "  thick.
                ---------
                1,210,440  cubic feet of ore.
```

A specimen analyzed, contains:

Water,	- -	13.
Silica,	- -	46.
Per Ox. iron,	-	33.5—or 22.8 per cent. iron.
Manganese,	-	7.5
		100.0

The compact ore is much richer.

The bog manganese, which also occurs in very large quantities, is a valuable article for bleaching by means of chlorine, which it disengages from muriatic acid, and will hereafter be required by cotton factories upon the Piscataquis. It may be used to prepare the gas, which may be employed directly, or the chlorine may be combined with lime, so as to form bleaching powder. Manganese is also a useful ingredient in making hydraulic cement, and is wanted for the manufacture of that cement from the hydraulic limestone of the Forks of the Kennebec, and of Starbord Creek, Machias.

On the farm of Mr. Robbins, in Foxcroft, one mile north of the village, there is also a small deposit of bog iron ore; which is, however, mixed with fragments of slate rock, cemented into a solid mass. The ore is however dry, and is only of importance as a contribution towards the supply of a furnace.

The bog ores of Dover will make good cast iron, and admirable water power may be obtained upon the Foxcroft and Dover Falls, for the erection of furnaces. The price of wood is from one to one dollar and twenty-five cents per cord, and charcoal now sells for eight cents per bushel, but could be made on a large scale for six cents.

Limestone required for a flux, abounds at and around the Falls.

The following is an analysis of the limestone found in large quantities on the south side of the Piscataquis, at Dover.

Slate, - - - - - -	25.4
Ox. iron, - - - - - -	4.0
Carbonate lime, - - -	70.6
	100.0

This rock is suitable for a flux for iron ores, and is also capable of being converted into good lime, for agricultural purposes. It is, however, too brown colored for plastering ceilings.

The slate of Foxcroft is of great value, on account of its extent, the goodness of the article, and the facilities for opening quarries. The most important locality is on the farm of Mr. Benjamin Leavitt, where the slate forms a hill seventy feet high above the immediate plain. The rock is perfectly sound, free from any impurities, and splits to the proper thickness required for making roofing and writing slates. It is soft enough for the latter purpose, and is wrought to small extent, for the supply of common school slates. The strata of this ledge run N. 80° E., S. 80° W., and dip to the south 85°. Slates, of suitable sizes for every demand, are easily split off, and wrought into the proper forms. The extent of slate measured by us was on the brow of the hill, in length 660 feet.

330	" width of good slate.
19800	
1980	
217800	
70	deep.
15,246,000	cubic feet of slate in the hill.
30	slates to a foot, allowing waste 10.
2)455,380,000	" one foot square.
228,690,000	slates, two feet square, in the hill

measured. Or, we may allow, nearly a million tons of slate can be obtained from this locality.

The cost of working and transportation, as I was informed by the best authorities in the town :

Four men in one day will quarry and trim one ton of roofing slate, at $1 per day, - - - -	4
Transportation to Bangor, 35 miles, at $6 per ton,	6
Cost at Bangor, - - - -	$10
Freight to Boston market, - - - -	3
Cost of slate in Boston, - - -	$13

To this we must add the interest on the cost of the quarry, tools and stock, and the wearing and loss of tools used. These items cannot of course at present be ascertained, but they will not amount to much. The slate quarries of Maine are numerous and valuable, offering ample inducements to enterprise, and will ere long be successfully wrought for the supply of the Atlantic coast.

There are many other quarries described in my former Reports, viz. at Williamsburgh, Brownville and Barnard—besides those upon the Kennebec, above Bingham and Concord.

The following valuable statistics have been furnished me through the politeness of Capt. Isaac Gage, of Augusta, who has recently visited the slate quarries of Wales.

AUGUSTA, January 1st, 1839.

Dr. CHARLES T. JACKSON,

Dear Sir :—Having during a recent visit to England, had an opportunity of examining the Penrhyn slate quarries near Bangor in Wales, I take the liberty of giving to you some of the information obtained, and the observations I have made upon them, and which, if they can be of any use to you, in illustrating the advantages to be derived from the valuable quarries in the State of Maine, and thereby induce enterprising capitalists to turn their attention to the working of them, will confer immense benefits upon the community,—reducing of the premiums of insurance, consequent upon their general use, and avoiding of those destructive fires, which so often in a night destroy the accumulations of years of industry, I shall be amply repaid. They are situated on the north coast of Wales, at the entrance of the Straits of Menai, about seven miles from the ancient town of Bangor, and at a considerable elevation from the water. They are of great extent, and are opened into the sides of the mountain amphitheatrically, and mostly open to the weather. There are about ten galleries, with breasts of about twenty feet high, which in working are always carried back upon their levels, and as nearly simultaneously as possible. Upon each of these galleries or levels, moveable iron railways are laid for the transportation upon cars of the slate rock and the waste, as it is quarried, and the rails are connected with an inclined railway, terminating at Port Penrhyn, from which the shipments are made. There are said to be employed in the quarries about 2000 men and boys, in quarrying and preparing the slates—besides those employed in transporting them to the port. There is also upon the estate, a mill for the manufacture of writing slates, monuments, tombstones, chimney jambs, mantle peices, tanks, pavements, &c. &c., making in all probably not less than 2500 persons employed in giving value to a material, which in its native bed is of but little or no value; besides the employment of tonnage in transporting it to almost all parts of the world. There are generally from twenty to thirty vessels, in the shipping season, waiting for cargoes. The production of the quarries is estimated at about 200 tons per day, through the year; they are the property of a Mr. Pennant, a gentleman of the highest estimation, who devotes the large income derived from them, in improving their productiveness, and in ornamenting his estates. He has converted the half savage and turbulent Welch mountaineer into the peaceable and quiet laborer and agriculturist, and spread comfort and happiness over his wide domain; and from the ready market, afforded at the quarries, for its agricultural products, the soil has been converted into a perfect garden. The net annual income from these quarries is said to be on an average of £70,000 sterling: or $336,000. The slates are sold, delivered upon the wharf, at Port Penrhyn—the imperials or largest size, at 50s. per ton, equal to $12.00; and the next smaller sizes, of an equal quality, and in equal quantities of each, at an average of about $10.00. The other inferior sized roofing slates, which are more generally used, are sold by the thousand of twelve hundred, and weigh per thousand from 66 cwt. to 13 cwt., and varying in size from 24 by 12 inches to 11 by 5½ inches—the first five and best sizes averaging $10 per ton; and the next four sizes, which are not often exported, $5.50. To these prices, are to be added the shipping charges, freight, insurance, commission, &c. &c., altogether amounting to quite one half the above largest sum—to say nothing of the breakage—and to all of which must be added the merchant's and dealer's profits; so it may be quite safely calculated, that slates cannot be ever imported into the United States, (when the duty of nearly twenty-five per cent. is added,) and sold for less than twenty-five dollars per ton. These quarries are probably better situated for shipping to the United States, than any other in Europe; and upon viewing the subject, in all its bearings, one cannot but come to the conclusion, that if the working of some of the slate quarries in Maine were commenced, upon a scale commensurate with their importance, and the great and increasing demand for the article, and conducted with ordinary skill and economy, that from them the whole coast of America, and much of the interior, especially of New-England, would be supplied ; and it could hardly fail of paying to the proprietors large and permanent dividends, and leave them with a property constantly increasing in value.

The people employed in quarrying and preparing the slate, are generally paid by the piece, or receive the price of a certain proportion of the current value of the articles prepared—consequently their emoluments depend upon their industry. From their appearance, I should think they were better paid, fed and clothed, than the operatives in the manufacturing districts in England, with the exception of the workers in iron, who, as you are aware, generallv receive higher wages than most other laborers.

I remain, respectfully,
Your ob't serv't,
ISAAC GAGE.

Dover Falls measured near the Kersey Factory of the Piscataquis Manufacturing Company, have a perpendicular fall of 20 feet 9 inches. In the factory there are manufactured some of the strongest and best kerseys, and they are mostly drab colored.

Opposite the factory on the borders of the stream, there is a large cavern 25 feet in depth, which the action of water and ice has excavated in the slate rocks. The slate is filled with veins of calcareous spar, and is itself higly calciferous. The rock is stratified, and the strata run nearly E. and W., and dip 85° S.

Foxcroft Falls have a perpendicular pitch from the dam, of 14 feet. Upon these falls there is an extensive mill for purifying, grinding and bolting wheat for flour, the mill having besides an excellent winnowing apparatus, and three sets of stones for grinding. They belong to Mr. J. Bradbury, who informed me, that in the months of January, February and March last, that he ground in this mill no less than 6000 bushels of wheat, besides large quantities of other grain, and in 9 months he received the value of $1000 in tolls. I mention the above facts, to show the amount of grain produced and consumed, in this immediate vicinity.

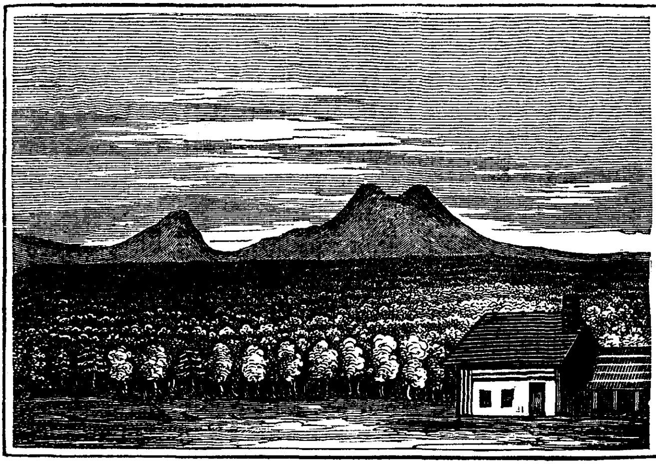
The rocks at the falls are calciferous slate, filled with veins of calcareous spar, and the obstruction caused by their outcropping edges produces the falls on the river. Beside the above mentioned water privileges, there is another good site, upon which a furnace ought to be erected for smelting the iron ore. It is upon the Eastern side of the stream in Dover, and there a water power of 14 or 15 feet fall, may be readily obtained for the purpose.

Another locality of roofing slate has been discovered upon the estate of Mr. Amos Morse, 6 miles N. E. by E., from the village of Sebec. The strata of slate run N. 80° E., S. 80° W., and dip to the north.

Since quarries have not been opened, it was difficult for me to judge so well of the workable quality of the slate, but it appears to be of good quality, and the slabs which we removed split very well.

Another locality of slate is found near the Sebec Pond, one hundred rods from the town line; but since no excavations have fairly exposed it, Mr. Morse thought it would be impossible for me to gain any satisfactory information by visiting it, as the outcropping edges do not shew its quality. The latter locality has been sold to Mr. E. Smith, of Bangor.

From the high land of Foxcroft, we have a view of a remarkable mountain in Elliotsville, called the Borestone Mountain. It bears so striking a resemblance to the form of Mt. Vesuvius, in Naples, that I made the following sketch of its outlines.



Borestone Mountain, Elliotsville, bearing N. N. W. from Leavett's Slate quarry in Foxcroft.

I was enabled to obtain some agricultural statistics, in Dover, from several farmers, and present the following facts:

On the land of Nathaniel M. Stephens, one acre of land, planted with two bushels of bald wheat, gave him a product of thirty bushels. He thinks that the bald wheat does best on ploughed land, and the bearded wheat on burnt land.

Mr. William S. Mayhew planted one and three quarters acres of land with two and a half bushels of bearded wheat, and raised forty bushels.

The above data shew that the soil of Dover is luxuriant, and capable of producing heavy crops of grain; and it is evident that the occurrence of carbonate of lime, as one of its components, is the cause of its remarkable fertility.

Guilford. On the estate of Mr. Joseph Kelsey, two acres of land were planted with six bushels of oats, and sixty bushels to the acre were raised. No manure was used, but the soil was broken up the year previous and planted with potatoes.

The same farmer also planted five acres of land with nine bushels of wheat, and raised one hundred bushels—or twenty bushels to the acre. The Hessian fly and weavel damaged the crop, or it would have been much larger.

His field on the opposite side of the road, was last year treated with plaster of Paris, as a top dressing; and on half an acre of the land, he planted one bushel of wheat, the produce of which was thirty bushels. From this fact it will appear that gypsum exerts a beneficial influence on soils containing a very little lime distributed in clay loam.

The rocks of Guilford are argillaceous slate, with beds of limestone of a blue color. The strata run N. 88° E., S. 88° W., and dip south 80°—the limestone occurring in alternating strata with the slate rocks, in layers which separate when the rock is struck with the hammer. It may be burned for agricultural and ordinary use. It occurs on the river's banks in inexhaustible quantities, near a little island in the stream, while there are now a sufficiency of loose blocks in the bed of the stream to make several kilns of lime. There are also thin strata of limestone one hundred rods north of the meeting house. The limestone on the river, analysed, is found to be composed, in 100 grains, of

Insoluble slate, - - - -	13.8
Per Oxide of iron, - - - -	1.4
Carbonate of lime, - - -	84.8
	100.0

From the above analysis, it is evidently a strong and good limestone, and may be profitably burned, since wood costs but seventy-five cents a cord, and the expense of transporting lime from the sea coast is so high as to forbid its use in agriculture.

The following estimate will shew the cost of burning 100 casks of lime:

Labor and blasting the rock, 10 cents per cask,	$10.00
Wood, ten cords at 75 cents, - - -	7.50
Attendance on kiln, two men four days, -	8.00
Per 100 casks in bulk, - - -	$25.50
One hundred casks at 20 cents, - - -	20.00
Cost of 100 casks of lime, - -	$45.50

Or 45 cents per cask, packed.

The refuse slabs from the saw-mill on the stream, may also be advantageously used in burning the lime, and they cost but fifty cents per cord.

Guilford Falls are also the sites of several manufacturing establishments, there being carding, clothing, shingle, clapboard and saw mills, besides a tannery. The fall of water is about six feet perpendicular pitch. Boulders of grauwacke with terebratulæ three feet in diameter, of diluvial deposition, occur in the river.

Elliotsville, twenty miles north of Guilford, furnishes a solid and good slate for the manufacture of tombstones; and Mr. Thompson, of Guilford, has an establishment where they are wrought extensively. At his shop, I saw slabs of this stone from four to five feet wide, and eight feet long, but engagements on another section prevented my visiting the quarry.

Travelling from Guilford to Parkman, we noted a great number of diluvial scratches upon the surface of the slate rocks. The grooves run N. 5° W., S. 5° E., while the strata run nearly east and west. The same direction in the grooves was also observed to be constant on the road to Dexter, excepting on the high lands, where they run N. 15° W., S. 15° E.

Dexter is a pretty village, situated on the eastern head branch of the Sebasticook stream, and is distinguished for its manufacturing and agricultural enterprise. On the river there are a number of manufacturing establishments. The Kersey factory, when in full operation, employs sixty-seven persons, thirty-five of whom are females. It has 1050 spindles in spinning jacks, and twenty-four power looms. At the time when I visited it, but eight looms were in operation, and but seventeen persons employed. This establishment belongs to Messrs. Cutler, Farrar & Co. An extensive tannery and several mills, are also situated upon the stream.

Near the factory there is a deposit of ochreous yellow oxide of iron, that is continually deposited by a strongly charged chalybeate spring, which comes out in the meadow. It is too small in quantity to be used for other purposes than for paint, while the mineral spring is a good tonic medicine, useful in some disorders of the digestive functions.

While at Dexter, Mr. Simeon Safford shewed me some specimens of lead ore, which had been found upon the estate of Mr. Charles Jennings, near the south line of the town; and accompanied by him and several gentlemen of Dexter, I visited and examined the locality. The ore was discovered accidentally, in digging a well in slate rock charged with veins of quartz. On examination, it was found that the ore occurred in one of the veins of quartz, associated with iron pyrites, ochreous oxide of iron, black blende or sulphuret of zinc, and sulphuret of copper and iron. The vein at the top of the well is but eight or nine inches wide, and it widens in descending twelve feet to the width of two feet. The ore contained in the vein is from one to three inches wide, and is quite irregular. It runs N. 70° W., S. 70° E., and dips 40 or 50° to the southwest, following all the irregularities of the quartz vein. Associated with the ore, there occurs an abundance of green talc, which is very soft and flaky when first obtained, but hardens on exposure to the air. On examining the slate strata which form the wall rock in the well, they were found to be much contorted, shewing great disturbance at the epoch of their elevation. The general dip is to the south, but could not be measured owing to the contortions.

From the evidence which I was able to obtain, it would appear that a similar vein of lead ore runs through Corinna, and comes out near the house of Mr. John Bigelow, two and a half miles south, or at Mr. James Couland's, six miles and a half southeast from Mr. Bigelow's.

Having obtained all the information which I could on the spot, I cut out a number of specimens from the vein, and subjected them to chemical examination by cupellation, for the purpose of ascertaining whether any silver was contained in the galena. Five grains of it cupelled before the blow pipe, gave a very distinct globule of silver, which by estimation, was equal to $\frac{1}{500}$ the weight of the ore. This is, then, a very rich argentiferous galena, and if larger veins should be discovered, might be profitably wrought for silver, the lead being at the same time converted into litharge. It is not worth the labor to work the present small veins, but I would request those who reside in the vicinity to examine every vein that may in future be discovered; for there may perhaps be one of sufficient width to work profitably, since every 500 pounds of the ore will give a pound of pure silver. I would not, however, advise sinking shafts into the rock, for such researches would prove expensive—it being only necessary to be attentive to those excavations, which may be made for other purposes—such as cellars and wells, sunk down to the rock, excavations on roads, &c. If the ore is found, it will be discovered in the quartz veins, associated with yellow ochre and blende.

Another discovery which we were able to make, will prove of great value to all the citizens of Dexter. It is the existence of immense beds of good limestone in that town. On the estate of Mr. Crowell, there is a very extensive bed of good limestone, which is of a blue color and occurs in regular strata running N. 85° E., S. 85° W., and dip S. 80°. This locality is favorably situated for working, and the stone, on chemical analysis of 100 grains, gives the following results;

Insoluble slaty particles, - - -	8.6
Oxide of iron, - - - - -	1.4
Carbonate of lime, - - - -	90.0
	100.0

It bears a full red heat, and makes a very good and strong lime, which slakes well, and will answer for all ordinary purposes.

We found also another important locality, upon the estate of Mr. Fish, where the limestone is of a blue color, with veins of calcareous spar, and is imbedded or inter-stratified with calciferous slate. By chemical analysis, I find it to be composed, in 100 grains of the blue rock, as follows:

Insoluble slaty particles, - -	9.6
Oxide of iron, - - - -	1.2
Carbonate of lime, - - -	89.2
	100.0

This is also a good limestone, and will burn like that just described.

Another bed of limestone occurs on the farm of Mr. L. Pullen. It is a blue compact limestone, inter-stratified with the strata of slate. By chemical analysis, I find it to be composed of

Slate, - - - - -	20.0
Oxide iron, - - - -	1.8
Carbonate lime, - - -	78.2
	100.0

This is not quite so rich as the former varieties, but still burns well and makes a light brown lime, that slakes nearly white.

On the farm of Mr. John Puffer, there also occurs a similar limestone, composed of

Slate, - - - - -	14.4
Ox. iron, - - - - -	1.6
Carb. lime, - - - -	84.0
	100.0

Estimate of the cost of burning 300 casks of lime, at Dexter:

Labor in blasting and breaking the rock, 10 cents per cask, - - - - - -	$30.00
Thirty cords of wood, at 80 cents, - -	24.00
Attendance on kiln—packing and discharging the kiln included—three men five days, at 1.00,	15.00
Cost of 300 casks of lime, in bulk,	$69.00
Three hundred lime casks, at 20 cents, -	60.00
Cost of 300 casks of packed lime,	$129.00
Or for one hundred casks, - - -	$43.00

which is 43 cents per cask—or in bulk, 23 cents per cask for lime.

If but one hundred casks are burned at a time, the cost of lime in bulk, will be 26 cts., or 46 cts. in the cask. Thomaston lime, at Dexter, costs two dollars per cask, and a considerable proportion of the lime is sifted out through the staves, by transportation over land from Bangor. It is evident, then, that it is far cheaper for the people to burn the lime which they require from their own rocks, than to depend upon a supply from distant places; and it would be altogether impracticable there, to afford the use of Thomaston lime for agricultural purposes, since so large a quantity is needed.

I obtained some agricultural information in Dexter, which is here recorded.

On the farm of Mr. Benjamin Green, three acres of land, ploughed and dressed with barn yard manure, was planted with four and a half bushels of wheat, or one and a half bushels to the acre—the seed having first been steeped in a solution of blue vitriol, containing one ounce to the quart of water, and then dried by rolling the seed in slaked lime. Crop raised, forty bushels to the acre, last year. Supposes that he shall obtain but twenty-five bushels to the acre, this season. He thinks that lime decidedly prevents smut in wheat, but is doubtful as to the effect of blue vitriol. He tried a field with wheat rolled in lime, and wheat not so treated; and the former was destitute of smut, while the latter was troubled with it. (For analysis of soils, see the Agricultural section.)

Dr. Burleigh informs me that there is an extensive granite quarry near the S. W. corner of Ripley and N. W. corner of St. Albans. It forms a mountain mass, and is easily quarried for the supply of the neighboring towns, but it is too remote from navigable waters for distant transportation.

Corinna. Passing through this town, I remarked that an abundance of erratic blocks of granite, rounded masses of grauwacke, with fossil shell impressions, occured in the soil, while the ledges are uniformly composed of argillaceous slate. The soil appears to be good, sugar maple, yellow birch and ash trees being abundant and thrifty.

SKOWHEGAN. Returning to this place, I collected some additional specimens of limestone, and learned some interesting facts respecting the tertiary clay, which there contains remains of marine shells. They have been found at Mr. Philbrook's pottery, 30 feet above the river's level.

They also occur in Vassalboro', and were discovered in digging a well near the house of Capt. Wm. Reed, in that town, being 50 feet above the Kennebec River, and 29 feet below the surface of the earth. These are probably the highest limits of the ancient tertiary sea, which does not appear to have covered the State of Maine, more than to the depth of 150 feet beyond the present tide waters rise.

Returning to Augusta I met the assistants who had been sent to explore the Androscoggin section, which I afterwards reviewed with them, and continued a measured section to the Megalloway River.

Returning to Portland after repairing my barometer, I again compared the instrument, with the stationary one kept by Mr. Solomon Adams, of Portland, and then set out on the sectional tour, through that great tract of country watered by the Androscoggin River.

Sept. 11th. The surveys which I proposed to make on this section, were to measure the rise and fall of the land, the distances from the several points, and the situation of the great rock formations, as we crossed them at the northwesternmost corner of the State. At the same time we collected all the minerals, fossils, specimens of rocks and soils, required for a full illustration of the subject.

From Portland we went to Westbrook, where there is a very interesting deposit of fossil shells, several of which belong to extinct species. They characterize the lower tertiary clay of Maine, and in a scientific point of view, throw great light upon the ancient history of the earth. The draftsman was directed to make a sketch of the locality, while we collected the specimens required, and measured the height of the spot. The locality in question is the slide of the Presumpscot, a little north of Pride's bridge, in Westbrook. This bank of clay and soil slid down into the river, and so obstructed its course as to turn it back upon itself, while the water was stopped off from below. At length, the waters burst the barrier, and after sweeping off several acres of an adjoining field, made for itself a new channel. Owing to the manner in which the slide took place, the clay is thrown up in curious winrows, and the small trees, which formerly stood perpendicularly upon it, were inclined towards the river at a considerable angle.

In the clay we found a great abundance of ancient marine shells, the most abundant species being one described by Professor Hitchcock, under the name of the nucula portlandca, and another species of that genus, described by Dr. Gould. Besides the above, there occur an infinity of corbulas, mactras, sanguinularios, and clams or mya mercinarina and mya dehiscens. Also the bucklers and claws of crabs.

WINDHAM. In this town, near the bridge, I found an abundance of mica slate rocks, filled with large crystals of staurotide, also large detached blocks of granite, containing a rare mineral called spodumene, it being one of the minerals containing the new and fixed alcali, lithia. Crystals of garnet also abound.

A mass of cyanite is said to have been found in this town, but we could not learn where it occurred, and there was none in any of the rocks *in place.* The rocks from Portland to this place, are first talcose slate, then mica slate and granite gneiss—and they all dip to the southeast.

RAYMOND, on the borders of Sebago Lake, was our first stopping place for the first day's route. Here we proposed examining an iron mine of some note, and to explore the vicinity for other useful minerals. In the evening, I took astronomical measurements for the latitude and variation of compass. By two observations of N. and S. stars, the latitude of Raymond is N. 43° 57^{m} 26^{s}.

Specimens of magnetic iron ore, from Davis' Hill, in Raymond, having been sent to me for analysis, I was desirous of examining the locality where it was found, for the purpose of ascertaining whether a sufficient quantity of the ore could be obtained to render it of economical value. At my request, several gentlemen of Raymond accompanied me to the spot, which is a mountain situated in the northeast part of Raymond, six miles from Sebago Lake and three quarters of a mile northwest from the head of Great Rattle Snake Pond. The land belongs to Messrs. John and Valentine Davis, who had made some exertions to ascertain the value of the ore, and cheerfully aided me in my examination of the locality. The hill is an abruptly precipitous mass of rocks, covered with a scanty soil, bearing a few small forest trees, and attains an elevation of 371 feet above the level of Rattle Snake Pond. The rock which contains the iron ore, is a huge bed of green epidote rock, containing also many scattered crystals of black hornblende, and the iron ore occurs in sheets or veins, closely implanted, measuring from one to four inches in thickness. They are closely attached to the rock, and were evidently formed at the same time with it, since they are so intimately blended. Owing to this close attachment, it is difficult to extract the ore without quarrying out large portions of the matrix, which in working should be broken off, so as not to encumber the furnace with useless matter.

There is evidently a sufficient quantity of the iron ore in this mountain to supply a blast furnace, but it will cost much labor to extract it from the rock. I would not, however, abandon the locality, without making a trial of the quantity of picked ore, which a laborer can blast out and clean for the furnace in a day; for if it should prove that one man can earn fair wages at the work, as many hands can be employed as might be required—for there is ample room on the face of the cliff for all the laborers that might be necessary, since the bed is nine rods wide, and exposes the iron ore along its whole breadth. By chemical examination, it appears that the ore will yield, when free from the rocky matrix, seventy per cent. of iron, and I should think that, picked as clean as might be required, it would give about fifty per cent. of cast iron, if wrought in the blast furnace. Should a less expensive investment be required, a bloom forge might be erected, and I have no doubt but an ample supply of the ore could be obtained to keep it in operation. Compact magnetic iron ores like this, work more easily in the forge than they do in a blast furnace, for they are so heavy as to overload the latter. In case a forge should be erected, it will be necessary to break the ore small before throwing it upon the fire, and if it is first roasted it will crush more readily. It may also be completely picked from its gangue, by means of a rotary wheel, made up of horse-shoe magnets, as is done at some of the furnaces in New Hampshire. Water power may be readily obtained near the hill, by means of a dam thrown across the stream from Dumpling Pond; a head of ten or fifteen feet of water being, as I am informed, easily produced by this means.

Wood on the spot is worth seventy-five cents per cord, delivered, or twenty-five cents per cord for standing trees, and fifty cents for cutting and hauling to foundry. Limestone abounds in the town of Poland, six miles from this mine, and may be obtained for a flux in smelting the ore.

Transportation to Portland costs four dollars per ton, for ordinary merchandize; but the iron, being less bulky, could be carried for a less price. It may be carried upon the canal, by hauling it six miles to Sebago Lake; or in winter, it may be transported upon sleds.

From the above elements, any iron master can readily calculate whether it would be profitable or not for him to work the Raymond iron ore.

Returning to Longley's tavern, in the village of Raymond, I took several observations to determine the latitude of the place, and the variation of the compass needle, north and south stars being alternately observed. Lat. $43^{\circ}\ 57^{m}\ 26^{s}$ N. Variation of magnetic needle, $9^{\circ}\ 45^{m}$ west from the true meridian.

14th Sept. There was a most magnificent exhibition of the Aurora Borealis, which shot up in splendid coruscations from the northern horizon to the zenith, causing a sensible deviation in the magnetic needle. Barometer, 7 P. M., 30.113, T. 64° F.

15th Sept., 7 A. M., 30.120, T. 61° F. I also made several excursions in the vicinity, and found a dyke of red compact felspar porphyry, ten feet wide, intersecting granite and running N. 60° E., S. 60° W. It contains brilliant crystals of iron pyrites, scattered through its mass. Two dykes of greenstone trap, one four and the other six feet wide, cut across it, and run N. 75° E., S. 75° W. They occur near the mill on the side of the brook. It is evident from this instance, that both the porphyry and trap were injected from below and through the granite rocks, and that the porphyry was thrown up first and was subsequently cut through by the intrusion of the trap—results which conform to the theory of their origin, which I have long since proved.

Sebago Lake is a thoroughfare and feeder of the Cumberland and Oxford Canal, and there are between the lake and the sea twenty-six locks of nearly ten feet each, making the fall equal to 255 feet, according to the statement of Mr. Longley.

17th Sept. Leaving Raymond, we visited Otisfield and Oxford, on our way to Paris, where I calculated to make some observations of the annular eclipse of the sun, that was to take place the next day. Owing to this circumstance, I was unable to stop long enough in Otisfield to make any extensive researches. I remarked, on the road from Raymond to this place, that the rocks were uniformly granitic, and the soil originated from the decomposition of a similar rock. Numerous picturesque views of lakes and mountains present themselves on the right, which repay the traveller for journeying over the irregular and rocky road, which is very hilly as we approach Oxford.

Directly in front of the meeting-house, in Oxford, there is a curious loose granite rock, cut through by numerous dykes of greenstone trap, presenting a very striking contrast of colors.

Oxford is an irregularly built village, seated in a valley, amid an amphitheatre of hills.

18th Sept., 7 A. M., barometer 29.710, T. 52° F., at Harris' tavern. Set out for Paris Hill, passing over the little Androscoggin in the South village, where there is a satinet factory and flour mill, the machinery of which is moved by the waters of the stream, and arrived on Paris Hill in season to take a meridional altitude of the sun, preparatory to our observations of the solar eclipse. 18th Sept., noon—baromter 29.210, T. 72° F. Latitude, by meridional altitude of sun, 44° 7^m 59^s. Having carefully adjusted the Kater's circle, I watched for the moment of the first contact of the solar and lunar discs, the watch being regulated to Portland mean time.

The moment of first contact was 3 h. 28^m 30^s, by watch. At 3 h. 32^m 50^s, sun's lower limb, apparent altitude 25° 40^m. 3 h. 54^m 50^s, sun's upper limb, apparent altitude 22° 45^m 30^s. 4 h. 14^m 14^s, sun's upper limb, apparent altitude 20°.

Mean of times, 3 h. 31^m $32^s.5$. Mean of the altitudes sun's lower limb, 25° 53^m 15^s.

Time calculated from the above observations was, P. M. 3 h. 37^m 28^s, for apparent time—and for mean time, 3 h. 31^m $31^s.58$.

Watch, -	3 h. 31^m $32^s.50$
Mean time,	3 31 31 58
	0 h. 00^m $00^s.92$ difference—watch fast.

Time by watch regulated to Portland mean time—

P. M.	3 h. 28^m 30^s, first contact lunar and solar discs.		
"	3 30 15 appar. alt. sun's lower limb,	26° 6^m 30^s.	*Bar. 29.140,
"	3 32 50 " " " "	25 40 00	Ther. 21° ct.
	3 h. 31^m $32^s.5$ mean of times.	25° 53^m 15^s mean of altitudes of sun's lower limb.	

Apparent altitude sun's upper limb—

P. M.	3 h. 54^m 50^s, -	22° 45^m 30^s.	Bar. 29.130, T. 69° F., t. 19°.5 ct.
"	4 h. 14^m 14^s, -	20 00 00 .	" 29.120, T. 68° F., t. 19° ct.
	4 h. 04^m 32^s,	21° 27^m 45^s mean of alts. sun's lower limb.	

* Time calculated from apparent altitude sun's lower limb.

Apparent time,	3 h. 37m 28s.	
Equation of time,	5 46 .42	
	3 h. 31m 31s.58	mean time at Paris.
Watch,	3 31 32 .50	
	0 h. 00m 00s.92	watch too fast.

Time of first contact of sun and moon's discs at Portland, as observed by Messrs. Senter and Adams, - - - - -	3 h. 28m 28s.90
Observed by me at Paris, - - - - -	3 28 29 .03
Later, - - - -	0 h. 00m 00s.13

Leaving Paris, we travelled through Woodstock to Rumford, passing over a very hilly road, from which many magnificent views of mountains, lakes and streams, may be seen. As we descend from Paris Hill, we come to a small stream, on which there is a saw-mill. At the level with its waters, the barometer stood, Sept. 20th, 11½ A. M. 29.87, T. 65°. Ascending from this point to the summit of a high hill, over which the road crosses, barometer stood 29.351, T. 69° F. Rise of the hill from the stream, 560 feet. From this eminence a number of beautiful sketches were made by Mr. Devereux. Paris Hill is seen to the southeast, nearly on a level with this place. Above it, to the eastward, is Streaked Mountain, and farther to the left, the mountains of Hebron. Speckled Mountain, in Peru, presents its lofty and abrupt escarpment to the N. N. E. Indeed, the whole landscape to the eastward, is truly magnificent, composed of heaving masses of lofty mountains of granite, with thickly wooded valleys, and here and there scattering houses relieve the wildness of the scene. The maple and birch trees had put on their gay red and yellow foliage, giving a most picturesque effect to the whole view.

Woodstock is wholly underlaid with granitic rocks, rising into large rounded mountains. On the hill, at noon, barometer 29.154, T. 68° F. Hence this point is 184 feet above Paris Hill. The granite rocks are here marked with diluvial furrows, running N. 20° W. Several trap dykes cut through the granite, and run N. 37° E., S. 37° W. They are from one to two feet wide. But few interesting minerals were found on this route. Plumbago occurs in the gneiss and mica slate, resting on the flanks of the granite mountains, and here and there a little limestone presented itself, imbedded in similar rocks.

RUMFORD, 20th Sept. 6¼ P. M. At the hotel, near the bridge, barometer 29.610, T. 58° F. In the evening, took meridional altitudes of north and south stars, for the purpose of obtaining the latitude of the place. North star, (Polaris) at 10 h. 31^m 30^s; apparent altitude 45° 44^m; bears N. 11° 30^m E. Variation 11° W. Latitude, by calculation, 44° 30^m 10^s N. Alpha Aquilæ at meridian, apparent altitude 53° 59^m. Latitude calculated—44° 29^m 45^s N.

44°	30^m	10^s	by Polaris.
44	29	45	" A. Aquilæ.
2)88	59	55	

N.44° 29^m $57^s.5$ mean lat. of Rumford (Wardwell's) hotel.

Between Rumford and Woodstock, there are high ridges of land a mile or more long, called Whalebacks, and appear to be diluvial embankments of granitic soil.

On the estate of Mr. David Holt, in Woodstock, there is a hill composed of granite and mica slate rocks, and large masses of plumbago are scattered through the latter rock. They are, however, very difficult to extract, and hence are of but little value. The granite rides over the mica slate on the southwest side of the hill, and the plumbago is found at point of contact of the granite and mica slate, in veins and nodules from one to three inches wide, and from three to six inches thick. Near the house, there occurs a little poor limestone, not pure enough for burning.

A hill of granite, to the south of this place, presents lofty cliffs, attaining a perpendicular elevation of three hundred feet above the immediate base.

The soil in the valley, is of a dark brownish color, and is of good quality, bearing a native forest of fine rock maple trees. It is evident that the disintegration of the neighboring limestone, contained in the rocks, has enriched the soil with lime, and hence its fertility.

From the maple forest, Mr. Alonso Holt has obtained, during the past spring, about three hundred pounds of good sugar, besides a considerable quantity of molasses. He tapped about 200 hundred trees, and says that a barrel of sap yields seven or eight pounds of sugar.

The Paint Mine, as it is called, demanded our attention, and accompanied by several intelligent and public spirited citizens of Rumford, we visited it, to examine its nature and extent. The locality in question, is upon the estate of Mr. Samuel Luffkins, three miles north of the village of Rumford. It is on a hill-side, where a mineral spring, issuing from the rocks, has deposited a conical heap of the ochreous red oxide of iron, amid a clump of trees. The paint is capable of being wrought advantageously for the manufacture of red ochre, since the quantity is large, and it is constantly forming by gradual deposition from the water of the spring. It may be rendered of a very bright red, simply by the process of roasting it—and then it may be rendered fine by levigation with water, or by sifting.

Since it was evident that a deposit of oxide of iron had been taking place here for ages, I thought it probable that a sufficiency of bog iron ore might have collected in the lowlands around, and on exploration I found such a bed, the least dimensions of which are as follows:

Length 450—width 90 feet—depth 2 feet:

$$450 \times 90 \times 2 = 81,000 \text{ cubic feet.}$$

A cubic foot of this ore will weigh 99 pounds:

$$81,000 \times 99 = 8,019,000 \text{ pounds.}$$

And it yields 50 per cent. of iron:

$$8,019,000 = 4,009,500 \text{ pounds.}$$

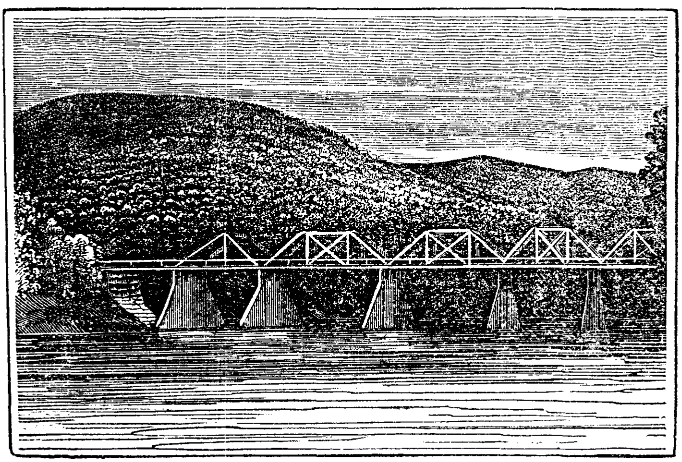
Or about 2,004 tons of iron, and would supply a small blast furnace about ten years, allowing that it was worked six months in the year. Other deposits of similar ore, will be discovered in the vicinity—when large works may be set up. Charcoal may be obtained in any quantity desired for six cents per bushel.

The composition of the Rumford bog iron ore, by my analysis, is as follows:

Water,	- -	15.5
Vegetable matter,		6.5
Silex,	- -	3.0
Per. Ox. iron,	-	75.0=pure iron, 51.97 per ct.
		100.0

It will yield fifty per cent. of iron, in the blast furnance, and will smelt easily, making good cast iron. Other ores of iron are said to occur in the neighboring mountains, but we were not fortunate enough to discover them. Bog ores do occur in the adjoining towns, as will be seen in the sequel.

Rumford is a very picturesque spot, surrounded by rugged granite mountains, amid which the beautiful Androscoggin winds its devious way. The bridge which crosses this river is similar to some of those which occur in the old states of Europe, and although not of the best style of architecture, still gives a pleasing effect to the landscape. The following sketch, furnished by Mr. Devereux, will give an idea of that place.

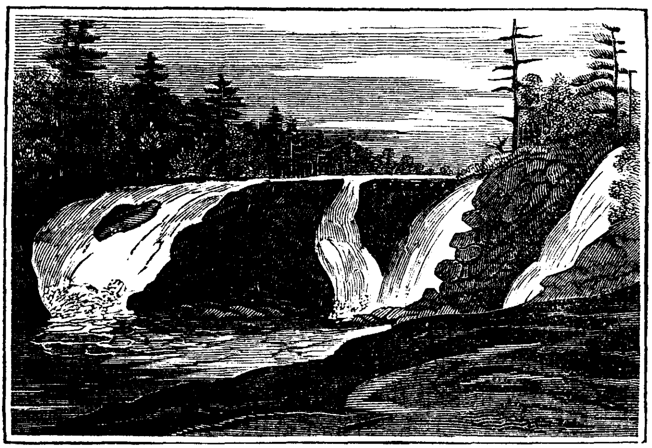


View of Rumford Bridge, Androscoggin River.

Rumford Falls are produced by the bounding waters of the Great Androscoggin, as they sportively leap over abrupt and craggy ledges of granite rocks, and dash their spray high in air. This spot presents some most picturesque scenery, and many facts of scientific importance.

There are at present three or four water falls at this place, while anciently there must have been others of greater magnitude, for deep holes are seen worn high up on the rocky banks, where the waters never ran in modern times. Now the whole descent is divided into two principal and two minor falls—the first two being from six to ten feet—the middle, seventy feet perpendicular—and the fourth, twenty feet; while the whole pitch is estimated at 180 feet. It is the middle fall, however, that will attract the attention of the traveller, for there the torrent of water pouring down with the noise of thunder, and dashing itself into foam as it chafes the rocky walls, produces an effect full of grandeur.

From below this cataract, our draftsmen obtained the following sketch, which is here represented by a small wood cut.



Rumford Falls, Androscoggin River.

To the geologist and mineralogist, this locality will also prove instructive, for there are many curious, beautiful and useful minerals, found in the rocks.

On a point just below the great falls, there is a bed of granular limestone, which was examined by my assistants, on a former occasion, but which still afforded me additional information. This bed is of a coarse granular or crystaline variety of carbonate of lime, containing scattered green crystals of actynolite and pargasite, in small grains and fibres. The limestone is included between strata of mica slate rocks, which are greatly contorted by the power of the up-thrown granite, which cuts through its mass. Thus it will be seen that the granite veins have torn off masses of the limestone and mica slate, and swept them up to higher places than they originally occupied, while the disturbed appearance of the strata themselves evince most clearly the action of an injected igneous rock. A variety of crystallized silicates of various kinds, are found in the poorer limestone beds; and observing their resemblance to similar productions of the Phipsburg limestone, I searched and found a number of those rare minerals which I had formerly discovered at the latter locality. Yellow garnet, massive and crystallized—egeran—pyroxene, of several species and varieties—such as the sahlite, augite and pargasite. Phosphate of lime, of the variety called asparagus stone, &c. occur, with a few scattered crystals of scapolite. Limestone is, however, the most important substance which occurs, and there is a sufficiency to supply the demand which may arise for many years. Some of the beds are ten feet in thickness, excluding the interfoliated masses of rock which they contain. I should estimate the quantity of lime that may be obtained here at 100,000 casks, and it is easy to quarry and burn. In order to bring it to land, it will be needful to make an inclined plane of timber, like those used in saw-mills, and the machinery of the saw-mill immediately above will drag the rock to the bank where it is to be burned. Wood is cheap and abundant, but refuse slabs of the mill are the cheapest and best fuel for the burning of lime.

Estimate of cost of 100 casks of lime:

Quarrying and hauling to bank, 15 cts. per cask,	$15.00
Breaking rock, packing and discharging kiln, 10 cts,	10.00
Three days attendance on kiln, two men, - -	6.00
Ten cords of wood, at 75 cts. - - - - -	7.50
Cost of lime, 100 casks in bulk,	$38,50

One hundred casks, at 20 cents, - - - -	20.00
Cost of 100 casks of lime packed,	$58.50

Or 38½ cents per cask in bulk—58½ cents per cask, packed.

The result will not vary much from this estimate. Place against it the present price of lime at Rumford, and it will be seen how great a saving may be made by burning this limestone.

I beg leave also to remark that the rock is very pure, and makes strong lime of good quality, but at the same time observe that some of it will burn fine, or crumble in the fire. By chemical analysis, I find this limestone to contain, in 100 parts:

Insoluble green crystals, - -	20.8
Oxide of iron, - - - - -	1.2
Carbonate of lime, - - -	78.0
	100.0

Burns fine in part, but slakes quickly and makes a strong white mortar of good quality.

Andover. This little village is seated on an elevated table land valley, amid an amphitheatre of high mountains, which skirt the horizon all around. It is a good agricultural district, and the people are active and enterprising. Several gentlemen of the village kindly aided us in the examination of the rocks and minerals, and all seemed deeply interested in the work which it was our duty to perform. The latitude of this place had been observed by Capt. Bragg, who found it to be N. 44° 40^m 41^s; while my observation gave it 44° 40^m 39^s; which observations agree very nearly with each other. The range of the barometer, &c. intended to measure the height of this place above the sea level, will be seen in the tables at the end of this Report.

While in Andover, assisted by the kindness of several gentlemen, I visited and examined every locality which appeared to be of economical or scientific importance.

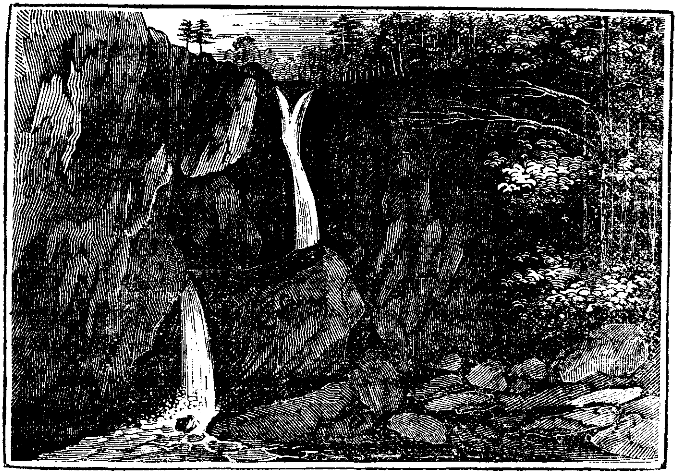
One mile north from Virgin's tavern, on the estate of Mr. Holdsworth Newton, and upon the west branch of Ellis river, there is a small deposit of excellent bog iron ore—too limited, however, to be of value. The bed is but ten or twelve feet square and about a foot thick; $10\times10=100$ cubic feet.

On the land of Ezekiel Merrill, one and a half miles south-east from the village, there is a larger deposite of similar ore, which exists along the brook side, and is fifty feet long by ten feet wide and eighteen inches thick. It is a solid pan ore, and is underlaid by a white silicious sand, full of nut ore. $50\times10=500\times1\frac{1}{2}=750$ cubic feet of ore.

While I was engaged in examining the metalliferous deposits, I sent one of the assistants, Mr. Wall, and the draftsman, in company with Capt. Bragg and other gentlemen, to examine and sketch Frye's Falls, in Andover Surplus. These falls exists upon Frye's stream, a tributary of Ellis river, four and a half miles from the village of Andover, and half a mile from the road to township B., upon the left hand or S. W. side of the road. This stream rushes over a precipitous mass of granite gneiss and mica slate rocks, precipitating itself by a fall of twenty-five feet into a rocky basin below. The chasm is fifteen feet wide, and the basin fifty-five feet broad. Here the waters form a beautiful pool, and then leap again by a second fall of twenty feet into another larger and shallower reservoir, from whence they descend gradually to Sawyer's brook, which runs into Ellis river.

One hundred rods above, there is another fall of water, which precipitates itself twenty feet over similar rocks, which stand in vertical strata, running N. E., S. W. This fall also produces similar pools, which are collected in huge granitic basins. Above, is "the Channel," a curious ravine, walled up, as if by artificial masonry, with huge blocks of granite, piled one on another. It is fifteen or twenty feet wide, and extends to the distance of fifteen rods in length.

The sketch below, furnished by our accomplished artist, will give some idea of one of the views above described.



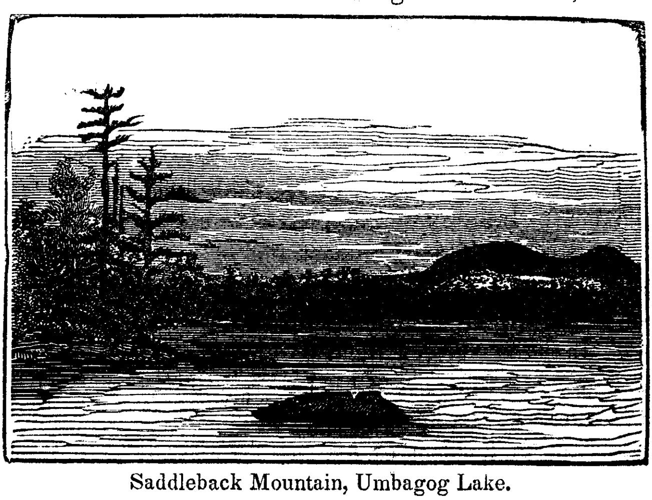
Frye's Falls, Andover Surplus.

From Andover, we pursued our course to Umbagog Lake, travelling over a rough road, that crosses a broken hilly country, to township B., at the southern extremity of the Lake. On the road to this place, we ascended a hill and stopped on its summit, at the house of Mr. West, 24th Sept. at noon, the barometer stood at 28.050, T. 10° cent. Height of this spot above the town of Andover, 1036 feet. The country around consists of high mountains and rounded hills of granite, gneiss, and mica slate, covered with a good soil, bearing an abundant growth of sugar maple and beech trees. The mica slate is found, resting on the sides of the granite mountains, and is exposed in numerous places along the road side. It answers very well for hearth stones, and is sometimes used for the construction of forges and chimney backs. From West's hill, we descended towards the Lake, and at the house of Mr. Thomas Bragg, one and a half miles south-east from the head of the Lake, we stopped to make our observations, Sept. 24th, 7 P. M., barometer h. 28.350, t. 6° cent. In the evening, I took astronomical observations, for determining the latitude of the place. By observations upon the North star, it was found to be N. 44° 42^m 39^s; and by Alpha Aquilæ, a southern star, N. 44° 42^m 44^s; Meridional altitude sun, N. 44° 42^m 16^s.5 ; or the mean of the three observations, N. 44° 42^m 30^s. Variation of the magnetic needle, 13° west.

Sept. 25th, at Mr. Bragg's, 9½ A. M., barometer 28.684, T. 6° cent. Level of Umbagog Lake, 11½ A.M., barometer h. 29.221, T. 9° cent. Descent from Mr. Bragg's house to the Lake, 433 feet.

Having engaged a large batteau and two boatmen, we set out for the exploration of the Lake, and for our voyage up the Megalloway river. The Umbagog Lake is an irregular shallow sheet of water, with grassy and boggy shores, and is surrounded by lofty mountains of granite, which were clothed with the red and yellow foliage of maple and birch trees, the former greatly predominating and covering the mountains to their very summits. Steering our course northwestward, we sketched a panoramic view of the shores of the Lake, and arriving at the Narrows, stopped to dine, and to take some additional observations.

At noon, 25th Sept., level of Lake, barometer 29.249, T. 55° F., t. air 12° cent. Latitude, by meridional altitude of sun, 44° 49^m 20^s. Saddleback Mountain, a lofty eminence whose name is descriptive of its outlines, bears, centre, S. 26° W. Angle of elevation from the Lake level, 2° 14^m. Speckled Mountain S. 10° W. Angle of elevation, 2° 20^m.



Saddleback Mountain, Umbagog Lake.

Umbagog Lake is eleven miles long, and the Narrows are eight miles from the head, or south extremity of the Lake. It is erroneously laid down on all the maps of the State ; but we have been able to obtain a more correct outline from the plan furnished us by Capt. Wilson, and from our own observations. The Lake forms a remarkable reservoir for the supply of the Androscoggin river, and acts as a regulator of its freshets. When the Megalloway rises, it flows into the Androscoggin and raises its waters, so that they run back into the Lake for the distance of two miles, having the appearance of a river running back to its source. The Androscoggin rises from the western side of the Lake, and is a sluggish stream, with low grassy banks, five feet high, covered with scattering swamp maple trees. Its whole aspect reminds us of the appearance of the Moose river, where it flows into Moose Head Lake, and when the river is turned back into the lake by freshets, their similitude would be still more striking. On each side, there is low land which is overflowed by the freshets.

Descending the Androscoggin two miles, we come to its confluence with the Megalloway river, which is here 100 yards wide, and has low banks, covered with a dense growth of swamp maples near its mouth, but farther up the sugar maple, spruce and birch trees abound, and the soil is good. No ledges of rock present themselves on the shores of the river, but high mountains of granite rise abruptly at a short distance back from its shores. Duskin Mountain presents its high and sharp peak in the north.

Arrived at Lombard's landing, we left the boat and walked to his house. 25th Sept., 5 P. M., four feet above level of Megalloway river, at Lombard's landing—barometer h. 29.260, T. 63° F. At Lombard's house, we spent the night, and next morning, 26th, 7 A. M., barometer 29.300, T. 8° cent. Leaving this place, we returned to the river, and taking our boat, ran up the river to Capt. Wilson's, at the first falls upon the stream. The Megalloway is extremely serpentine in its course, winding its way amid high mountains, while its banks are composed of a sandy loam, covered thickly with maple trees. Large angular masses of granite rocks, which have been hurled from the mountains, are profusely scattered in the soil.

Three miles above Lombard's, by the river, the water becomes more rapid, and is shallow, while its banks are higher. Four miles farther, we come to deeper and more sluggish water, with gravel bottom, and the river's banks are clothed with an abundance of large sugar maples. Stopping at Hibbert's house to dine, I took a meridional altitude of sun, by which the latitude of the spot is ascertained to be $44^{\circ}\ 57^{m}\ 52^{s}$.

Noon, 26th Sept., barometer, eight feet above level of river, 29.440, T. 16° cent., or 62° F.

Diamond Mountain bears N. 66° W.; angle of elevation, $9^{\circ}\ 29^{m}$. Aziscoos Mountain bears N. $46^{\circ}\ 30^{m}$ E.; angle of elevation, $5^{\circ}\ 49^{m}$.

$4\frac{1}{2}$ P. M., 26th. Arrived at Wilson's landing, and eight feet above level of river, barometer 29.400, T. $17\frac{1}{2}^{\circ}$ cent. Walking to the house, which we reached at $5\frac{3}{4}$ P. M., barometer 29.315, T. 16° cent.

Capt. John M. Wilson has cleared for himself a farm upon this secluded spot, on the borders of the Megalloway, at the falls, and is there constructing a saw mill for the purpose of sawing boards. He is a gentleman of high intelligence, and is more familiar with the topographical features of the surrounding country, than any other person with whom I am acquainted. He states that for four years past more than six million feet of pine timber have been sent down the stream, per annum. The Merrimack Company, winter before last, cut and put into the river no less than five million feet of logs, but last year, only three million feet. The logs were principally cut on No. 4, of the 1st Range. On township A 2, there are saw-mills, where boards and shingles are sawed for the Portland market. Aziscoos Mountain is in No. 5, of the second Range, and is one of the most remarkable peaks seen from this river.

The Megalloway, (according to the experienced hunter on those waters, Mr. Miner Hilliard, of Colebrook, N. H.,) rises much farther north than has been commonly represented, for he has followed it, in his course around the Camel's Rump Mountain, and ten or eleven miles farther north than its sources are laid down upon Greenleaf's map, which represents our boundary much too far south of the true line of the treaty of 1783. The land to the south of the highlands dividing the waters, which form the boundary line, are stated to be much higher than at the present New Hampshire corner, and the hills fall off very rapidly towards the north. The rocks are stated to be argillaceous slate, and the growth of forest trees to be chiefly sugar maple, birch, beech and spruce.

Being desirous of learning more particularly the nature of that section, and having an opportunity of sending one person in Mr. Hilliard's little skiff, I requested one of the assistants to go with him, and fully explore the region in question, when Dr. Stephenson at once volunteered his services, and has performed that arduous duty in a most satisfactory manner, braving many hardships peculiar to such a cruise. Herewith I present the results of his researches, by which it will appear that the opinions of Mr. Hilliard and of Capt. Wilson are fully substantiated, while at the same time, we have a vast deal of additional information relating to the geological and topographical features of the country.

It was impossible for me to go farther on this route, without abandoning engagements, which I had made, to explore other districts; and hence, after supplying Dr. Stephenson with the necessary camping fare, we turned our batteau down stream, and returned to Umbagog Lake.

29th Sept., 2 P. M., four feet above level of Umbagog Lake, barometer 28.800, T. 17° cent.

October 1st. Returned to Andover, where I took some additional observations and topographical sketches, and then examined all those localities, which the citizens of the town wished me to explore. An account of those which are most important, has already been rendered.

After making such researches as were needful, we set out for Rumford Falls, which I have before described, and then continued our route to Dixfield, crossing a small ford at Swift River, and riding along the banks of the beautiful Androscoggin, we reached the tavern kept by Col. S. Morrill, in Dixfield. 3d October, 7 P. M., barometer 29.584, T. 9° cent.; 4th Oct., 7 A. M., 29.770, T. 4° cent.

The rocks in Dixfield, are wholly of the primary class, such as gneiss and granite rocks. The strata of the former run N. N. E., S. S. W., and dip S. E. 80°.

The latitude of Dixfield, by meridional altitude of sun, N. 44° 32^{m} 46^{s}. Variation of magnetic needle, 12° W. 4th, 1 P. M., barometer 29.736, T. 13° cent.

The Sugar Loaves are two remarkable eminences in Dixfield, bearing N.40° E. from the meeting-house, in the village. They were formerly examined by my assistants, and are stated to be composed entirely of granite, deeply worn by diluvial markings.

From Dixfield, we journeyed on to Wilton, where some important observations were made, respecting the geological and agricultural resources of that town and its vicinity. One mile from Holman's hill, we examined a bed of limestone, which is included in mica slate and is cut through by a basaltic dyke, two feet wide, running in a N. W., S. E. direction, and associated with transparent crystals of calcareous spar. The limestone is of good quality, and some of it has been burned for lime.

At Maj. Willard's hotel, in Wilton, 4th Oct., 7 P. M., barometer 29.480, T. 9° cent. 5th Oct., 7 A. M., 29.330, T. 8½° cent.

From the decomposition of neighboring limestone rocks, a small quantity of lime is found disseminated in the soil, and hence it is productive of good crops of wheat. A specimen taken from the field of Mr. McCully, where a crop of forty-eight bushels of wheat had been raised per acre, gave the following results, upon mechanical and chemical analysis:

Pebbles, - -	175
Sand, - -	162
Fine soil,	663
	1000

Chemical analysis, on 100 grains :

Water, - - - - - - - -	5.0
Veg. matter, soluble in an alcaline solution,	12.0
Insoluble vegetable matter, - - -	5.5
Silica, - - - - - - - -	54.2
Alumina, - - - - - - -	10.6
Sub. Phos. alumina, - - - -	3.0
Per. Ox. iron, - - - - - -	7.0
Manganese, - - - - - - -	1.0
Lime, - - - - - - - -	1.5
	99.8

Carthage. This town possesses some valuable localities of limestone, which were fully examined. The most important beds occur in the south part of the town, a quarter of a mile northeast from the Dixfield line, and eight miles west from Wilton, on the estate of Mr. Isaac Reed. An abruptly precipitous hill, on the northeast side of the Weld road, exposes this rock. There are seen two large beds of granular limestone, included in mica slate, running N. E., S. W., and dipping to the N. W. 40°, the strata having been much disturbed by the intrusion of a large granite vein, which divides the limestone beds. This hill rises eighty or ninety feet, perpendicular elevation, above its immediate base, and the cliff of limestone is sixty-six feet high, with a slope of 30° or thirty-two feet perpendicular. The width of the limestone was measured and found to be—southern bed, sixty-seven feet—northwestern bed, twenty feet. It extends for a great distance, but the soil concealed it from view, so that I could not measure its length. Northwest from this locality, there is, beside several similar beds, a very large tract of limestone, belonging to Mr. William Winter, which is eighty feet wide. Descending from the hill to the northwest, we come to the farm of Benjamin Winter, where there is a bed of good limestone, sixty feet wide and of great extent in length.

All the above mentioned limestones are included in mica slate rocks, and are admirably situated for quarrying—the ground being high, affords ample drainage, and the rock is easily blasted out in enormous masses. By chemical analysis, I have ascertained the composition of this limestone to be, in 100 grains:

	Winter's.	Reed's.
Silex, - - - - -	8.8	23.4
Ox. iron, - - - -	1.4	0.4
Carbonate of lime, - -	89.8	76.2
	100.0	100.0

It may be advantageously burned for lime.

The following estimate will shew the expenses and profits on the work, in case 100 casks are burned at a time:

Quarrying, 3 cents per cask, - - -	\$3.00
Ten cords of wood, at 75 cts. - - -	7.50
Four days' labor, two men, at 1.00, - -	8.00
Packing and discharging, - - - - -	6.00
For 100 casks of lime, in bulk, -	\$24.50
One hundred lime casks at 20 cents, -	20.00
Cost of 100 casks of lime, packed,	\$44.50

Or 24½ cents per cask, in bulk—44½ cents per cask, packed.

Thomaston lime costs, at Wilton and Carthage, \$2.50.

\$2.50 per cask.
44½

\$2.05½ clear gain per cask, by burning the Carthage rock.

Since it is clear that this lime will answer for every ordinary purpose, it will be for the interest of the people of Carthage, Wilton, Dixfield, and vicinity, to set up kilns forthwith. In case three hundred casks should be burned at a time, should the demand require that quantity, it is easy to make the lime at the cost of forty cents per cask. So important is the application of lime dressing to soils, where wheat crops are to be raised, I apprehend the farmers will not let this limestone remain as it has been for ages—a buried treasure.

Specimens of mineral waters were brought to me from Jay, and on testing them by chemical means, I found they contained carbonate of iron and sulphate of lime, but they are too weak to have much efficacy as chalybeate waters.

On the farm of Mr. Woodward, there occur boulders of grauwacke, with terebratulæ impressions, the rounded rocks being three feet in diameter. These boulders evidently came from the great bed to which I have formerly alluded, as crossing the country from Parlin Pond to the Aroostook river, and were deposited here by diluvial transportation from the north.

On Mr. Pike's farm, the rocks are mica slate, and run N. 55° E., S. 55° W., dipping to the N. W. 70°. On the ledges there are diluvial scratches, running N. 15° W. and S. 15° E., which are from one to two inches in width, and half an inch deep.

TEMPLE. In this town, I examined the estate of Mr. Joel Varnum, an old gentleman who is very curious in mineral matters, and has made quite a collection of curiosities, upon which he places high value. The most important of his minerals, however, appeared to be several beds of blue granular limestone, which are from ten to thirty-five feet wide, and run N. E., S. W., for a long distance, dipping to the N. W. This limestone can easily be wrought to the depth of twelve feet by the immediate drainage. The limestone is enclosed in micaceous and talcose slate strata, the latter rock having such a degree of softness as to cut like soapstone into fire jambs, &c. It is a valuable rock for building lime kilns, as it withstands perfectly the action of fire. It may, therefore, be of value to the inhabitants, for that purpose. Mr. Varnum saves the saw-dust of this rock, for the purpose of sharpening razors, and he assured me that he sold it for six cents per ounce. Some of the more silicious varieties of the talcose slate, he cuts into hones, which he values at twenty-five cents each.

From Wilton, I went to Farmington, and there took a number of observations for latitude of the place, and for variation of the compass. Latitude 44° 42^{m} 30^{s} ; variation by sun's amplitude, 11° 20^{m} W. My object in this excursion, was to learn more facts relating to the iron ore of Phillips; but the state of the weather prevented our fully accomplishing that purpose.

10th October, we set out from Phillips to explore the crest of Saddleback Mountain, and travelled to Madison, where we obtained a guide to conduct us through the tangled woods, and to aid us in carrying our mineral specimens and instruments. The heavens looked unfavorable to our enterprise, but we hoped for clear weather, and set out for the mountain. Travelled through the thick forest, until we came to a hill, seven hundred and twenty feet high, clad with spruce trees and composed of loose blocks of granite. We then descended into a valley, in view of the mountain. Arriving near the borders of a little pond, we pitched our tent, and encamped for the night. A heavy tempest rolled over the mountain to the westward, and gave us but little encouragement, since this betokened a storm. During the night the rain descended in torrents, and all the next day continued, so that we were completely drenched with water. The mountain was completely enveloped in clouds and darkness. Waiting until noon, without any prospect of clear weather, it was resolved by unanimous consent, to abandon our attempt for a while, and we returned to Phillips. The storm continued incessant for eight days, and the whole mountain top was thickly clad with snow, so that all prospects of making a successful exploration for iron ore, were cut off for the season.

During the stormy weather, we remained at Phillips, and finished our tabular calculations, drawings, &c. &c.

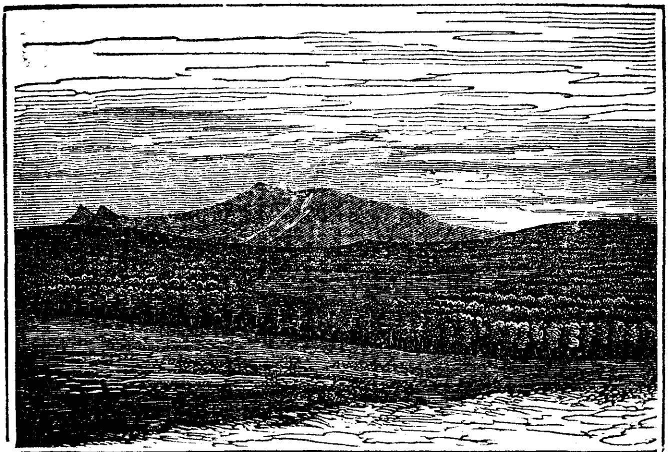
16th October, we set out for Kingfield, passing through the town of North Salem, for the purpose of making some sketches of Mt. Abraham, and in order to renew our former observations at Heath's. 11½ A. M., 16th Oct., at Heath's, barometer 29.162, T. 9° cent.

16th, Kingfield, 1¼ P. M., barometer 29.468, T. 10° cent. 6 P. M., barometer 29.550, T. 8° cent.

Visited Boynton & Quint's farms, in Lexington, where large masses of limestone occur, scattered in the fields, and have been used in attempting to make lime. It is too poor a rock for the purpose, and is not *in place*. The ledges are silicious slate, containing frequent veins of quartz. Porphyritic granite, in boulders and huge blocks, occurs abundantly in the soil. Pyritiferous slate also abounds. Being satisfied that the limestone was not available, I returned to Kingfield, where I obtained some interesting agricultural information. The soil is of good quality, bearing good crops of potatoes and of wheat. Benjamin Webster informed me that he cultivated about half an acre of intervale land, where the crop had been winter killed—and ploughing, without harrowing the ground afterwards, planted ten bushels of potatoes, and manured with nine cart loads of long barn manure, which, instead of being put into the hills, was spread upon the surface. From this planting, he obtained one hundred bushels of excellent potatoes. Beside this field, was another, which was treated in similar manner, but the manure was harrowed in. From one and a half acres, but one hundred and twenty bushels of potatoes were raised, and they were not so large or good as those above mentioned. This fact seems to denote some advantage in superficial manuring; but we cannot decide so important a question without other and more complete evidence.

One and a half bushels of wheat, sowed upon three quarters of an acre of land, yielded to the same farmer, thirty bushels of wheat. The average crop in town does not, however, amount to more than fifteen bushels to the acre, while the largest crops are forty bushels.

It was our intention to have explored Mt. Bigelow, a lofty mountain upon Dead River, but the snow covered its surface and forbad any researches into its geology, so that we reluctantly abandoned the enterprise for the season, with the intent of taking up the Dead River section, on a future occasion, and completing it at once.



Mt. Bigelow from New Poit.and.

From Kingfield, we went to New Portland, and on our way examined the estate of Mr. Thomas Wyman. The rocks are strongly charged with pyrites, which is magnetic, causing a powerful deflection of the magnetic needle. 18th October, 7 A. M., at New Portland, barometer 29.930, t. 6° cent.

The village of New Portland is a large and flourishing town, having a pretty good soil, bearing crops from twelve to forty bushels, according to the soil and the dressing. From the specimens of the wheat seen at the flour mill, I should not consider it generally of the first quality, it not being full and heavy; but there were some samples of excellent quality. From the nature of the soil, I should have anticipated such a result, for it is generally of granitic origin, and is poor in lime, a deficiency easily remedied.

Limestone occurs near the borders of the Vineyard, and Mr. Wall having visited the locality, brought home some specimens resembling the variety of rock which occurs in the town of Strong. The masses were, however, loose, but by searching, it may be found in place.

On the road to Anson, three miles east from Hanson's, there are diluvial marks on the silicious slate, which run N. 10°, 15° W., and S. 10°, and 15° E. The slate strata run N. 55° E., S. 55° W., and are nearly vertical in their inclination.

On Mr. Churchill's farm, a very rich pyritiferous slate occurs abundantly, and by its decomposition, it has produced a small bed of excellent bog iron ore in the meadow below, which is but two rods square, and about one foot thick, and hence insufficient for practical uses in the manufacture of iron. It will, however, make fine red ochre, on being burned and pulverized, and may be used for paint. The pyritiferous slate is so rich in sulphuret of iron, as to be worth working for copperas, and will make at least its own weight of the crystalized salt. The present price of transportation of goods from this place to Augusta, is fifty cents per cwt., and thirty-two cents to Waterville. Wood is worth about one dollar per cord, on the spot. Even at this rate, the manufacture of copperas from this rock might, if skilfully managed, prove profitable, when factories upon the Kennebec waters produce a demand for the article.

From Anson, we returned to Augusta, sending a party of the assistants to examine the roofing slate, above Bingham, while I went to Norridgewock and Skowhegan, for the purpose of obtaining some additional information, and to allow the draftsman to make sketches of several interesting scenes, on the way.

Near the north line of Clinton, upon the margin of "Fifteen Mile Stream," in Skowhegan, there occur several large deposits of bog iron ore, some of which is solid and of good quality ; while a much larger proportion is in the state of fine powder, or yellow ochre and brown oxide of iron. The solid ore makes good iron, but the pulverulent variety contains a considerable proportion of arsenic, derived from the arsenical pyrites, from the decomposition of which the bog ore was formed. It is unsuitable for the manufacture of bar iron, but will make cast iron of sufficiently good quality for ordinary castings, and there is an ample supply of ore for a blast furnace.

On the estate of Mr. Sampson Parker, I examined the length, breadth and depth of iron ore, and obtained the following results :

Length, 480 feet—width, 240—average depth, one foot.

15

$480 \times 240 = 115{,}200$ cubic feet of ore.

On the estate of Mr. Jonas Burrill, there is also a bed of bog iron, 1320 feet long, 33 feet wide, and one foot average depth:—$1320 \times 33 = 43{,}560$ cubic feet of ore.

Two miles northwest from this place, there is a large deposit of similar ore, upon the estate of Messrs. Blake, Sanburn & Foster, the deposit being discovered in numerous places over an area of four acres of swampy land.

On the land of Mr. Pitts, three miles northwest from Parker's, there is also a deposit, one hundred rods in length, and from one to two rods wide. Southeast from Parker's, on the land of Mr. Hood, there is also a bed of good and solid bog iron, of considerable extent, estimated to be about thirty acres of swamp, the greater part of which is filled with iron ore. In Mr. Sanburn's swamp, there is an area of three quarters of an acre filled with bog iron.

The whole extent of the swampy land, in which the above mentioned ores occur, is from two to three miles in a northwest and southeast direction, bordering upon the Fifteen Mile Stream. It is evident that a sufficiency of the ore may there be obtained for the supply of a blast furnace, capable of smelting from one to two tons per day; and wood, suitable for making charcoal, abounds in the vicinity—standing trees being worth twenty-five cents per cord, and the cutting fifty cents per cord. Charcoal can be made for six cents per bushel, in any quantity desired, and the hauling of it two and a half miles to the furnace, would cost one dollar per hundred bushels.

There is a fall of six feet pitch in the river, one mile northeast from Pishon's Ferry, where a dam eight feet high, may be built, and a pond flowed back for the distance of two and a half miles, so that the iron ore can be brought down by scows, to a furnace erected at the dam. Limestone, suitable for a flux, abounds in the vicinity.

Should a furnace be erected at this place, the lump ore should be selected for smelting; and if it is roasted before it is introduced into the furnace, it will be in a great measure freed from the traces of arsenic, and will then make good cast iron. I have examined the bar iron, made from the fine powdered or yellow ochre, and find that its bad qualities are owing to the existence of considerable quantities of arsenic, which it contains, and that substance prevents its welding firmly, and makes it "short" or brittle under the hammer. During the attempts to weld bars of such iron, the white fumes of arsenious acid are observed to rise from the iron, and the arsenical or garlic odor fills the room in which the operation is carried on.

On account of the above mentioned bad qualities of the Clinton bog iron, the forge formerly established at that place was abandoned, the iron having a very low reputation in the market. Arsenic does not, however, do any essential injury to common cast iron, and hence I advise the working of the above described ore into castings. If it is collected just as it is found, the lumps and ochreous oxide being mixed together, I should advise the washing out of the fine powder by means of a current of water, and by this process the good ore may be completely separated, and the fine ochre which subsides from the water, may be roasted, and thus converted into red ochre for paint, which may be made in any desired quantity, and afforded at a very low price.

The following analyses exhibit the composition of the iron ores from Skowhegan. 100 grains of bog ore from Mr. Foster's swamp, of brownish color and compact structure :

Water, - - -	18.0
Silex, - - -	13.4
Per. oxide of iron, -	68.6=Iron, 48 per ct.
	100.0

On roasting the ore, there is a slight odor of arsenic, which is in too small quantity to be separated.

100 grains from Mr. Jonas Burrill's bog :

Water and vegetable matter, -	33.0
Silex, - - - - - -	4.4
Per. oxide of iron, - - -	62.0=Iron, 42 per cent.
	99.4

At Brown's Corner, in Clinton, on the estate of Mr. Luke Brown, quarries have been opened for limestone, which has been burned under the direction of Mr. Leander Hussey. The rock is a blue argillo ferruginous limestone, charged with numerous crystals of iron pyrites, and makes a brown colored lime, sufficiently strong to slake and answer for agricultural purposes. The strata run N. 50° E., S. 50° W., and dip 85° S. E.

100 grains of the limestone yield, by chemical analysis:

Insoluble slate, - - - -	43.0
Per. oxide of iron, - - - -	3.0
Carbonate of lime, - - - -	54.0
	100.0

Limestone also occurs on the estate of Mr. A. Brown, in Clinton, and specimens analyzed, give the following results:

Insoluble slate, - - - -	17.2
Per. oxide of iron, - - - -	6.0
Carbonate of lime, - - - -	76.8
	100.0

At Clinton Falls, there is also an abundance of similar limestone, occurring in regular strata which run N. 48° E., S. 48° W., and dip S. E. 76°. It contains numerous veins of calcareous spar, and is in many places of sufficiently good quality to burn into strong and good lime.

At Mr. Abijah Brown's, a well sunk to the depth of twenty feet disclosed a bed of fossil marine shells, which deposit is forty or fifty feet above the level of the Kennebec river, at that place, and this altitude corresponds very nearly with the greatest height of the tertiary deposits in Maine.

On reaching Augusta, I went immediately to Whitefield, to examine a bed of limestone, specimens of which had been sent to me. On Enoch Heath's farm, there is a bed of this rock, running N. 53° E., S. 53° W., and dips to the S. E. 80°. It is cut across by a trap dyke, eight inches wide. Southeast from this bed, occurs another of similar character, four feet wide, running in a parallel direction with the above.

Both these localities have been wrought to a trifling extent, a small kiln capable of burning fifty casks at a time, being set once a year. The lime is of good quality, and is used by the inhabitants of the town. It is not easy to drain the quarries below the depth of eight feet, and hence they are not so available as another locality which I shall describe.

On the farm of Mr. Joseph Jewett, two miles south from Davis' tavern, in Whitefield, four miles northeast from the East River, a branch of the Kennebec, a large bed of excellent limestone was accidentally discovered, in ploughing the field. The discovery having been made but a few days before my arrival, I had an opportunity of inspecting the rock, which the owner had just uncovered. The bed is fifteen feet wide, and I traced it for the distance of one hundred and fifty feet in length. It runs N. E., S. W., and dips about 80° S. E. It is favorably situated for working, and can be drained easily to the depth of fifteen feet. The rock is a white, fine granular limestone, shaded with blue clouds, and will make good lime. Wood costs from one dollar to one dollar and twenty-five cents per cord, on the spot, and labor is obtained for fifteen dollars per month. Under such circumstances, it is evident that the lime may be burned profitably.

24th October, I visited Patricktown, for the purpose of examining the iron ore, said to have been found there. Several of the gentlemen interested in the locality, accompanied me to the mine, and we examined it, and found that it was not of any value. It is situated on the farm of David Patrick, eastward of the centre of the town, and is a mass of hornblende rock, imbedded in gneiss, running N. E., S. W. The hornblende rock contains manganesian garnets, oxide of manganese, and small veins of magnetic iron ore, mixed with brown pyrites. The latter mineral would destroy its value, even were there ore enough for a furnace, which is not the case.

Union. This town is one of the most important localities on the St. George river, rich in agricultural and mineral resources, and it wants but free communication by canal with the sea, to render it a flourishing town. Inexhaustible quarries of fine marble and limestone, and a fertile soil, would soon repay the trifling expense of locking the St. George, and would increase the wealth of the inhabitants. Surveys have been made to ascertain the feasibility of this project, and it was decided that it could be advantageously executed.—(See Report of Capt. Hall.)

Among the great beds of limestone and marble, are the following:

The Miller ledge, a bed of fine greyish white limestone, twenty-nine feet wide, running N. 48° E., S. 48° W. This rock makes a strong and good lime.

S. 25° W. from Miller's ledge, is the Orchard Quarry, twelve feet wide at the top and seven at the bottom, the depth of the opening being ten feet. It runs N. 48° E., S. 48° W., and dips S. E. 80°

Southeast from the Orchard Quarry, is the Bullin ledge, which is a very handsome white marble, clouded with grey. Its grain is bright, and it takes a fine polish, making very handsome slabs and blocks for tables, grave-stones and buildings. This bed is fifty-two feet wide, and I measured its length, and found it to be eleven hundred feet. It runs N. 33° E., S. 33° W., and dips S. E. 65°. The largest block of marble which has been obtained from this quarry, is seven feet long—two and a half feet square—and is perfectly solid and suitable for monumental work, or for sawing into slabs. Mills have been erected for the purpose of sawing the marble into slabs by water power, and gangs of fourteen saws are now in readiness for the work. Each saw cuts at the rate of six inches per day, in a block two feet long, the size of the tablets. Fourteen slabs of the above dimensions, are sawed in four days. In case fewer saws are put in action, the work can be done more rapidly. Common river sand is used for sawing the stone, but it may be done twice as rapidly with granular quartz, which may be obtained abundantly at Liberty. Blocks of marble, six feet long, two feet eight inches wide, and two feet thick, lay at the mill, ready for the saw. Mr. David

Hull, the superintendent of the mill and quarry, informed me that it was proposed to saw slabs, two feet square, and two inches thick, for encrusting brick buildings, in New-York, so as to give them the appearance of solid marble. A similar expedient was used in the buildings of ancient Rome, and I have there seen houses lined with slabs only an inch in thickness.

Near Union Common, upon the estate of Captain N. Bachelder, upon the west side of the St. George, there is an extensive bed of greyish white limestone, which runs N. 24° E., S. 24° W., and is nine hundred and twenty-four feet long, and more than thirty feet wide.

Upon Harden's ledge, one and a quarter miles southeast from Cobb's tavern, upon the shores of a pond, there are also extensive beds of limestone ; one of which is ninety-one feet wide, and twenty rods long, and can be wrought to the depth of twenty-nine feet. Another bed occurs near the Point, and runs across the promontory. The limestone is intersected at the southwest extremity by a vein of granite, which has been thrown up through the limestone, since its deposition.

Considering the great number and magnitude of the limestone beds in Union, it will appear that there is but one obstacle to the successful manufacture of lime for exportation—and that is the distance which it is necessary to transport it by land carriage, twelve miles to Thomaston.

The following estimates will show the relative cost of the business at Union and at Thomaston, for 300 casks of lime.

UNION.		THOMASTON.	
Quarrying, six cents per cask,	18 00	Quarrying, at 7 cts. per cask,	21.00
Thirty cords of wood, at 1.50,	45.00	Hauling to port, 10 cents,	30.00
Packing kiln, &c. - -	10.00	Thirty cords wood, at 3.00,	90.00
Four days attendance on kiln,	10.00	Labor in packing kiln,	10.00
	——	Attendance on kiln,	10.00
	$83.00		——
300 lime casks, at 20 cents,	60.00		$161.00
	——	300 lime casks,	60.00
For 300 casks of lime,	$143.00		——
Per hundred casks,	47.66		3)221.00
Transportation to Thomaston,	25.00		——
	——	Per 100 casks,	77.00
Per 100 casks, at Thomaston,	$72.66		72.66
			——
		Per 100 in favor of Union,	$4.50

It will be seen, then, that the Union lime can be afforded four cents less per cask than that manufactured at Thomaston; and if it brought the same price in the market, the business could be carried on profitably, were it not that by means of the perpetual kiln, the Thomaston people can now burn lime from ten to fifteen per cent. cheaper than is estimated above.

26th October, 2 P. M., at Cobb's hotel, barometer 29,860, T. 11° cent.; 5½ P. M., 29.652, T. 6½° cent.; 6½ P. M., 29.652, T. 3° cent.

Passing through the town of Washington, I rode to Liberty, for the purpose of examining the extent of certain beds of granular quartz, which I described in my First Annual Report. A specimen of this valuable rock, was first discovered by my late friend, Capt. Uriah Coolidge, of the Eastport Cutter, while we were cruising upon the coast—the captain having taken a ride out to Liberty, obtained the specimen from the ledge, which was at first supposed to be of white marble, so closely does it resemble granular dolomite. While I was instructing the assistants in the art of examining minerals, I took a piece of this rock, and discovered it to be pure granular quartz, and have already described it as such. My active engagements elsewhere, have prevented me from exploring its extent until now, and thus it has remained almost un-noticed. Capt. Bickford E. Matthews is the owner of the land on which this mineral occurs, and he aided me in every possible manner, in ascertaining the quantity that could be depended upon, in case glass works should be erected for its manufacture. The granular quartz I found to exist in beds, included between strata of mica slate, running N. E. and S. W., and dipping to the S. E. The widest bed measured eleven feet, and it is exposed to view for the distance of thirty-one feet, and can be drained easily to the depth of twenty or thirty feet. Beside this, there are numerous smaller beds, which it is more difficult to measure, as they are quite irregular.

Passing through the woods, half a mile northwest from this locality, we come to several other similar beds and veins, one of which is from two to three feet wide, and extends fifteen rods in length. It can be drained to the depth of twenty feet or more, very easily. A number of narrow beds and veins, from a few inches to a foot in width, also occur, running parallel to the above. From measurements of those beds that are uncovered of soil, it appears that there are about three thousand tons of the granular quartz that may be seen. Besides this, the great beds evidently run under, and are concealed by the soil, and extend to a much greater distance than we were able to explore. I have no doubt that an ample supply of the quartz may be obtained to supply a glass furnace; and it may be converted into beautiful glass by the usual operations. It is much purer than any sand that can be obtained, being free from oxide of iron, and vegetable matter. When burned in the fire, and then thrown into water, it becomes friable and is more easily crushed than loaf sugar, so that it may be pulverized by an ordinary crushing wheel of iron, turned like those used by tanners in the bark mill, by horse or water power. Wood is worth from $1.00 to $1.50 per cord, and slabs from the saw-mill may be obtained much cheaper, and will form the best fuel for the glass furnace. Waldoborough is the nearest seaport, and is fifteen miles distant by the road. Price of transportation to that port, two dollars and fifty cents per ton. Belfast is eighteen miles distant, but the road is good, and the same price is paid for transportation of goods, viz. $2.50 per ton.

From the above elements, it is easy for the manufacturer to calculate whether it will be profitable to erect glass works at Liberty. There is no such establishment in Maine, and since every person uses glass, there will be demand enough to take up all that any one furnace could manufacture.

I have made several kinds of glass from this rock, for the purpose of shewing its quality, and although the specimens that I have made and deposited in the Cabinet, are rich and beautiful, they are not to be compared in brilliancy and transparency, with glass made on a large scale, for it is very difficult to regulate the heat applied to a small crucible.

I should recommend the establishment of works for the manufacture of window glass, either crown or cylinder, as may be thought expedient. The amount of capital required is not more than forty or fifty thousand dollars; and if well managed, would prove a profitable investment. Window glass is made of various qualities, according to the purity of the materials, and the skill of the workmen; and I doubt not that an article, equal in beauty to the best Bohemian crowns, may be made from this rock. The Bohemian glass is made of the following ingredients:

Quartz, or silicious sand, - - - - - - -	100
Carbonate of lime, pulverized marble, or air slaked lime,	16
Carbonate of potash, pure pearlash, - - - - -	60

Sometimes a little saltpetre or oxide of manganese and arsenic, is also added, to remove vegetable matter, or to give a peculiar shade to the glass.

Ordinary WINDOW GLASS is made of:

Silicious sand, or granular quartz, - -	100
Carbonate of lime, - - - - - -	35 to 40.
Dried carbonate of soda, - - - - -	30 " 35.
Broken glass, - - - - - -	180
(Sometimes used) Per. oxide of manganese, -	0.25
(Sometimes used) Arsenic, - - - - -	0.20

Mirror, or PLATE GLASS, is made of the following ingredients:

Granular quartz, - - - - - - -	300
Dried carbonate of soda, - - - - - -	100
Air slaked lime, - - - - - - -	43
Broken glass in powder, (calcin,) - - -	300

CRYSTAL GLASS is composed of:		FLINT GLASS.	
Quartz, - - - -	300	Quartz, - - - -	300
Red lead, - - - -	100	Red lead, - - - -	300
Carb. potash—pure, -	120	Potash, - - - -	150
Broken glass, - -	300	Nitre, - - - -	10
Arsenious acid, - -	0.45	Arsenic, - - - -	0.45
Ox manganese, - -	0.60	Ox. manganese, - -	0.60

It would require too much room in an annual Report, to explain all the manual operations of the glass house, and I must, therefore, refer the reader to the only complete essay on this interesting subject, which may be found in Dumas Traite de Chimic Appliquèe Aux Arts, tome 2e. A more detailed account of the chemical principles, and the methods of obviating the difficulties in this art, will be contained in my final or complete Report, which will be drawn up on the completion of the survey of the State.

AGRICULTURAL GEOLOGY.

Of all the arts, I know of none more likely to be improved by geological examinations, than that of Agriculture ; since the composition of soils indicates their fertility, or capabilities of improvement, and the causes of barrenness. The science of geology demonstrates the origin, and distribution of the mineral matters, constituting the basis of all soils, to which they chiefly owe their peculiarities. I know that it is a favorite opinion with many agriculturists, that the mineral constituents of a soil have but little, if any influence on their fertility ; and that they suppose the whole secret resides in the presence of certain vegetable or animal matters ; but such a theory is at once exploded by an attentive examination of the natural soils, with their peculiar vegetation ; for it will be seen that there are regular zones of vegetation, peculiar to each geological district, in which the same vegetable or animal matters are present, but which differ essentially in their mineral constitution. Thus how different is the soil derived from granitic rocks, from that which is formed by the disintegration and decomposition of limestones and slates. How peculiar is the vegetation which follows the great bands of trap rocks, and how remarkable is the growth on the ancient clay loams, of tertiary deposition. Whoever considers the attempts made to raise wheat upon soil totally destitute of lime, will at once appreciate the value of that mineral substance, and its importance in the production of grain. An imperfect or blighted product is sure to follow the planting of this grain upon soils destitute of lime, while it is well known that certain districts, where the soil contains this mineral, are always favored with luxuriant and heavy crops. This is one of the settled points in agriculture, and one which every farmer should duly appreciate, if he wishes to prosper in his art. Indian corn requires but little, if any lime, and hence we see excellent crops of that grain raised upon sandy plains, unsuited to wheat. Rye, likewise, will do pretty well without it, but it is always more full and heavy where it exists in the soil; and by attending to this circumstance, the value of the crop may be greatly improved.

The overlapping of soils, from diluvial causes, is also a point greatly illuminated by a knowledge of geology; and we are able, by means of a good geological map, to predict the nature of a soil in a given district, with as much certainty as we refer back certain rounded and transported stones to their native beds. It is also easy by the geological and topographical features of a country, to predict the nature of the alluvial or intervale soils, which have been washed down from the hills and mountains by brooks, rivers and rain; and such knowledge not only helps us to account for the phenomena in question, but also in the selection of suitable grounds for our various crops.

The situations in which are found substances capable of being used for the amelioration of soils, is also pointed out in a geological survey; and a scientific farmer soon learns to avail himself of the natural resources of the country. We also are able to indicate by the natural growth, the nature of the soil, and to point out to the farmer tracts of country which will form the best settling lands; and by the application of the science of chemistry, we indicate to him the peculiarities of the different kinds of soils, and the modes of renovating those which are deemed to be exhausted.

There are certain tracts, upon which gypsum acts favorably, while on others it does no good; and there are those where liming is required, and others where it is not. Some soils require the introduction of a quantity of vegetable matter, and we show the farmer the cheapest mode of introducing it; others are wanting in certain saline matters, required for peculiar vegetation, and the nature and quantity of such matter required, is indicated by a chemical analysis of the soil. Enormous quantities of valuable materials in manures, are lost by a want of chemical art in preserving them, and still more is wasted by improper application. The causes which effect these results, are well known to chemists and geologists, and by special examinations, the knowledge is applied to particular cases with skill, and with certainty in the result; whereas vast amounts of both time and money are lavished in idle experiments, by those who are unacquainted with the laws of nature.

It is to correct these errors in agriculture, that science, "the handmaid of the arts," comes to our aid, and by learning and following her laws, we soon come to a more perfect knowledge of the subject, and with the lever which she puts in our hands, overthrow all obstacles. Why is it that the noble art of agriculture, holds so low a rank in the opinion of men, if it be not that reason has left the field, and given place to empyricism? If it is ever to be restored to its pristine rank, and a new Eden is to bloom, with its fruitful fields, it must be by bringing the GOD-LIKE attribute of man to the task of renovation. I have always been startled with the gratuitous assumption that knowledge and reason were not to be the rules of agricultural labor. That any one knows enough to be a farmer, and that the *concentrated experience of the world was not to be put in competition with the narrow circle of individual experience!* Is it indeed so with any other science or art? or should we not conceive it to be arrant folly for any one to pretend to learn any other business, without availing himself of the knowledge of others? I know that intelligent men make no such gratuitous assumptions; but still there may be many, who are not aware of the application of certain sciences which I mention, to the improvement of this most important of arts, or they may have but a partial glimpse into the arcana of science. Others may have formed an opinion, that since science is confessedly imperfect, that it cannot meet the exigencies of the case, but that innovations upon ancient customs are fraught with danger. To such we may reply, that enough is already known to render the art great service, and that knowledge is marching on with such rapid strides, that we should hasten in our movements, lest all hope of overtaking her should be lost.

I knew a gentleman once, who stated that he was waiting for the science of chemistry to come to a stop, before he engaged in the study. It was then comparatively easy to acquire the mass of information requisite for the comprehension of that science. But now, look back to the accumulated knowledge on this subject, which has loaded our shelves with ponderous volumes. Is there now any better opportunity of overcoming the difficulty ? So it will shortly be with scientific agriculture. But comparatively few are the records now—but with the new impulse it has received, in a few years it will cause "meek eyed patience to fold her arms in despair," when contemplating the mass of materials that will be collected for our instruction. "Little by little the bird makes its nest;" and so must we gradually collect the materials of knowledge. Let the young farmer, therefore, be on the alert, and not let the rest of the world get the start of him in his art. Agricultural colleges are required throughout our country, and the time is not far distant when we shall see them in full operation. Analytical chemistry and geology, will be among the essential principles of a farmer's education. Botanical knowledge will teach the peculiarities of plants, and their adaptation to peculiar soils; and chemistry will teach us so to modify our soils as to produce such results as are required. In the mean time, a few professional men must take the burthen upon their shoulders, and aid the farmer in his first steps in science. Mutual aid and good fellowship, will make the burthen light, and both parties will profit by their association. The farmer, attached to one spot, has great advantages in obtaining facts, which more fully illustrate the knowledge of that particular district. The facts so obtained, are to be collated and duly explained, so as to become capable of forming general rules or principles, for the guidance of others. Soils remarkable for peculiar vegetation, luxuriant or barren, form subjects of particular interest, capable of explanation by chemical analysis. The present state and future condition of a soil, can in a certain degree be ascertained by a knowledge of their geological origin, and the nature of the chemical reactions which will take place in it. Advantage may sometimes be taken of defects in soils, to render them the most powerfully beneficial. Thus, in the town of Saco, there is an intervale plain, belonging to Mr. I. Jordan, having several remarkable substances in it, which nothing but a knowledge of geology and chemistry could explain or improve. There is a kind of clay marl, filled with minute and almost invisible particles of pyrites or bi-sulphuret of iron, composed of 54 parts sulphur and 46 of iron. The marl also contains three per cent. of carbonate of lime, and the remainder is clay. When this substance is first dug up, it is without any saline taste, and nearly inert; but upon exposure to the air, it crumbles, and after a while, becomes charged with copperas or sulphate of iron, which is formed by the oxidation of the sulphur and the iron, by atmospheric action. While in its first stages, it acts as a powerful fertilizer, for the sulphuric acid is taken from the iron and combines with the lime, forming gypsum or sulphate of lime, while the oxide of iron is deposited. After a while, the copperas or sulphate of iron, constantly forming, gains the ascendency, and then has powerful corrosive properties, nine or ten per cent. of suphuric acid being produced; and having no lime with which to combine, it attacks the roots of the plants and kills them.—(See chemical analysis of this copperas marl.) Thus, as Mr. Jordan happily expressed himself, " it first makes the corn grow, and then eats off its roots and kills it." Certain other plants of the *graminæ*, are capable of withstanding this substance, if not in great excess; and hence herd's grass, rye and wheat, are not so likely to be destroyed by it, since they are armed with a coat of mail composed of silex, which envelopes their whole surface; but all herbaceous or tender plants are cut off by it.

Here, then, we have a defect to remedy, and to turn to our account, and it is an extremely simple case, for we have only to add a sufficiency of lime to the copperas marl to render it one of the most valuable and powerful fertilizers. Thus a compost heap affords us an accessible remedy, and the enemy is soon tamed and made subservient to our will. The origin of this pyritiferous clay is at once explained by geology, which teaches us that it is composed of the fine particles of pyritiferous slate rocks, that have been deposited by water. So also the occurrence of nodules of shot and nut iron ore in it, and the mineral waters which flow from the meadows charged with sulphate of lime explain themselves by the reaction of carbonate of lime upon sulphate of iron, an exchange of elements taking place in accordance with the well known laws of chemical affinity.

Peat also occurs abundantly in the same meadow, and by a little chemical skill may be converted into an excellent manure by means of a mixture of lime and a little barn yard manure or any animal matter. Thus three or four cords of the peat mixed with one cord of animal manure, and treated with a cask or two of slaked lime will make a compost superior in value to five cords of the best stable manure alone. They ought to be placed in alternating layers, thus:

PEAT,

LIME,

ANIMAL MANURE,

PEAT,

&c.

The whole forming a regular compost heap. The chemical reactions which follow are chiefly thus:—

The lime extricates a large quantity of gazeous ammonia from the animal matter, which is absorbed by and enters into combination with the peat, and is thus retained ready for use in the state of ulmate or geat of ammonia—(a most powerful manure)—and the lime becomes completely carbonated or air slaked by the carbonic acid given out during fermentation, and in this state is a proper and permanent ameliorator of the soil. The peat is converted into a powder and soluble pulp, and becomes more suitable for the nutriment of plants. While if lime and animal matter was used in excess we shall have also a considerable quantity of carbonate of ammonia, in the peat, a well known and powerful saline manure.

In case the soil is sandy, the clay marl, neutralized with lime, is the most proper amendment for it, and such is generally the condition of the fields in Saco, so that by a proper use of this marl the happiest effects may be realized by the farmers in that town.

I could quote other instances of the kind, but the above fully illustrates my meaning, and will show how favorable an influence scientific knowledge would exert in agriculture, were it more generally appreciated.

The principles which I have laid down, have been adopted by several distinguished farmers of Massachusetts, and their experience most fully corroborates the truth of the theory inculcated.

I need but appeal to the experience of one of our most intelligent farmers in Massachusetts, Elias Phinney, Esq., of Lexington, to demonstrate the correctness of the rules we have laid down, with regard to the use of peat for compost manure, or to the beautiful farm of Benjamin Bussey, Esq. of Jamaica Plain, Roxbury, where similar results have been obtained.

LEXINGTON, January 30, 1839.

DR. CHARLES T. JACKSON,

Dear Sir:—I herewith send you a sample of my peat. I am very desirous of availing myself of the benefit to be derived from a chemical analysis of the same, which you kindly offered to make. A more intimate knowledge of the nature and properties of peat, which can be obtained only by a scientific examination of its constituent parts, would enable farmers more justly to appreciate this valuable species of land. It is from a want of this knowledge, that our extensive tracts of low meadow and swamp lands have hitherto been esteemed of little, or no value. Allow me to say, sir, that I know of no way, in which you could render a more essential service to the public, more especially to farmers, than by enabling them to convert their unproductive and unsightly bogs and morasses into luxuriant fields, and sources of wealth. I consider my peat grounds by far the most valuable part of my farm, more valuable than my wood lots for fuel, and more than double the value of an equal number of acres of my uplands, for the purposes of cultivation.

In addition to these, they furnish an inexhaustible supply of the most essential ingredient for the manure heap. A statement of the uses, to which I have appropriated peat lands, and my management of them, though very imperfect, may serve to give you a partial conception of their value and uses, and at the same time enable you to see how important it is that the farming community should have more information on this subject.

In the first place they are valuable for fuel. I have for twenty years past resorted to my peat meadows for fuel. These, with the prunings of my fruit trees, and the brush from my uncleared lands, have given me my whole supply. The prunings and brush are bound in bundles, and housed, and with the help of a small bundle of these faggots, and peat, a quick and durable fire is made. It gives a summer-like atmosphere, and lights a room better than a wood fire. The smoke from peat has no irritating effect upon the eyes, and does not in the slightest degree obstruct respiration, like the smoke of wood ; and it has none of that drying, unpleasant effect of a coal fire. The ashes of peat are, to be sure, more abundant, but not more troublesome, and are less injurious to the furniture of a room, than the ashes of coal.

The best peat is found in meadows, which have for many years been destitute of trees, and brush, and well drained, and where the surface has become so dry, and the accumulation of decayed vegetable matter so great, that but little grass or herbage of any description is seen upon the surface. If the meadows are suffered to remain in a wet and miry condition, the wild grasses and coarse herbage will continue to grow, and the peat be of a light and chaffy texture, filled with undecayed fibrous roots. By draining they become hard, and the peat becomes compact and solid, and the cutting out, and carrying off greatly facilitated. A rod square, cut two splittings deep, each splitting of the length of eighteen inches, will give three cords when dried. It may be cut from May to September. If the weather in autumn be very dry, the best time for cutting will be from the middle of August to the middle of September. If cut the latter part of summer, or early in autumn, it dries more gradually, and is not so liable to crack and crumble, as when cut early in summer. The peices are taken out with an instrument made for the purpose, from two to three inches square ; and if of good quality, will shrink about one half in drying. It is considered a day's work for a man, a boy and a horse, to cut out and spread a rod square. The man cuts it out, and lays it upon a light kind of drag, made for the purpose, and it is drawn off by the horse, and spread by the boy as thick as the peices can lay singly. After becoming dry enough to handle without breaking, it is made into piles, cob-house fashion, of from twelve to twenty peices in a pile. It will then require about four weeks of dry weather to render it fit to be housed for use. The top, or turf, is thrown back into the pits, from which the peat is taken; and if well levelled, and the ground drained, it will, after the first year, give a large crop of foul meadow, or other lowland grass. Peat, taken from land which has been many years drained, when dried, is nearly as heavy as oak wood, and bears about the same price in the market.

The value of peat and swamp lands for tillage, is now pretty well known, and acknowledged. Some years since, I occasionally sold to my neighbors a few rods of my peat land, yearly, to be cut out for fuel, at three dollars per rod, being at the rate of four hundred and eighty dollars per acre; but finding this sum to be less than its value for cultivation, especially when laid to grass, I have declined making further sales at that price. I have raised upon my reclaimed meadows, seventy-five bushels of corn, five hundred bushels of potatoes, or from four to five tons of the best hay, at a first and second cutting, to the acre, at a less expense of labor and manure, than would be required to produce half this crop upon uplands. To render these lands productive, they should be thoroughly drained, by digging a ditch around the margin of the meadow, so as to cut off the springs, and receive the water, that is continually flowing in from the surrounding uplands. If the meadow be wide, a ditch through the centre may be necessary, but this will be of no use without the border ditches. This being thoroughly done, and the surplus water all drawn off, the next step is to exterminate the wild grasses, and herbage of every kind, that grow upon the surface. To effect this, the method heretofore generally, and now by some pursued, is to cover with gravel or sand, top dress with manure, sow the grass seed, and then rake, or bush it over. This, for the first year or two, will give a good crop of hay; but after this, I have invariably found that the more coarse and hardy kinds of wild grass would work their way through the sand, or gravel, and entirely supplant the cultivated grasses—when the whole must have another covering, or be abandoned as worthless. If to be planted with corn, or any of the root crops, my course has been to turn over the turf or sward with a plough having a wrought iron share or coulter, ground to a sharp edge, in the driest season, say in the month of September, roll down as hard as possible, carry on in the winter a sufficient top dressing of compost, twenty cart-loads to the acre, and in the spring plant with corn, or roots, without disturbing the sod. When the corn or roots are taken off, the surface is made smooth with the cultivator, or hoe and harrow, and late in November, or just before the heavy frosts set in, sow with herd's grass and red top seed, half a bushel of the former and one bushel of the latter to the acre. The field is then rolled, which completes the process. If the plough does not turn the sods smooth, it will be necessary to follow it with the bog hoe, to level the uneven places. By keeping the sod undisturbed in the cultivation, a more firm and compact surface is formed, upon which oxen or horses may work, generally, without danger of miring. If the land is intended for grass, without the intervention of a hoed crop, the turf is turned over with the plough, as before stated, in August or September, or as early as the surface becomes dry enough to admit the oxen or horses upon it; then follow with the bog hoe, and turn over such parts as the plough has left unturned, make the whole smooth with the hoe, and late in November, spread on a top dressing of compost, not less than twenty cart loads, made half of loam, and half of stable manure, to the acre; then sow the grass seed, and bush, and roll down. If the ground be miry, so as to render the use of the plough impracticable, the bog hoe must be resorted to, and the whole turned over by hand, and top dressed, and seeded to grass, as above stated. The cost of turning over with the hoe, will be twenty dollars per acre, at the usual price of labor. This mode of culture completely subdues the natural wild grasses, and gives a compact and rich surface of vegetable mould, which will give an abundant crop of the best English hay for four or five years, without the aid of more manure. If the sod is disturbed and attempted to be pulverized in the course of the cultivation, the surface, when laid to grass, will be loose and spongy—an extra top dressing of loam and manure will be required, and after all, the surface will not become so compact, nor the produce by any means so great. Should meadows be found too soft and miry to admit of their being ploughed in the summer, or autumn, and the expense of turning with the hoe should be thought to be too great, I would advise ploughing in the spring, when the frost is out to the depth of three or four inches, carting on the manure, and then sowing or planting at a convenient and proper season. The art of reclaiming these low meadows, consists in taking off all the surplus water by judicious draining, and in thoroughly exterminating the natural herbage and grasses. This being effected, we have our rich bottoms, equally as productive as the deep alluvials of the west, and obtained at a cost and sacrifice infinitely less.

The third particular, in which peat lands may be considered valuable to the farmer, consists in furnishing him with a very important ingredient for his compost. Peat is made up principally of decomposed vegetable substances, with a portion of the lighter particles of vegetable mould, washed in from the surrounding highlands. But when taken fresh from the pit, it contains certain antisceptic properties, injurious to vegetation, which must be absorbed, or neutralized, by a combination with other substances, in order to render it food for plants. This may in some measure be effected by exposure to the action of the air and frost. Where the surrounding uplands are composed of gravel or sand, the peat or swamp mud may be called silicious, and is less valuable for manure, especially if the adjacent uplands rise abruptly; when composed principally of clay, the peat is aluminous—this is frequently found resting on beds of marl, and is considered much richer, and more valuable for the compost heap.

I have annually, for some years past, used on my farm some hundreds of loads of peat mud, which is either thrown into my hog stye, or mixed with fresh stable dung, or with lime. When mixed with green stable manure, the proportions are two parts of peat mud to one of dung; and I am confident, from repeated experiments, that a load of this compost, well mixed and fermented, will give as great a produce, and a more permanent improvement to the soil, than the same quantity of stable manure. In this opinion, I am not alone. Other accurate and intelligent cultivators, have made similar experiments with similar results.

The vegetable substances of which peat is composed, having been decomposed in stagnant waters, they have not passed through a putrefactive fermentation, and are therefore supposed to retain much of their natural oils, gums and acids. Peats, in this region, are also supposed to contain portions of sulphate of iron, or copperas, oxide of iron, &c. This opinion is formed from noticing the difference between the effect produced by using the peat mud on grounds, when first taken out of the meadow, and that which is produced after fermentation, with stable manure, or by mixing it with lime. The ashes of peat have little or no perceptible effects, when used alone, but by mixing them with lime, they become a valuable manure.

That our peat may possess other and different properties, which are in a greater or less degree injurious to plants, is highly probable. These can be detected and remedied only by the aid of science. It is to the agricultural chemist, that the practical farmer must look for a development of his resources, to remove the obstacles which impede his progress, and to impart that information which will give confidence to action, and a successful issue to labor.

With an earnest desire that you may persevere in your useful labors, I am, dear sir,

With the highest respect,

Your obedient servant,

E. PHINNEY.

Having, two years since, given Dr. N. C. Keep some instructions, relating to the management of peat compost, that gentleman communicated them to his father, an old and intelligent farmer, residing at Longmeadow, upon the Connecticut river; and the experimental trial having been made to his satisfaction, he politely furnishes me with the following interesting statistics:

To Charles T. Jackson, State Geologist, &c.

Dear Sir:—Being much indebted to you for information in regard to the use of peat, as a manure, and the mode in which its acid properties may be not only neutralized, but made a most valuable food for plants, I beg leave to state, that in the fall of 1836, I took from my bog about three cords of peat, and placed it in a pile on the nearest solid land, in the woods. It remained there undisturbed until sometime in November, 1837. By the action of the *frost* of the preceding winter, and the heat of the summer, it had lost much of its adhesive property, and was greatly reduced in weight.

I now brought it home, and while one was unloading, another sifted in lime with the hand, (it having been previously slaked to a fine powder,) at the rate of one bushel to a cord of peat. Lime having been thus scattered evenly through the whole mass, nothing further was done to it until about the middle of the next May. Observing, after the manure had been removed from the barn yard, that a considerable quantity of water from the rains had collected itself in the lowest part of the yard, (say six or eight barrels,) I had the peat removed into it. The garnet-colored wash of the yard was rapidly and entirely absorbed. I allowed it to remain in this situation until the first of June, during which time its color had changed from mahogany to a jet black. Fermentation did not take place.

By the successive action of the frost, lime, and the wash of the yard, the sensible qualities of the peat had very much changed. When first taken from the bog, it was pulpy and very adhesive—could be spread like butter; now it was a fine powder, having entirely lost its peculiar adhesive properties.

I used the manure thus prepared, for squashes—planting fifteen rods of ground, very sandy and much exposed to drought. After the manure had been dropped, (one shovel full in a hill,) I sprinkled a little lime in each hill, directly upon the peat. Upon this, I planted the autumnal marrow squash. The seeds came up well, and the plants were of a healthy color. Some of the plants were entirely destroyed, and all of them badly eaten by insects; the yellow bug was most destructive. The plants, after they had recovered from this shock, grew more rapidly than any that I had before witnessed. The color of the vines, and the rapidity with which they covered the ground, were most convincing proofs to my mind that they were perfectly healthy, and well supplied with nutriment. In the severe drought which came on in the summer, these vines, for many weeks, did not appear to suffer, while others of a similar kind in the neighborhood, were dead and dying. The result was, that notwithstanding the long continuance of the drought, in which nearly all our potatoes, peas, &c. were killed, these squashes were preserved, and yielded a middling crop.

I also used the compost, as above, on intervale land, near the Connecticut river, soil alluvial, no stones or gravel—can be easily compressed, does not bake in the sun—has been cultivated for more than one hundred and fifty years, and yields a very scanty crop, without manure. The compost was spread over the ground, and ploughed in, at the rate of nine cords to the acre of ground; thus prepared, I planted thirty rods with sugar beets—distance between the rows, eighteen inches—hills eight inches—one seed in a hill. The seeds proved bad, not more than one third coming up—yet I had 116 bushels of beets; while above an acre of the same land, manured with the best stable manure, at the rate of twelve cords to the acre, did not produce one hundred bushels. Two rows of potatoes were planted next the beets; the land had been designed for beets, and was prepared precisely the same. Between these two rows and more than an acre immediately adjoining, (where a larger quantity of best barn-yard or animal manure was used,) there was a very perceptible difference in favor of the former. I also planted a few hills of potatoes on very sandy land, in the latter part of June. Into the hills I put peat, which had been saturated with lye, from the bottom of a soap tub—no lime. The tops of these potatoes, during the whole drought, were of the most living green, and the most luxuriant growth that I ever beheld. They were killed by the frost in the fall, before maturity—the potatoes were small.

In conclusion, I would mention, that I am so well pleased with the result of these experiments on a small scale, that I am now preparing one hundred and fifty cords of peat, and fifty casks of Camden lime, and all the animal manure I can make, to enrich as fast as possible my whole farm.

Expenses. I get out my peat by ox team and cart. Three men can, in this way, get out eight cords per day, $4.00; price of lime, $1.50 per cask. My peat being three and a half miles from my barn, that portion of it which I bring home, I estimate to cost me, for carting, one dollar per cord. The peat and the lime for the compost—using one third of a cask of lime to a cord of peat—then, cost me, on the ground near the peat bog—three cords of peat, $1.50—one cask of lime, $1.50; that which I cart home, $1.00 per cord more.

I intend to put about one-sixth part of animal manure, but as it cannot be purchased in any adequate quantity, it is more difficult to fix a price. The nearest place where livery stable manure is sold, is four miles; price there, per cord, $3.00—cost of carting, $1.50.

Five cords of peat, delivered, - - -	$7.50
Two and one third casks of lime, delivered,	3.50
One cord livery stable manure, " -	4.50
	$15.50—

divided by six—the number of cords, not estimating the increase of quantity from the bulk of the lime—gives the cost, two dollars and fifty-eight cents, delivered—or one dollar and fifty-eight cents per cord, at the peat bog.

(Signed) SAMUEL KEEP.

Dear Sir :—Herewith are the facts, collected with care, at my request, by my father, Samuel Keep, of Longmeadow. My own opinion is, that a new era has begun in agriculture. The quantity of one third of a cask of lime to a cord, was selected in the absence of chemical experiments, to determine how much was absolutely needed to neutralize the ulmic acid, because he prefers to put on ten to twelve cords to the acre—and twelve cords would take four casks of lime to the acre. If lime was as cheap as in Maine, he would probably have put in more. Notwithstanding the expense appears to be great, my father feels confident that he gets a better article in compost at $2.58, than the livery stables furnish at $3.00, with the additional cost to him of $1.50 for carting, making $4.50. N. C. KEEP.

In order that a plant should absorb the requisite nutricient matters, it is essential that its rootlets should have free play, and hence the necessity of a proper texture in soils. It is also requisite that the materials should be rendered in some degree soluble; and that the soil remain permanently good, it is essential that it should not be too loose in its texture; for, against the opinions of some farmers, I still maintain that the principal and most active ingredients of manures and soils, are lost by solution and infiltration, the evaporation being as it were but a drop in the bucket. On this point, however, I shall present some considerations hereafter.

There is also another property of soils too generally lost sight of, namely, their electro motive power, and their influence in this manner, upon the absorbing spongioles of the radicles, producing the effect called by M. Dutrochet, *endosmose*, or *internal impulse*. This effect is most assuredly produced by those mixtures and combinations of mineral matters and salts, with vegetable humus, which characterize luxuriant soils. Here, then, is a new field of research for the philosophical farmer, who will find the still small galvanic currents which take place among the particles of soil, are busy preparing his bread. The influence of electricity has long been known to hasten vegetation, and plans will ultimately be adopted to bring the results of the laboratory into the hot bed and green house, while a contemplation of the phenomena will illustrate those great natural laboratories—the corn-fields of the farmer. A soil consisting of *one kind of earth, is barren*—no matter of what earth it may be composed, whether silex, alumina, lime or gypsum. *Pure vegetable matter, is also barren; but proper combinations or mixtures of three earths, always produce fertility,* provided the *pabulum* or food of the plant be present also. Certain saline matters are said to stimulate plants, and by this I understand that they produce electrical movements or endosmose, for they will act in a similar manner upon dead or inorganic matter, as seen in Dutrochet's experiments. By saline stimulants, the foliage of plants is rapidly and substantially developed, owing to the absorption of carbonic acid gas from the atmosphere, and the retention of its carbon, while the oxigen gas is exhaled by the green leaves. And since such stimuli tend only to the development of the foliage, and act against both germination and ripening, the proper time to apply such substances, is after the plant has shot up, and before it begins to ripen its seeds or fruits.

These principles are generally unknown to farmers, and hence their unskilful application of gypsum, salt, &c., as dressings to soils. They also neglect to consider the native *habitat* of their plants, and hence often apply the wrong stimuli. Now it is evident, that since asparagus plants, onions, cabbages, and similar vegetables, are native plants of the sea-coasts of those countries, to which they are indigenus, that if they are to be cultivated in soils free from saline matter, salt may be advantageously used in small quantities, to render them more luxuriant. Gypsum and sea salt have nearly the same effect upon plants, and hence when the soil derives saline matter from salt-water spray, or vapor, gypsum will not benefit the soil, or act as a stimulant upon plants. This opinion, which is proved in the Prize Essay of Professor Le Cocq, on saline manures, explains the fact, well known in Maine, that gypsum exerts but little action upon the soils near the sea-coast, but does act favorably on the soils of farms situated in the interior of the State, especially on those which contain small quantities of carbonate or geate of lime.

As I have formerly stated, it is evident from an examination of the mineral ingredients of soils, that they *all originated from the decomposition and disintegration of rocks, which for ages have been acted upon by air and water;* those agents having, by their mechanical and chemical powers, shivered and crumbled the solid ledges into those pulverulent matters which form the basis of all soils—to which, subsequently, small quantities of vegetable humus are added by the decay of plants.

Ancient soils. There have been various epochs in the earth's history, when soils were thus formed, and after bearing their luxuriant vegetation, were reconverted by aqueous and igneous causes, into rocks, the structure, and fossil contents of which, denote their origin to have been from sedimentary matter, hardened by pressure and heat. Thus, when we look back to the epoch of the transition formations, we find the rocks composing that series to be composed of agglomerated sand and pebbles, cemented by clay, which presents itself in an indurated form, the result of igneous action. Marine shells, contained in the grauwacke rocks just described, evince that this deposit was chiefly formed beneath the waters of the sea, while some portions of it were deposited in fresh water, as proved by the presence of certain plants, peculiar to bogs and lakes. The slates of this formation contain prints and casts of numerous plants—such as ferns, equisetaceæ, lepidodendræ and stigmaricæ; while beds of anthracite coal, shewing by their structure and composition their vegetable origin, are also included between the strata.

Now it is evident, that the above mentioned plants could not have grown without a soil, and the rocks in which they are imbedded bear every proof that they were once in that condition.

Secondary soils. We come next to the secondary epoch, and here again we are astonished to find proofs of a numerous succession of alternating beds of soil, each having, for long periods of time bore their perennial verdure of intertropical plants, allied to those above noticed, but more complicated and perfect in their structure. The sandstones and shales of this formation are vast herbariæ of ancient vegetation, and their strata contain, well preserved between their sheets, perfect impressions of numerous genera of plants, the species of which are now extinct. Large trunks of trees are also exposed by opening coal mines and quarries of sandstone, while the numerous and reiterated strata of coal itself also bear ample proofs of their vegetable origin.

Here, then, we have another epoch, at which soils existed, produced their abundant vegetation, stored the earth with fuel, and then were reconverted into solid rocks, to be again subjected to the wear and tear of elemental strife.

The TERTIARY EPOCH was of a milder character, and but little disturbance of the solid rocks appears to have been effected during those submersions, when the plastic clay, calcareous marls and strata of perfectly preserved marine shells, were deposited. These sedementary matters appear to have resulted from a slow and gradual deposition of clay and other fine sedementary matter, which beneath the sea, became soon inhabited by numerous shell fish, and were imbedded in succession as we now find them, since the elevation of the land above the encroachments of the sea.

When we consider the several periods which I have briefly mentioned, it will at once reveal to any reflecting person, that the world has been during the lapse of inconceivable ages, subject to great revolutions in its geological organization. At one time, the rocks are worn down into soils, and bear their vegetation—then continents were sunk in the ocean's depths, and subsequently were raised again, the soils having in the mean time, been converted into rocks. By such considerations, we soon learn to respect the antiquity of the world; and knowing that such records are legibly written on the tablets of stone, we feel a natural desire to read and understand their meaning.

ANCIENT ALLUVIAL SOILS, OR DILUVIUM. Subsequent to the epochs of which I have spoken, we find that another scene of violence disturbed the tranquility of the great deep, and the northern ocean was hurled, with its seas of ice, over the land, sweeping the loose materials from the very mountain tops, and depositing them far south of their former resting places—while the grooves, scratches and water marks upon the surface of the fixed ledges, shew the direction in which the current passed. By such a flood, (proofs of which are nearly universal in Maine, as elsewhere,) the soils were transported and commingled, so that we rarely find a soil similar to the rocks beneath it, but identical with that derived from other rocks, which occur to the north and northwest. Having already cited so many localities in proof of this position, I shall not here recapitulate, and the intelligent observer will find so many illustrations in Maine, to satisfy his rational curiosity on the subject, that he need not long remain in doubt as to the facts.

Modern alluvial soils. The present causes which act upon the solid rocks, are both chemical and mechanical. Oxigen, from the atmosphere and from water, is constantly effecting some portions of the work, especially where the rocks contain pyrites. Rivers, torrents, brooks, and even rain, are gradually sweeping away the solid rocks, by their continued action; but more powerful than all others, is the action of freezing water, which, by an almost irresistibly expansive force, rends all rocks, into which water can find a passage, and crumbles down those which are porous in their structure. Upon the coast, the sea ever beating the solid rocks and hurling the loose fragments with the force of battering ordnance against the shores, wears away the ledges, the detritus being either spread out on the bottom, or sifted up at the mouths of harbors and estuaries.

Alluvial soils are produced by the transportation of fine particles, by aqueous agency, from higher sources, and are especially brought down and deposited during freshets, when a river bursts its confines, and being diminished in its velocity, deposits its sedementary matter over the intervales. The force of the wind is also constantly removing fine particles of soil from one district to another, and the dust of ages is of greater importance than is commonly believed. Enough has been said on this subject to excite inquiry, and to stimulate others to look over the pages of nature, for their own satisfaction, and this is all that can be expected from introductory remarks, such as I now offer to the reflecting observer.

It must not be expected that any one locality is to furnish all the data for the elucidation of a general theory; but a discriminating eye will quickly select such as may bear upon the subject in question. Books, relating the observations and experience of others, should also serve to guide those who may engage in this study.

In order to examine a soil, we must become familiar with the mineral ingredients which enter into the composition of ordinary rocks, and learn to discriminate them, even when masked by a covering or stain from metallic oxides and vegetable humus. By practice, this is easily done, where the particles are distinctly visible to the eye, but when they are reduced to a fine powder, then recourse must be had to the microscope, and to the separation by agitation with water. In the field, there is but little difficulty in ascertaining the mineral ingredients of soils, for there we can always discover some places, where they may be distinctly seen. In case the particles are too small for occular examination, then we must resort at once to chemical tests. In all cases where the quantitative determination of the various ingredients of a soil is undertaken, the work is extremely difficult, and requires a long course of exact experiments, which can only be made in a well furnished laboratory; but it often happens that some more simple question is to be settled, which is all that is required for directing the amendments or cultivation of the farm. Such, for instance, as the presence and quantity of vegetable matters, and of any salt of lime. These substances, any ingenious farmer may learn to separate, or at least determine their presence or absence, which may be sufficient to direct his operations in the cultivation of his farm. A minute analysis, however, is too difficult and complicated a task for any one who is not a professed chemist, having at his disposal delicate balances, crucibles of silver and of platina, with all the other usual instruments of analysis, and a complete set of all the various reagents and tests, in a state of absolute purity. To furnish such a laboratory, the farmer would have to expend too much money. Considering how seldom he would have to make use of it, he will find it vastly more economical to avail himself of the skill and materials of those who are duly prepared for such operations.

While engaged in the geological survey of the State, I have always considered it my duty to make chemical analyses of such soils as were in any way remarkable, and I shall herewith present some of the results—such as will prove valuable to agriculturists. I shall also describe the method of making a chemical examination of soils, for the purpose of aiding those who may feel desirous of learning the art.

Analysis of soils. We have first to inspect the particles of the soil in question, in order to ascertain its principal mineral components, so as to learn to what class it belongs. The method of doing this has been described in my Second Annual Report. The soil must then be dried, either by the sun's rays, or by spreading it upon paper in a warm and dry room. It is then ready for mechanical separation by seives, as described in the above mentioned Report. Having separated the pebbles, sticks, and coarse particles, we take a portion of the finest powder that passes the gauze seive, and agitate it with water, pour off the suspended particles, and inspect the remainder, to discover the fine mineral components, which may be done easily by means of the microscope. The quantities of matter suspensible and not suspensible in water, is ascertained by drying and weighing the powders collected, on a filter.

The above operations belong to the mechanical separation of the particles, and shed much light upon the nature of the soil.

Chemical analysis. After the above operations, we have to make a chemical analysis; and for this purpose, one hundred grains of the fine powder which passed the gauze seive, is to be weighed out and placed upon a piece of sheet platina, or even upon a quarter of a sheet of letter paper, and is to be dried at a temperature of 300° F., or not above that point where white paper begins to turn brown by heat. It is then freed from water, and by weighing it a second time, the loss in weight indicates its quantity. (A)

The next operation is intended to determine the quantity of vegetable matter in the soil; and for that purpose, the soil, freed from water,(A) is placed upon a sheet of platina, or in a platina capsule, and introduced into a muffle, or small oven, which is then heated red hot, until all the vegetable matter is burned out of the soil, (the odor while burning may be ascertained by smelting the gas given out by means of a glass tube, placed over the burning soil,) and if animal matter be present, the odor will be similar to that of burning feathers, while the vegetable matter smells like burning peat. After the vegetable and animal matters are burned out, weigh the soil again, and the loss will indicate the quantity of organic matter. (B)

The soil is now ready for the next step, which is to ascertain the quantity of soluble matter it contains. Place it in a thin glass flask, (a clean oil flask will answer,) and pour upon it a sufficiency of distilled water to cover it to the depth of half an inch; then pour in an ounce of pure muriatic acid, and boil it for an hour. Then dilute with water, and filter the solution through a folded double filter of India paper, placed in a glass or wedgewood ware funnel, collect the solution as it drops, in a glass phial or decanting vessel —wash the soil, which is all thrown on the filter, until the water passes tasteless. Remove the filter—dry it, with its contents—then separate the outside filter, and burn the inside one, with the soil which it contains, in the muffle, as before described. Burn also the outside filter, the ashes of which must be weighed and deducted from the burnt soil and filter. (c)

Weigh the insoluble soil, (c) and its loss indicates the soluble matter taken up by the muriatic acid. This serves as a check upon the next operations, and will shew if any matter has escaped detection. The solution which had passed the filter, is now to be returned to the clean flask, a small quantity of nitric acid being added, to convert the oxide of iron into the per-oxide. It is next to be boiled for fifteen minutes, and then pure liquid ammonia is to be added in excess, so as to precipitate all the per-oxide of iron. The whole is now thrown on a double filter, as before, and the per-oxide of iron will remain upon it, while the solution passes the filter, and must be collected, as before described. The per-oxide of iron, and the soluble alumina, are now together upon the filter. Wash with water, until the solution passes tasteless; then dry the filters, separate one from the other, and burn them separately. Weigh one against the other, and the per-oxide of iron and soluble alumina will be obtained. (D). From this, the alumina may be separated by a new attack—or it might have been taken from the iron, before weighing; the former operation being preferable. This operation is done, by melting the alumina and per-oxide of iron in a silver crucible, with thrice its weight of pure potash; then dissolve in water and add more pure potash, until all the alumina is taken up, and the per-oxide of iron remains pure; filter, wash, dry, ignite, and weigh—the loss is the alumina,(E) and the remaining matter is the per-oxide of iron. (F)

The filtered solution, after the separation of the oxide of iron and alumina, is now to be treated for lime, by means of the oxalate of ammonia, and a white precipitate of oxalate of lime will form, if any is present, and may be separated after it has subsided, by filtration. Wash, dry, ignite, to destroy the oxalic acid—add a few drops of a concentrated solution of carbonate of ammonia—heat to dull redness, to expel the carbonate of ammonia in excess, and weigh; this is carbonate of lime. (G)

Now add up the results, and if you have obtained all the components of the soil, and have met with no loss, the sum will be exactly 100 grains. If there is any considerable loss, you must take another portion of the soil, and test it for other substances, and repeat the analysis.

It is seldom necessary to make a thorough analysis of the matters insoluble in acids, since they have not an immediate influence upon vegetation; but to know the future state of the soil, it must be done. In that case, you must take the dry insoluble soil, grind it to the finest powder—weigh it again, to be sure you have not lost any of it—then mix it with four times its weight of pure carbonate of soda, and melt it in a platina crucible. After fusion, soften it with water, and dissolve the whole of it in dilute muriatic acid. Evaporate to entire dryness, in a glass or porcelain basin—stirring it towards the end of the operation, to prevent spattering; then, when it is entirely dry, moisten it with muriatic acid, and dissolve the soluble muriates in water. Boil—then filter the whole on a double filter, as before; wash it for twenty-four hours with pure hot water—which passing tasteless, remove the filter, dry, separate the two filters, burn one against the other, and weigh; the substance is a pure white powder, and is silica. (h). It ought to be weighed while it is warm, for it absorbs water hygrometrically.

From the filtered solutions, you are now to separate the alumina,(i) per-oxide of iron,(k) and lime,(l) as before described; and if your results balance the amount operated upon, you have obtained all the products. If not, test your solutions for magnesia,(m) manganese,(n) and for potash.(o) Test your alumina also, for phosphoric acid. (p)

Magnesia is detected by means of the phosphate of soda and ammonia solution most readily, with which it forms a white precipitate. Manganese is thrown down by carbonate of soda, from its acid solutions, in the state of a white powder, which becomes brownish black on burning. Potash is tested by means of the solution of hydro-chlorate of platina and soda.

The above is one of the most common analyses of soils, and there are so many operations required, that not more than a dozen analyses could be made in four months, unless we could carry on several at a time, as we are able to do in a regular chemical laboratory.

Beside the above method, we have also to determine the quantity of matter soluble in water, in order to ascertain the soluble salts. For this purpose, take 1000 grains of the dry soil, and boil it in a glass bottle, with a pint of distilled water; filter, and then evaporate one half of the solution to dryness, and weigh the residue—re-dissolve it, and test the nature of the saline matters. Test, also, the other half of the solution, separate the products, and weigh them separately.

For the discovery of common salt, chloride of sodium, note whether cubic crystals formed in the evaporated solution, which is salt. (q)

To detect the presence of any muriate, use a solution of pure nitrate of silver. If any such salt is present, you will have a thick curdy precipitate of chloride of silver. Collect it, wash, dry and fuse it in a counterbalanced porcelain capsule. Its weight denotes the quantity of muriatic acid, which is 25.36 per cent. of the chloride of silver.—Soluble chloride. (r).

Any sulphate may be detected by the muriate or acetate of barytes, which gives a white precipitate of sulphate of barytes. Collect on a filter, wash, dry, ignite, and weigh. It contains 34.37 per cent. of sulphuric acid, indicating a sulphate of some base. (s)

The presence of any salt of lime, is detected by the solution of oxalate of ammonia, which gives a white cloudy precipitate of the oxalate of lime. Collect, burn, and weigh. You will have the quantity of carbonate of lime. (t)

Potash and all its saline combinations, give a yellow precipitate with the chloride of platina solution. (u)

Nitre is detected by deflagration with charcoal, and by testing the result for potash. (v)

By referring to the letter against each step of the analysis, it will be seen whether the work is complete; and it may then be drawn up thus—the weight of each article being inserted opposite to its name:

(A) Water of absorption.
(B) Organic matter, animal or vegetable.
(C) Insoluble soil.
(D) Per. oxide of iron and alumina.
(E) Alumina—separated.

(F) Per-oxide of iron—separated.
(G) Carbonate of lime.
(h) Silica.
(i) Alumina.
(k) Per-oxide of iron.
(l) Lime.
(m) Magnesia.
(n) Manganese.
(o) Potash.
(p) Phosphoric acid.
(q) Sea salt.
(r) Soluble chloride.
(s) Sulphate of some base.
(t) Soluble salt of lime.
(u) Potash, or any salt of that base.
(v) Nitrate of potash, or nitrate of any alcaline base.

The small letters refer to the operations subsequent to the gross analysis, and are seldom required, excepting for the purpose of detecting the presence of soluble saline matters, as described in another section.

To ascertain the quantity of vegetable matter, soluble in carbonated alcalies or *geine*, the following is the process proposed by Dr. Dana, with some essential modifications. Take one hundred grains of the fine soil, dry it at 300° F., or until paper browns. Then place it in a flask, and pour upon it a solution of fifty grains of carbonate of potash, dissolved in four ounces of distilled water; boil it until it is saturated, then let the soil subside, and pour off the solution upon a filter. Add to the residue a similar alcaline solution, boil again, and pour off in a similar manner upon the same filter. If the last solution was colorless, all the soluble vegetable matter is taken up, and the soil itself may now be washed out and thrown on the filter, and washed with boiling distilled water until it is tasteless. Dry the powder on the filter at 300°, weigh it, and the loss shews the quantity of vegetable matter, soluble in alcaline solutions. Burn the weighed residue, until all the remaining vegetable matter is consumed; weigh again, and the loss is the insoluble vegetable matter.

The solution which has passed the filter, is of the color of port wine, if it contains vegetable matter in solution. Take a portion of it, and neutralize the alcali by nitric acid; then test it with a solution of nitrate of silver. It will give a dense precipitate of a grey color, which turns reddish brown by exposure to light. Treat the alcaline solution with lime-water, in great excess, and you will then throw down a buff colored precipitate of geate, or ulmate of lime. Wash this on the filter, with dilute acetic or muriatic acid, and you will remove the lime, and pure geine, or ulmic acid will remain.

The insoluble matter on the first filter, may now be analyzed for its mineral elements, in the usual manner; but the salts will have been converted into carbonates. Thus, if gypsum was present, it will be found converted into carbonate of lime.

The above process, suggested principally by Dr. S. Dana, was used by Professor Hitchcock, in the analysis of the soils of Massachusetts. It is a good method for the purpose above indicated, but the varying quality of the vegetable and animal matters is not fully shown by it, nor by any other ordinary method, the process by the deut-oxide of copper being requisite for the analysis of highly manured soils. In Maine, however, we have mostly vegetable matters to deal with, as the organic ingredients in soils, and this process is, therefore, applicable, and has been used by me in several analyses, as above modified.

Dr. Dana suggested the occurrence of sub-phosphate of alumina in soils, and I found in one instance three per cent. of this matter in a soil from Wilton. It is highly probable that it has been overlooked by chemists, since it so closely resembles pure alumina, and precipitates with it.

According to the above described processes, we have analyzed numerous soils from Maine, the results being given below, and again resumed, in a tabular form, at the end of the Report.

Soil from the farm of Mr. J. McCully, of Wilton. It is a yellow loam, derived from the decomposition of argillaceous and mica slate rocks, particles of which are visible in the soil, especially after the fine parts are removed by agitation with water. This soil produced, last year, forty-eight bushels of wheat to the acre, according to the statement of Mr. McCully. Mechanical separation, by two seives, one of which has meshes one-tenth inch in diameter, and the other is of the finest gauze:

Remains on 1st seive, vegetable fibres, pebbles of slate and quartz, - - -	175	grains.
" " 2d seive, fine sand and veg. fibres,	162	"
Passes last seive, very fine yellow powder,	663	"
	1000	

Chemical analysis of 100 grains of the soil, gives:

Water, - - - - - -	5.0	grains.
Soluble vegetable matter, - -	12.0	or geine.
Insoluble, - - - - - -	5.5	
Silica, - - - - - -	54.2	
Alumina, - - - - - -	10.6	
Sub-phosphate of alumina, - -	3.0	
Per-oxide of iron, - - -	7.0	
Oxide of manganese, - - -	1.0	
Carbonate of lime - - -	1.5	
	99.8	
	.2	loss.

Although this soil now produces heavy crops, it will soon become exhausted, unless it is treated with lime. It is rich in vegetable matter, and skilfully treated, will continue fertile without any other manure than above noted.

Soil from the farm of Mr. Harding, Union, produced forty bushels of wheat to the acre, last year—now laid down to grass. It is a brownish yellow loam, containing pebbles of granite and quartz, with vegetable fibres undecomposed.

Remains on 1st seive,	43	grains pebbles.
" " 2d seive,	60	granitic sand and roots of grass.
Fine powder from the last seive, -	897	
	1000	

Chemical analysis :—100 grains, treated as usual, gave :

Water of absorption, - - -	4.6
Vegetable matter, - - - -	8.2
Per-oxide of iron and alumina, - -	9.8
Insoluble granitic soil, - - -	73.2
Carbonate of lime, - - - -	4.2
	100.0

This soil is rich in carbonate of lime, and effervesces with acids very distinctly. It is a good soil for grain, and will endure well. The vegetable matter may be replenished by compost manure, made with peat, when more is needed. The quantity of lime is unusually great in this soil, and was probably derived from the adjacent limestone beds.

Soil from the farm of Mr. L. Levensaler, of Thomaston. This soil is a yellow loam, derived from the decomposition of micaceous and talcose slate. It was dressed with twelve loads of manure to the acre, and had upon it a luxuriant crop of wheat.

Mechanical separation of the ingredients :

1st seive, pebbles of talcose slate, &c. -	271
2d seive, vegetable fibre and sand, -	231
Very fine powder from last seive, - -	498
	1000

Chemical analysis of 100 grains of the fine powder :

Water, - - - - - - -	7.7	
Vegetable matter, - - - -	8.0	
Per-oxide of iron and alumina, - -	11.2	
Insoluble, - - - - -	69.2	
Carbonate of lime, - - - -	2.0	
	98.1	
Carbonate of magnesia, not separated,	1.9	by loss.
	100.0	

This is evidently a good soil, although more loose in its texture than is advantageous for retaining manures.

Muscle mud, which is composed chiefly of clay and lime, being attainable, may be advantageously used, when the soil needs amelioration. It contains enough carbonate of lime to produce visible effervescence with acids.

THOMASTON. *Soil taken from the Beechwoods, north of the West Thomaston lime quarries.* This soil was selected from the midst of the grove, where it had never been cultivated. Its chemical composition is as follows:

Water of absorption, - - -	4.2
Vegetable matter, - - - -	13.8
Insoluble soil, - - - -	68.9
Per-oxide of iron, - - - -	12.9
Carbonate of lime, - - - -	0.2
	100.0

From the small proportion of lime in this soil, it will evidently, when cultivated, require an addition of it to render the soil suitable for wheat. It is an interesting and curious fact, that the soils of Thomaston, so celebrated for its lime quarries, should be wanting in lime.

Soil taken from the north side of the Meadow quarries, gives:—

Water, - - - - - -	7.0
Vegetable matter, - - -	8.0
Insoluble soil, - - - -	76.3
Per-oxide iron, - - - -	7.5
Carbonate of lime, - - -	1.0
	99.8

Soil from the farm of Dr. Burleigh, of Dexter. This soil is of a dark brownish yellow color, and bears luxuriant crops of oats. In some parts of the field, patches are observed where the oats are very tall and heavy, so that, while its general average height in the field is but two feet, some spots had stalks four feet high and of great fulness. Specimens were, therefore, selected from the different places, and herewith are presented the results of the analysis. That where the oats were of ordinary size gives, on mechanical separation:

1st seive, slate and quartz pebbles, - -	137
2d " fine sand, - - - - - -	166
Fine powder, - - - - - - -	697
	1000

Chemical analysis of 100 grains of the fine powder:

Water, - - - - - -	5.4	
Vegetable matter, - - - - -	8.6	
Per-oxide of iron and alumina, -	7.0	
Insoluble soil, silicious, - -	76.9	
Carbonate of lime, - - -	1.8	
	99.7	
	1.3	loss.
	100.0	

On the most fertile spots, the soil is composed as follows:

1st seive, quartz and slate pebbles, - -	20
2d " fine straws, and fibres with sand,	36
Fine powder, - - - - - -	944
	1000

Chemical analysis of 100 grains of the fine powder:

Water, - - - - - - -	3.4
Vegetable matter, - - - - -	7.7
Oxide iron, - - - - - -	2.3
Insoluble silicious residue, - -	83.7
Carbonate of lime, - - - - -	2.9
	100.0

From these analyses, it will appear that a finer texture of the soil, accompanied by a larger proportion of lime, produced the augmented degree of fertility; and it also shews that this takes place where there is even a less proportion of vegetable matter—this instance proving decisively that lime is the best fertilizer to the soil.

Soils from Dr. Bates' farm, Norridgewock. The soils were taken from the following tracts upon a table-land plain, near the Kennebec river. First, from the uncultivated plain, then covered with short grass; second, from the field upon which a luxuriant crop of oats and peas was growing; third, from the wheat field; the above localities being contiguous to each other, and forming a part of a uniform plain.

1st—pebbles and sticks, - - -	50
2d—fine roots of grass and sand, - -	350
Third, fine powder, - - - - -	600
	1000

Chemical analysis of 100 grains of the fine soil—No. 1:

Water, - - - - - -	4.8
Vegetable matter, - - -	10.2
Oxide iron, - - - - - -	6.8
Insoluble matter, - - - -	77.1
Carbonate of lime, - - -	0.9
	99.8
	.2 loss.
	100.0

Analysis of No. 2:

Pebbles and straws, - - -	27
Fine gravelly sand and roots of grass,	276
Fine soil, - - - - - -	697
	1000

Chemical analysis of 100 grains of the fine soil:

Water, - - - - - -	5.5
Vegetable matter, - - - -	7.4
Oxide of iron, - - - -	5.8
Insoluble, - - - - -	79.3
Carbonate lime, - - - -	1.6
	99.6
	0.4 loss.
	100.0

Specimen 3d, from the wheat field. Mechanical separation:—

1st—gravel and straws, - - - -	46
2d—sand and straws, - - - - -	242
Fine powder, - - - - - -	712
	1000

The increased quantity of lime in the cultivated field, may be owing to a top dressing of lime having been used. The soil is of good quality, but needs more lime. The wheat looked very well, excepting where the weavel had attacked it. Some of the ears were smutty, apparently from the action of a small worm in the stalk of the wheat.

Analysis of soil from the farm of B. Bryant, Esq., of Anson. This soil produces forty bushels of wheat to the acre, and has been cultivated for several years, barn yard manures having been used for dressing. Mr. Bryant informed me that he had never dressed it with lime, and since it does contain a large proportion of that substance, it must either have been naturally in the soil, or was introduced in the form of stable manure. Considering the large proportion which it bears, the latter could hardly have been the case; and it is more probable that the lime was derived from those rocks which produced the soil by their decomposition. The soil is of a dark brown yellow color, and of good texture, being composed of mechanical parts:

1st—grass and stones, - - - -	11
2d—sand and stones, - - - -	190
Fine loam, - - - - - -	799
	1000

100 grains of the fine powder contain:

Water, - - - - - - -	7.6
Vegetable matter, - - - - -	5.6
Per-oxide of iron, - - - - -	6.1
Carbonate lime, - - - - -	4.6
Insoluble, - - - - - -	75.0
	98.9
	1.1 loss.
	100.0

Soil from an uncultivated field, belonging to J. Ham, Esq. Bangor:—

1st—small gravel, - - -	4
2d—sand, - - - - -	10
Fine powder, - - - -	986
	1000

Chemical analysis of 100 grains:

Water, - - - - - -	4.9
Vegetable matter, - - - -	6.7
Insoluble soil, - - - -	74.6
Ox. iron and alumina, - - -	11.5
Carb. lime, - - - - -	1.2
	98.9
	1.1 loss.
	100.0

This analysis was requested, in order to ascertain if the soil contained a sufficiency of vegetable matter, since more could be added to it easily from a neighboring peat bog. It contains a sufficiency for the nourishment of several crops, but a compost of lime and peat, as I have recommended, will make it more fertile. It will also form a good covering to the peat bog, in case it is desirable to convert it into a meadow.

Soil from the corn field of Mr. E. C. Belcher, Farmington. This field has been cultivated for thirty years, and generally gives a good crop of Indian corn. It is a yellow and loose loam, composed of the following mechanical parts:

1st—pebbles and straws, - - -	26
2d—sand, - - - - -	430
Fine loam, - - - - -	544
	1000

Chemical analysis of 100 grains of the fine soil:

Water, - - - - - -	5.9
Vegetable matter, - - - -	8.5
Per-oxide of iron and alumina, - -	7.8
Insoluble matter, - - - -	75.9
Carbonate of lime, - - - -	0.8
	98.9
	1.1 loss.
	100.0

Soil from the field of Mr. Foster, Avon. This soil is of a light yellow color, is of granitic origin, and bears good crops of corn.

Mechanical separation:

1st—granite pebbles and sticks, - -	69
2d—sand, - - - - - -	338
Fine powder, - - - - -	593
	1000

Chemical analysis of 100 grains of the fine powder:

Water, - - - - - -	4.4
Vegetable matter, - - -	8.5
Insoluble granitic sand, - - -	76.0
Oxide of iron and alumina, - -	9.7
Carbonate of lime, - - - -	0.3
	98.9
	1.1 loss.
	100.0

DIXFIELD. *Soil from Col. Morrill's farm.* Grass, grain, oats.

Mechanical separation:

No. 1. Pebbles and straws, - -	7
No. 2. Fine gravel and vegetable fibres,	36
Fine soil, - - - - - -	957
	1000

Chemical analysis of 100 grains fine soil :

Water, - - - - - -	3.2
Vegetable matter, - - - -	7.1
Per-oxide of iron, - - - -	5.4
Carbonate of lime, - - - -	0.4
Insoluble matter, - - - -	82.8
	98.9
Loss, - - - -	1.1
	100.0

RUMFORD. *Mr. Wood's farm.* Soil dark brown yellow; crop Indian corn, one hundred bushels (ears?) to the acre.

Mechanical separation :

No. 1. Granite pebbles, - - -	48
No. 2. Sand, - - - - -	208
Fine soil, - - - - -	744
	1000

Chemical analysis of 100 grains :

Water, - - - - - -	5.7
Vegetable matter, - - - -	8.8
Oxide of iron, - - - - -	6.0
Carbonate of lime, - - - -	0.7
Insoluble matter, granitic sand, -	77.1
	98.3
Loss, - - - -	1.7
	100.0

ORRINGTON. Light yellow loam, with a heavy crop of wheat growing upon it.

Mechanical separation :

No. 1, Pebbles, - - - -	19
No. 2. Sand and vegetable fibre, -	125
Fine loam, - - - - -	856
	1000

Chemical analysis :

Water, - - - - - - -	3.8
Vegetable matter, - - - -	4.9
Insoluble " - - - -	81.8
Per-ox. iron and alumina, - - -	8.3
Carbonate of lime, - - - -	0.3
	99.1
	.9 loss.
	100.0

CLINTON. *Soil from farm of Mr. Burrill,* bears a good crop of corn.

Mechanical separation :

No. 1. Gravel and vegetable fibres, -	3
No. 2. Sand and " " -	122
Fine loam, - - - - - -	875
	1000

Chemical analysis of 100 grains fine soil :

Water, - - - - - - -	4.3
Vegetable matter, - - - -	11.1
Insoluble " - - - -	78.1
Per-ox. iron and alumina, - - -	6.4
Carbonate of lime, - - - -	0.1
	100.0

BETHEL. *Soil from the farm of I. Haynes, Esq.*, bears forty bushels of corn to the acre. Has been dressed with barn yard manure. The soil is of a brown color, and was derived from granitic rocks.

Mechanical separation :

No. 1. Granite pebbles, and sticks, -	20
No. 2. Fine gravel and vegetable fibres,	230
Fine soil, - - - - - - -	750
	1000

Chemical analysis on 100 grains:

Water, - - - - - - -	4.3
Vegetable matter, - - - -	8.7
Insoluble granitic sand, - - -	79.6
Per-oxide of iron, - - - -	4.4
Carbonate of lime, - - - -	2.3
	99.3
Loss, - - - -	.7
	100.0

This soil will evidently produce good crops of wheat, since it contains the requisite ingredients for such a crop.

Alna. *Soil taken from amid a white maple grove.* It is a reddish brown colored loam.

Mechanical separation:

1st seive, gravel, - - - -	30
2d " sand and vegetable fibre, -	254
3d " fine loam, - - - -	716
	1000

Chemical analysis on 100 grains:

Water, - - - - - - -	6.3
Vegetable matter, - - - -	10.2
Insoluble micaceous sand, - -	74.7
Ox. iron and alumina, - - -	6.3
Carbonate of lime, - - -	0.7
	98.2
Loss, - - - -	1.8
	100.0

Warren. *Soil from the farm of Mr. Fish,* bears a good crop of wheat. This soil is of granitic origin, and contains:

No. 1. Pebbles of granite and slate, -	52
No. 2. Fine particles of the same, - -	127
Fine soil, - - - - - -	821
	1000

100 grains analyzed, give :

Water,	8.2
Vegetable matter,	6.6
Insoluble granite sand,	74.9
Per-oxide iron,	8.6
Carbonate of lime,	0.8
	99.1
Loss,	.9
	100.0

This soil needs more lime and vegetable compost.

SEBEC VILLAGE. Soil brown yellow, derived from slate rocks. Bears a good crop of wheat.

Mechanical separation :

No. 1. Slate,	78
No. 2. Smaller particles,	155
No. 3. Fine loam,	767
	1000

Chemical analysis of 100 grains:

Water,	4.0
Vegetable matter,	10.3
Insoluble slaty particles,	76.8
Per-oxide iron,	7.4
Carbonate of lime,	0.9
	99.4

FOXCROFT. *Soil from the farm of Mr. W. S. Mayhew*—good crop of wheat. Soil granitic, brown yellow.

Its particles separated, gave :

No. 1. Granite pebbles and straws,	103
No. 2. Finer sand,	200
Fine soil,	697
	1000

Chemical analysis of 100 grains:

Water, - - - - -	5.5
Vegetable matter, - - -	13.9
Insoluble soil, - - - -	71.5
Per-ox. iron, - - - -	7.0
Carbonate lime, - - -	1.0
	98.9
Loss, - - - -	1.1
	100.0

GUILFORD. *Soil from farm of J. Kelsey, Esq.*, bears a good crop of oats. Soil light brown.

Mechanical separation:

No. 1. Gravel, - - - -	52
No. 2. Sand, - - - -	76
Fine soil, - - - - -	872
	1000

Chemical analysis:

Water, - - - - -	6.4
Vegetable matter, - - -	11.4
Insoluble soil, - - - -	70.8
Oxide iron, - - - - -	10.3
Carbonate lime, - - - -	0.3
	99.2

DOVER. *Farm of Mr. Stephens.* Soil brown yellow—bears a good crop of wheat.

No. 1. Pebbles and grass roots, -	54
No. 2. Sand, - - - -	206
No. 3. Fine loam, - - - -	740
	1000

Chemical analysis:

Water, - - - - -	6.6
Vegetable matter, - - -	11.1
Insoluble soil, - - - -	71.1
Per-oxide of iron, - - -	9.3
Carbonate of lime, - - -	0.8
	98.9
Loss, - - - -	1.1
	100.0

MINOT. *Soil from farm of S. Stetson.* Corn and Wheat crops said to be good.

Mechanical separation:

No. 1. Dry grass roots, - - -	3
No. 2. Sand, - - - -	76
Fine loam, - - - - -	921
	1000

Chemical analysis of 100 grains:

Water, - - - - - -	4.3
Vegetable matter, - - -	4.9
Insoluble soil, - - - -	83.7
Oxide of iron, - - - -	5.9
Carbonate of lime, - - -	0.5
	99.3
Loss, - - - -	.7
	100.0

LIVERMORE. *Soil from the farm of Mr. J. Washburn.* Clover, two tons to the acre. Soil, dark greyish yellow.

Pebbles and grass, - - - -	57
Sand and " - - - -	136
Fine loam, - - - - -	807
	1000

Its chemical composition is, on 100 grains:

Water of absorption, - - -	4.0
Vegetable matter, - - - -	9.3
Insoluble soil, - - - - -	78.1
Oxide iron, - - - - -	7.3
Carbonate of lime, - - - -	0.7
	99.4
Loss, - - - - - -	.6
	100.0

GLENBURN. *Soil from farm of Mr. Sears.* Wheat crop good. Soil yellowish grey.

No. 1. Pebbles, - - - -	250
No. 2. Sand, - - - - -	237
Fine soil, - - - - -	513
	1000

Water, - - - - - - -	5.7
Vegetable matter, - - - -	6.3
Insoluble, - - - - - -	77.8
Oxide of iron, - - - - -	8.5
Carbonate of lime, - - - -	0.7
	99.0

ACTION OF ALCALIES ON SOILS—BURNING OF SOILS, &C. Potash renders most of the vegetable humus soluble in water; consequently it produces a very marked and powerful effect, rendering vegetation for a while extremely luxuriant; but the evils that follow from a too free use of this substance, are very great, for the soil is in a few years deprived of its vegetable matter, and is rendered barren. Hence, it is absolutely necessary, if you make free use of ashes in the amendment of soils, that a constant supply of vegetable matter should be introduced into it, to fu:nish an unfailing supply of nutriment to the plants. Neglience of this principle, will surely convert the farm dressed in this manner into a barren waste, and every farmer ought to be well informed on this point. By knowing and attending to the rule here laid down, the agriculturist may avoid those difficulties which I find are so prevalent in Maine and New-Hampshire, where ashes is used in the treatment of soils. On the sandy soil of Long Island, New-York, the farmers know that they must put in a large quantity of compost with their ashes, and sea and rock weeds are the most accessible sources of vegetable manure which they have at command. Spent ashes acts also by the quantity of lime it contains, and the principal advantage of using it in preference to lime alone, in the treatment of sandy soils, depends upon the clayey nature of the ashes itself, which serves to improve the texture of the soil and retains the manures and water longer than it otherwise would.

Much discussion has arisen among farmers, as to the operation and advantages of burning the surface of the soil. The same principles, above enunciated, also explain this operation. It is true that a vast quantity of vegetable humus is destroyed by burning; but at the same time potash is formed by the combustion of wood, which acts as a fertilizer, for it dissolves the vegetable matter, and causes the vegetation to become more luxuriant. The potash also decomposes some of the mineral constituents in the earth, and saturates acid salts decomposing the sulphate of iron and converting it into a harmless substance. There can be no doubt, however, that a burnt soil soon runs out or becomes barren, and this fact is readily explained by the circumstance before mentioned—that is, the conversion of the humus into soluble matter, so that it is soon lost by infiltration. There is, however, no other method so convenient for the clearing away the forest trees, while preparing a farm in the wilderness; and if the farmer will take the trouble to restore the vegetable matter which he has lost in the soil, either by putting in compost, as directed in the foregoing pages, or by turning in the sod, after raising two crops upon his field, he will overcome the difficulty and retain the original luxuriance of his farm. The system that has been heretofore followed, would soon render the State a barren waste, and it is earnestly hoped, that our admonitions may be duly improved.

Ground bones have long been used in Europe for manure, with the happiest effects, and several years since I had occasion to call public attention to the vast amount of such matter thrown away in our large cities. The quantity of bones rejected from the soap works in Boston was immense, and those establishments were put to considerable trouble and expense to have them carted to some convenient place for throwing them into the sea. Since that time, there has been quite an important commerce carried on in the sale of bones, and a mill has been erected at Roxbury, for grinding them into powder for manure.

In answer to queries proposed by me, Mr. Nahum Ward has furnished me with the following statistics of his business:

"I grind three or four hundred tons of bones per annum.

"I obtain them in Boston and vicinity.

"They cost me eight dollars per ton, delivered at the mill, in Roxbury.

"Ground bones sell at thirty-five cents per bushel.

"The mill cost from five to six thousand dollars."

A similar establishment is maintained in New-York, and in both places the business is said to be profitable, there being a ready demand for the article. It acts as a permanent ameliorator of the soil, the animal matter doubtless undergoing putrefaction, and is rendered soluble, while the phosphate and carbonate of lime are also gradually taken up by the plants, but very slowly, since those substances are nearly insoluble in water.

If bones are burned or charred by fire, they may be easily ground in a common grist mill, or may be crushed by the rolling mill, used by tanners. In this state, the bone still preserves all its mineral and some of its animal matter, and will act as a powerful fertilizer, when placed on any soil. It is to be used for a top dressing.

Ground oyster shells are also useful, as a manure, and there is a bed of half disintegrated shells on the sea-coast, at Newcastle, in this State, where that substance may be readily prepared. The shells may be transported to the Plaster Mills of Waldoborough, and there be ground and packed in casks for sale.

Refuse bone, black from the sugar refineries, is also a very powerful manure, and is extensively used in France, and the sugar refiners send their ships to this country, and to all parts of the world, to obtain bones, which they use, first for decoloring sugar, and then sell the exhausted bone black for manure.

Maple sugar. The Acer Saccharinum, or sugar maple, is one of the most luxuriant and beautiful native forest trees in Maine, and abounds wherever the soil is of good quality. Its ascending sap is very rich in sugar, which is readily obtained by means of a tap, bored with an auger, half an inch in diameter, into the sap wood of the tree; the sap being collected in the spring of the year, when it first begins to ascend, and before the foliage puts forth. It is customary to heap snow around the roots or stumps of the trees, to prevent their putting forth their leaves so soon as they otherwise would, for the juices of the tree begin to be elaborated as soon as the foliage is developed, and will not run.

After obtaining a quantity of maple sap, it is poured into large iron or tinned copper kettles, and boiled down to a thick syrup; and after ascertaining that it is sufficiently concentrated to crystalize or grain, it is thrown into casks or vats, and when the sugar has formed, the molasses is drained off through a plug hole, slightly obstructed by tow. But little art is used in clarifying the syrup, and the chemist would regard the operations as very rude and clumsy; yet a very pleasant sugar, with a slightly acid taste, is made, and the molasses is of excellent flavor, and is largely used during the summer, for making sweetened water, which is a wholesome and delicious beverage.

The sugar frequently contains oxide of iron, which it dissolves from the rusty potash kettles, in which it is commonly boiled down, and hence it turns tea black. A neat manufacturer will always take care to scour out his kettles with vinegar and sand, so that the sugar may be white. He will also take care not to burn the syrup, by urging the fire towards the end of the operation. If his syrup is acid, a little clear lime water will saturate it, and the lime will principally separate with the molasses, or with the scum. The syrup should be skimmed carefully during the operation. It is not worth while, perhaps, to describe the process of refining sugar; but it is perfectly easy to make maple sugar as white as the best double refined loaf sugar of commerce. It would, however, lose its peculiar acid flavor, which now distinguishes it from ordinary cane sugar.

Were it generally known how productive are the groves of sugar maples, we should, I doubt not, be more careful, and not exterminate them from the forest, as is now too frequently done. It is, however, difficult to spare any forest trees, in clearing a farm by fire, but groves in which they abound, might be spared from the unrelenting axe of the woodman. Maple trees may also be cultivated, and will become productive in twenty or thirty years; and it would certainly be one of our most beautiful pledges of regard for posterity to plant groups of maples in convenient situations, upon our lands, and to line the road sides with them. I am sure that such a plan, if carried into effect, would please public *taste*, in more ways than one, and we might be in part disfranchised from dependence on the cane plantations of the West Indies.

The following statistics will serve as an example of the products of the sugar maple in Maine, and it will also be noted that the whole work of making maple sugar is completed in *three* or *four* weeks from the commencement of operations.

		lbs. of sugar.
At the Forks of the Kennebec, twelve persons made,		3,650
On No. 1, 2d Range, one man and boy	"	1,000
In Farmington, Mr. Titcomb	"	1,500
" Moscow, thirty families	"	10,500
" Bingham, twenty-five families	"	9,000
" Concord, thirty families	"	11,000
Pounds of sugar, - - - - -		36,650

This, at twelve and a half cents a pound, would be worth $4,581.

It must be also remarked, that the manufacture of maple sugar is carried on at a season of the year when there is little else to be done, and if properly shaped evaporating vessels were used, a much larger quantity of sugar could be made in the season.

Sugar may also be advantageously manufactured in Maine, from the beet, as is done in France. The wide-spread intervales of the Aroostook, above the entrance of the St. Croix, are well adapted for such crops; and I am informed by experienced farmers, that the season will there be amply long enough for the growth and maturity of the sugar beet, from the north of France. Information respecting the manufacture of beet sugar, and the value of the crops, may be found in Chaptal's Agricultural Chemistry, and the improved processes may be learned from the various agricultural papers, published periodically. The value of the sugar beet, for feeding cattle and swine, is very great; and where it is not used for that purpose, the pulp may be easily made into coarse wrapping paper, either bleached or colored. I would invite the attention of the farmers of Maine, to this important department of agriculture, and request the statistical results of their experience.

Tabular view of the Analyses of Soils collected and analyzed in 1838.

No	LOCATION.	Crops, &c.	Water, pr. cent.	Veg. matter, pr cent.	Soluble Soil, pr. ct.	Insoluble soil, pr. ct.	Oxide Iron, per cent.	Carb Lime. per cent.	Magnesia, per cent.	Manganese. pr. ct	Mechanical Analysis on 1000 grains. Coarse, did not pass the 1st sieve. No. 1.	Sand, &c did not pass the 2d sieve. No. 2.	Fine Loam. No. 3.
1	Albany.	Sugar maples—heavy growth.	6.3	10.2	16.2	74.7	6.3	0.7			60*	254	686
2	Anson—B. Bryant.	Wheat—good—soil dark brownish yellow—effervesces briskly with acids.	7.6	5.6	17.4	75.0	6.1	4.6			11	90	899
3	Avon—J. Foster.	Corn—good—soil light brown.	4.4	8.5	19.6	76.0	9.7	0.3			69†	338	407
4	Bangor—J. Ham.	Uncultivated—soil yellow.	4.9	6.7	20.5	74.6	11.5	1.2			4	10	980
5	Bethel—I. Haines.	Corn—40 bushels to acre—dressed with barn manure—soil brownish.	4.3	8.7	16.1	79.6	4.4	2.3			20†	230	750
6	Brewer—T. Barstow.	Wheat—luxuriant—dressed with lime—soil, clay loam, yellowish grey.	4.1	7.9	14.1	77.7	7.6	1.0			3	36	961
7	Canada Road—8 miles from Bingham.	Mixture of hard and soft growth of wood—soil light brownish yellow.	5.6	6.0	17.9	76.3	9.1	0.4			198‡	117	685
8	Clinton—Mr. Burrells.	Corn—good—light brownish yellow.	4.3	11.1	16.8	78.9	6.4	0.1			3	22	975
9	Dexter—Dr. Burleigh.	Oats—luxuriant—soil, dark yellow.	5.4	8.6	13.7	76.9	7.0	1.8			137§	166	697
10	" " "	Oats—4 feet high—soil only in spots, greyish white.	3.4	7.7	12.9	83.7	2.3	2.9			20§	36	944

11	" Mr. Green.	Wheat—good—soil, light brownish yellow.	4.6	10.2	12.9	72.5	10.1	1.0			73	174	753
12	Dixfield—Col. Morrill's	Oats—100 bushels to acre—soil light brownish yellow.	3.2	7.1	14.5	82.8	5.4	0.4			7	36	957
13	Dresden.	Clover and herds-grass—1½ tons to the acre.	3.8	7.6	19.2	77.0	8.7	2.5			18	131	851
14	Farmington—E. C. Belcher.	Corn—good—cultivated for corn 30 yrs.—soil brownish yellow.	5.9	8.5	18.4	75.9	7.8	0.8			26	430	544
15	Foxcroft—Mr. Stevens	Wheat—good—light brownish yellow.	6.6	11.1	22.3	71.1	9.3	0.8			54	206	740
16	" W.S.Mahew	Wheat—good—soil brownish yellow.	5.5	13.9	22.8	71.5	7.0	1.0			103	200	697
17	Glenburn—Mr. Sears.	Wheat—good—soil yellowish gray.	5.7	6.3	15.8	77.8	8.5	0.7			250	237	513
18	Guilford—J. Kelsey.	Oats—good—light brownish yellow.	6.4	11.4	25.4	70.8	10.3	0.3			52	76	872
19	Kingfield—Gen.King's	Uncultivated—soil yellow.	4.6	5.9	15.3	89.2	8.6	0.8			267	223	510
20	Livermore—J. Washburn.	Clover—2 tons per acre—soil dark yellowish grey.	4.0	9.3	17.3	78.1	7.3	0.7			57	136	807
21	Livermore—O. Pray.	Wheat—30 bush. to acre—soil yellowish grey.	3.4	8.0	15.6	79.1	7.3	0.3			128	135	737

* Pebbles, granite and mica slate. † Granite. ‡ Granite, slate and hornstone. § Slate and quartz.

Tabular view of the Analyses of Soils collected and analyzed in 1838.

No	LOCATION.	Crops, &c.	Water, pr cent	Veg. matter, pr cent	Soluble soil, pr. ct.	Insoluble soil, pr. ct	Oxide Iron, per cent.	Carb. Lime, per cent	Magnesia, per cent	Manganese, pr. ct	Sulphuric Acid, pr. ct.	Alumina.	Mechanical Analysis on 1000 grs. Coarse, did not pass the 1st sieve. No. 1.	Sand, &c did not pass the 2d sieve. No. 2.	Fine Loam No. 3.
22	Minot—E. Stetson.	Corn and wheat—good—soil dark brownish yellow.	4.3	4.9	11.3	83.7	5.9	0.5					3	76	921
23	Norridgewock—Doctor Bates's Plain.	Uncultivated.	4.8	10.2	17.9	77.1	6.8	0.9					50	350	600
24	" " " "	Oats and peas—good—soil brownish yellow, sandy.	5.5	7.4	14.8	79.3	5.8	1.6					27	276	697
25	Orrington.	Wheat—good—soil light yellow loam.	3.8	4.9	13.5	81.8	8.3	0.3					19	125	856
26	Rumford—Mr. Wood.	Corn—100 bush. to acre—dark brownish yellow.	5.7	8.8	15.4	77.1	6.0	0.7					48	208	744
27	Saco—I. Jordan.	Greenish—containing copperas.	13.5		13.9	54.7	11.2	2.7		0.6	9.8				
28	Sebec—Mr. Chandler.	Wheat—good—soil light brownish yellow.	4.0	10.3	18.6	76.8	7.4	0.9					134‡	143	723
29	Sebec Village.	Wheat—good—soil brownish yellow.	4.1	11.5	15.1	73.7	0.3	0.6					78	155	767
30	Thomaston—North of Lime Quarries.	Wheat—good.	7.0	8.0	16.5	76.3	7.5	1.0							

31	Thomaston—L. Levensaler.	Crop very fine.	7.7	8.0	20.2	69.2	11.2	2.0					271‡	231	498
32	Thomaston—North of Lime Quarries.	Uncultivated—beech growth of wood.	4.2	13.8	26.	65.9	12.9	0.2					360	268	372
33	Union—Mr. Harding.	Corn—40 bush. to acre—brownish yellow—slight effervesence with acid.	4.6	8.2	22.2	73.2	9.8	4.2					43	60	897
34	Warren—Mr. Fish.	Wheat—good—yellow.	8.2	16.6	25.6	74.9	8.6	0.8					52	127	821
35	Wilton—J. McCully.	Wheat—45 bushels to acre—brownish yellow.	5.0	12.0	28.0	5.5	7.0	1.5*	3.0†	1.0		10.6			

* Phosphate Lime. † Sub Phosphate of Alumina. ‡ Slate.

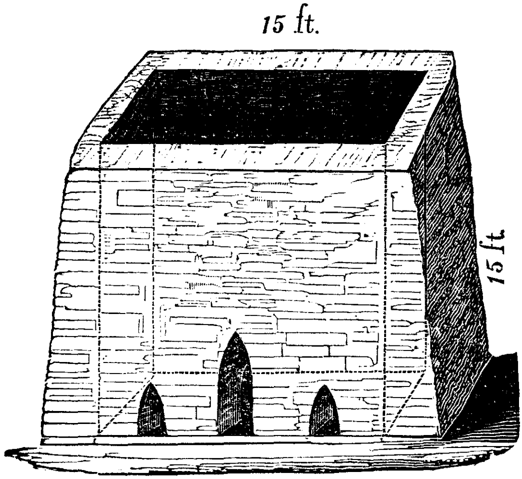
REMARKS ON LIMESTONES.

A tabular view of the chemical composition of each variety of limestone, analyzed in my laboratory during the present year, is herewith subjoined. From this table, it is easy to fix the relative values of each kind of rock, and to learn how they will burn in the kiln. Many of them will bear the heat requisite for converting them into lime, by the discharge of the carbonic acid gas, at a full red heat; others must be burned more slowly and with a gently increasing fire, which may be ultimately driven to a dull or cherry redness. All those marked as good, will slake perfectly, after being burned, and are sufficiently pure for all ordinary uses. They are generally free from magnesia, and hence are better adapted to agricultural use, than the magnesian limestones. Magnesia will remain a long time exposed without absorbing its equivalent of carbonic acid, and thus it does not act favorably, excepting when thoroughly saturated by the fermentation of compost, or by long exposure to the air. When such limestones are skilfully managed, they answer nearly as well as the pure lime. The argillaceous matter, contained in some of the limestones, that occur imbedded in slate rocks, does no harm to the soil, and is even beneficial in some cases. The Dexter and Guilford limestones will make a good and strong mortar, and will also prove very valuable in making compost, or for the treatment of soils by liming. So will also many of the other varieties hereafter mentioned in the tables.

Under the description of each locality, I have made ample observations on the nature of the lime-rock, and shall here present some views or plans of such kilns as may be required for the conversion of the rocks into quicklime.

Fig. 1st. Kiln built of refractory rocks, lined with clay, and laid outside with mortar—fifteen feet wide—fifteen feet high—five feet back. Arches—middle, five feet high—side arches, three and a half feet high.

Fig. I.



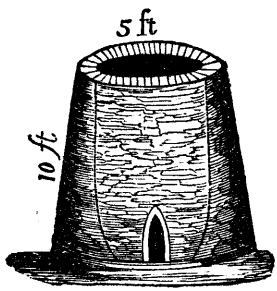
Lime Kiln for burning 300 casks of lime at a time.

This kiln is of the form commonly used at Thomaston, and the lime is burned by means of wood fuel—thirty cords of wood being required to burn the charge of rock. The operations are divided into four turns, and from three to four days and nights the fire is kept unremittingly in action. At the close of the operation, the limestone is found to be converted into caustic lime. A more full statistical view of this business, may be seen in my former Reports on the Geology of Maine. It is necessary, in case the rock is liable to slag, that it should be broken into pieces of pretty uniform dimensions, or at least, care must be taken to place the larger masses near the fire, and the smaller ones more distant from it. The arches are to be built up of large angular pieces of the rock, not more than six or eight inches in diameter, and they must be laid loosely, so that the flame may penetrate freely through them, and act upon the superincumbent mass of broken lime-rock. I have seen some persons break the limestone in the kiln. This should never be done, for the small pieces fill up the interstices in the charge, and prevent the passage of flame and heated air, required for the draft of the kiln.

In laying the arches of limestone, make them coincide with the arches of the kiln—pack the pieces so as to allow the passage of the fire, and lay the limestone in a very loose manner, until the kiln is half full. Then you may throw in the smaller pieces in confusion, and fill up the kiln to the top. This being done, place your fuel in the arches and kindle your fires, and drive them until the lime is sufficiently burned, which may be from three to four days and nights, according to the kind of rock, and the intensity of the fire.

A smaller kiln may be required in some towns, and in cases where the farmer burns his lime for his own use only. I therefore, herewith present a plan for such a kiln.

FIG. 2.



This kiln is of a cylindrical form, rather wider outside at the bottom than at the top, so as to give it more solidity. It is ten feet high, and five feet in diameter at the top, while the bottom internally contracts a little, so as to support the charge. This contraction is unnecessary, excepting where the limestone crumbles, or "*fine burns*," during its calcination. The arch may be made four and a half or five feet high, and two and a half or three feet wide, so as to allow room for discharging the lime, after it is burned. The kiln may be made of any rock, capable of withstanding a full red heat. Talcose slate, mica slate, or even common clay slate, will answer. It must be pointed with clay inside, and with mortar on the outside. In charging this kiln, the stone is broken into suitable sized pieces, and an arch is built up, corresponding with the arched opening and extending quite across the diameter of the kiln. Having laid up this arch loosely, pack the kiln in a careful manner, until it is half full of the broken limestone; then you may throw in the smaller pieces on the the top, and fill the kiln entirely. It is now set for burning, and you have only to place the wood and kindle a fire in the arch, keeping the heat gradually increasing, until the limestone is sufficiently burned. This may be known, either by the time required, or by the appearance of the pieces at the top of the charge. It will generally be noticed, that when the fire has done its office, that the smoke ceases to appear at the top of the kiln, and a flame rises through the interstices at the top. The charge begins also to settle a little. The time required for the burning of lime, varies with the different kinds of lime-rock, and hence it is alone to be learned by experience in a particular case, and with the kind of kiln with which the lime burner is acquainted. One or two fair trials, will teach any intelligent man how to do the work in a proper manner.

The cost of the lime prepared in a small kiln, is always a little more than when it is made in a large way; hence where an extensive demand exists, the three hundred cask kiln would prove the most profitable to the manufacturer. Most of the limestones here described, may be burned at the cost of twenty-five cents per cask, in bulk—or for fifty-cents, packed in casks. Where it is to be used on the spot, in agricultural improvements, it may be thrown out of the kiln, and allowed to slake itself, and then is ready for immediate use. Its weight is increased from thirty to fifty per cent. by slaking, and its bulk is tripled or quadrupled; hence, where it is to be transported to a distance, it is better to take it in its caustic state, either in bulk or in casks.

A shed ought to be built near the kiln, so as to keep the lime under cover, to prevent its being wet by rain.

Rock, fresh from the quarry, burns more easily than after it has become dry by laying exposed to the action of sun and air.

Limestones, containing pyrites, like that at Brown's corner, in Clinton, give out sulphurous acid gas during the process of burning, and in such cases, it is unpleasant to have the kiln near the house. In all cases, at the commencement of the operation, much smoke is produced, and it is, therefore, convenient to place the kiln where people are not likely to be annoyed by it. When driving the fire in a lime kiln, you perceive that the limestone melts or slags, you must not increase the heat beyond that point.

Poor limestones are frequently burned best by means of wood that is not perfectly dry, so as not to burn too rapidly. A little experience and discretion, however, will teach any man how to regulate the fire, so as to make the best kind of lime.

By examining the tables, knowing how one kind of limestone burns, you may judge of the others which are there presented. Nearly every variety of limestone found in Maine, I have burned in my laboratory, and know, practically, exactly how they will burn, and the quality of lime that will result. Where the oxide of iron is more than two per cent. the lime will have a brownish tinge, so as to render it unsuitable for plastering ceilings. The slate is merely inert, and gives an ash grey color to the lime, where it abounds.

Silex, when chemically combined with the lime and oxide of iron, forming what are called by chemists *silicates of lime and iron*, produces a hydraulic limestone, liable to melt at a full white heat. It is frequently a valuable article for making hydraulic cement, and abounds in several places in the State, especially at Machias, and at the Forks of the Kennebec river. Many of the rocks described in the catalogues appended to this Report, as calciferous slates, will also make hydraulic lime. They may be burned at a red heat, but beyond that temperature run into a deep green glass or slag.

Tabular view of the Analyses of Limestones collected during the Geological Survey of 1838.

No	Locality.	Variety.	Carbonate of Lime, per cent.	Insoluble matter, per cent.	Oxide Iron, per cent.	Magnesia, per cent.	Lime, per cent.	Remarks.
1	Abbot: Ira Witherum.	Blue—dull.	74.0	24.8	1.2		41.9	Good.
2	Athens Road.	Greyish white—crystaline.	70.4	25.2	4.4		39.6	Good for agriculture, but makes brown lime.
3	Athens Village.	Bluish, compact.	72.6	2.8			40.8	Good for agriculture, slags at white heat.
4	Bingham.	Reddish brown, dull—micaceous—hard.	42.6	55.8	0.6		24.4	Poor—not worth burning for lime.
5	Carthage: B. Winter.	Light grey—granular, containing mica.	89.8	8.8	1.4		50.4	Bears full burning—good for mortar and for agriculture.
6	Carthage: Mr. Reed, No. 2.	Reddish white.	76.2	23.4	0.4		42.8	Good—burns easily—liable to slag if over-burned.
7	Clinton: J. D. Burrell.	Bluish grey—slaty.	47.2	50.4	2.4		26.5	Poor—burns at red heat, slags—makes brown lime.
8	Clinton: L. Brown.	Bluish, containing slate and pyrites.	54.0	43.0	3.0		30.3	Slags at full red heat; makes brown lime—rather meagre, but good for agriculture.
9	Clinton: A. Brown.	Blue, interstratified with thin folia of slate.	76.8	17.2	0.6		43.1	Good—bears full red heat, makes a fair lime.
10	Dexter: E. Crowell's.	Blue, interstratified with thin folia of slate, containing small veins of calc. spar.	90.0	8.6	1.4		50.6	Very good; bears full red heat; makes nearly white lime.
11	Dexter: Mr. Fish.	Bluish, mixed with small veins of quartz and slate.	89.2	9.6	1.2		50.1	Good—like the above.
12	Dexter: L. Pullen's.	Bluish, compact; interstratified with thin folia of slate.	78.2	20.0	1.8		44.0	Good—but not quite so strong as the preceding.
13	Dexter: John Puffer.	Bluish—slaty—compact.	84.0	14.4	1.6		47.2	Good—makes strong lime.

Tabular view of the Analyses of Limestones collected during the Geological Survey of 1838.

No	Locality.	Variety.	Carbonate of Lime, per cent.	Insoluble matter, per cent.	Oxide Iron, per cent.	Magnesia, per cent.	Lime, per cent.	Remarks.
14	Dixfield.	Bluish, with crystals of actynolite.	69.4	29.2	1.4		38.9	Burns at red heat, slags at higher temperature; slakes coarse.
15	Dover: South side of River.	Bluish grey; mixed with slate, calc. spar and quartz.	70.6	25.4	4.0		39.7	Burns at a full red heat, slags at white heat—makes brown lime.
16	Dixfield: Mr. Holman's.	Dark bluish grey, dull—micaceous, containing small crystals of actynolite.	79.6	20.0	0.4		44.7	Burns solid at a full red heat, slags at white heat—good lime.
17	Dover.	Bluish grey—seams of calc. spar, containing slate and quartz.	70.6	25.4	4.0		39.7	Not so good as the above; makes brown lime.
18	Farmington, Titcomb's Hill: J. D. Coney's.	Dull bluish; mixed with slate.	88.8	6.4	4.8		49.4	Bears a full red heat, slags at a white heat; makes brown lime.
19	Farmington Hill: D. J. Coney.	Bluish, slaty; mixed with mica slate.	84.4	14.4	1.2		47.4	Like the above; but makes a better colored lime—ash grey, white when slaked.
20	Forks of Kennebec, Mr Foster. Recommended for hydraulic lime.	Buff-color—compact, stratified.	54.4	27.0 silex 8.2 alu.	carb. iron 2.8 silicate iron & mang. 2.4	5.0	30.5	Good for hydraulic lime, to be burned at red heat. Runs into glass at white heat.
21	Foxcroft Falls.	Light-blue, containing calc. spar, pyrites and slate.	35.6	62.0	2.4		19.9	Too poor for lime, but will answer for flux to iron ore.
22	Foxcroft: Cave near river.	Bluish—interstratified with slate, containing pyrites.	48.8	47.8	3.4		27.4	Poor—good only for flux to iron ore.
23	Guilford—River.	Dark blue.	84.8	13.8	1.4		47.6	Good—bears a full red heat, makes white lime, that will answer for all ordinary uses.

24	Hampden.	Blue, slaty, hard; not good.	5.0	93.2	1.8		2.8	Turns red in the fire; is not suitable for lime.
25	Harmony.	Bluish, slaty.	61.4	36.4	2.2		33.9	Burns at a red heat, slags at a white heat—makes a poor brown lime.
26	Industry—on Farmington Road.	Blue, micaceous, containing blue calc. spar.	76.0	21.2	2.8		42.7	Good—bears a full red heat; makes a brown lime.
27	Jay: Mr. Noyes.	White—crystaline, containing quartz and actynolite.	not good—rejected as useless.					
28	Livermore Falls.	Grey, with numerous crystals of actynolite.	62.8	34.0	3.2		35.3	The lime burns white, but is full of crystals of actynolite, but will answer for agriculture.
29	Mount Vernon.	Greyish white—granular—numerous crystals of actynolite, mixed with mica slate.	48.8	47.0	4.2		27.4	Bears a full red heat. The lime is white—but is full of crystals, that make it coarse. It will answer for agriculture.
30	New Sharon: J. Bean.	Blue, mixed with mica slate.	53.8	36.0	10.2		33.1	Bears a full red heat. The lime contains brown scales of mica, and is dark brown.
31	New Sharon: J. Winslow.	Light blue, micaceous.	77.0	20.6	2.4		43.3	Good—makes fair lime of a brown color.
32	New Sharon: S. Tollman.	Light blue, micaceous.	88.2	10.2	1.6		49.6	Good; less brown than the above.
33	Norridgewock: S. Sylvester.	Bluish, mixed with slate.	88 2	10.6	1.2		49.0	Good; burns solid, slakes well; is light brown, but strong.
34	Norway: W. Parsons.	Greenish grey.	51.4	47.6	1.0		28.8	Makes a weak lime; slags at full red heat.
35	Norridgewock: A. Wood	Dark blue, micaccous.	51.2	48.4	0.4		28.7	Weak lime; slags at high red heat.
36	Phillips: I. Whitney.	Granular, stratified with dark and light stripes.	64.8	34.4	0.8		36.3	Makes good lime; fine, burns a little; will slag at a white heat.

Tabular view of the Analyses of Limestones collected during the Geological Survey of 1838.

No	Locality.	Variety.	Carbonate of Lime, per cent.	Insoluble matter, silix or rock, per cent.	Oxide Iron, per cent.	Magnesia, per cent.	Lime, per cent.	Remarks.
37	Phillips: E. side County Road.	Greenish grey, compact.	67.6	26.8	5.6		37.9	Weak, slags; makes brown lime.
38	Phillips: I. Whitney.	White; granular.	65.0	34.6	0.4		36.5	Like the other variety; fine, burns a little.
39	Phillips: W. side County Road.	Greyish white.	5.2	88.2	6.0		2.9	Not good for lime.
40	Poland: N. Bray.	Greenish white; granular, containing actynolite.	43.6	54.4	2.0		24.4	Makes brown lime, coarse when slaked.
41	Rumford Falls.	Greyish white; crystaline, with crystals of actynolite.	78.0	20.8	1.2		43.9	Fine, burns; but makes a good strong and white lime; good for every usual purpose.
42	Skowhegan Falls.	Bluish grey, mixed with a little slate.	52.6	38.6	3.8		32.3	Good for agriculture; but is brown colored.
43	Strong: Norton's Mills.	Containing calc. spar, mixed with a little slate.	90.5	8.4	1.0		50.8	Good for lime; makes a good mortar.
44	Temple: I. Varnum.	Bluish grey, dull, micaceous, containing spots of iron.	70.2	28.4	1.4		39.5	Burns at red heat; slags at higher temperature; makes light brown lime.
45	Thomaston: Beechwood Q., hard stone.	Stratified with blue and grey stripes.	55.6	2.8	1.2	carb. magnesia 39.4	31.2	Burns solid; slakes well; makes good white lime for mortar.
46	Turner: S. Davy.	Greyish white—granular—with crystals of actynolite.	74.6	25.0	0.4		42.9	Good; burns to good lime, but contains crystals of actynolite, and is coarse.
47	Turner: Oak Hill.	Greenish grey, granular.	40.0	59.0	1.0		23.7	Not good; will not make lime.
48	Union.	Brown, with numerous pieces of hornblend.	9.8	32.0	58.2		5.4	Not good for lime.

49	Waterville: Gen. Robinson.	Bluish, dull, interstratified with slate.	47.2	47.2	5.6		26.5	Too weak to make good lime.
50	W. Waterville—Great Falls.	Bluish, interstratified with thin folia of slate.	73.8	24.8	1.4		41.4	Good for agriculture; makes lime of a light brown color; slags at a white heat.
51	West Waterville: Mr. Crowell's.	Light bluish, interstratified with thin folia of slate.	89.8	9.0	1.2		50.4	Good; makes light brown lime.
52	Winslow: James Wall.	Light bluish grey, with small veins of calc. spar.	73.8	24.2	2.0		41.4	Good for agriculture; makes brown lime.
53	Winslow: T. Simpson.	Light grey, dull, coated with slate.	68.4	31.0	0.6		38.4	Burns at red heat; slags at higher temperature; makes weak lime.
54	Winslow: Mr. Drummond's.	Blue;—interstratified with slate.	81.8	16.2	2.0		45.9	Good; burns at full red heat; slags at white heat; makes brown lime.
55	Winslow: Mr. Furbur.	Dark blue, mixed with a little slate.	77.8	20.6	1.6		43.7	Good; burns at red heat, and slakes light brown.
56	Winthrop: J. Richard's.	Dark granular.	78.8	20.2	1.0		44.3	Good for lime; burns well at intense red heat; makes a solid lime, that slakes well, and is full of scales of mica. It is strong.

REMARKS ON THE IRON ORES.

A tabular view presents the results of my researches on the various iron ores, analyzed during the present year.

In several instances, there are sufficiently large deposits in a single bog, to supply a blast furnace for many years. Other localities are found, situated so near together that it would be easy to transport the ore to some common central point, where a blast furnace might be erected for smelting the ore. By consulting the map of the State, it may be seen where the most convenient localities are found for the above purpose.

Iron ores will bear transportation to a great distance, as is evident from the fact that it is found to be a profitable business to bring the bog iron ore from New Jersey, and from the islands on the coast of Maine, to Boston and Plymouth, from whence it is transported over land to furnaces situated in the interior, from fourteen to twenty miles, and there to convert it into iron, and carry the iron to Boston for sale, where much of it is purchased by citizens of Maine.

Although bog ores are not so rich in iron as some of the solid or mountain ores, they are so much easier smelted in the furnace, that the workmen generally prefer them; and by the hot blast applied to a furnace fed by charcoal, a much larger proportion of good iron may be obtained than is usually extracted by the common methods.

Bog ores mix advantageously with the magnetic iron ore in the blast furnace, lighten the charge, and make the slag run better; so where they can be obtained within reasonable distances, they ought to be mixed and wrought together.

Where magnetic iron ore alone is to be wrought, such as occurs at Marshall's Island and Buckfield, it may be more conveniently converted into bar iron directly, by the bloom forge—and such forges are of but little cost, and may be advantageously set up for working such ores. It sometimes happens that iron pyrites, or arsenical iron, occurs accidentally in the bog ores, and then it injures the quality of the bar iron, making it brittle or "*short.*" A portion of these troublesome matters may be expelled by roasting the ore by means of a wood fire, over which the lumps of ore are to be piled, and allowed to remain until the fuel is burnt away. A portion of the arsenic and sulphur will remain, and still contaminate the iron. Ores, containing this substance, are to be used, then, only for the manufacture of cast iron.

In a few instances, a slight arsenical odor was perceived during the roasting of bog ores from Maine. The pulverulent variety, or ochre, from Clinton and Skowhegan, contains so much of this impurity that it is unfit for wrought iron. Such ores arise from the decomposition of arsenical iron pyrites, common in some of the slate rocks around the deposit. Of all the iron ores, the red and brown hæmatite are considered the best, since they yield about fifty-four per cent. of iron, and are just heavy enough for a good charge in the blast furnace. Such ores I have found in inexhaustible beds upon the Aroostook river, near Currier's settlement, and at Woodstock, N. B. From the latter locality, it is now contemplated to ship the ore, in its crude state, to Liverpool, England—where it will sell for eight dollars per ton. It will be carried as ballast in the lumber ships. If Woodstock should be granted to the United States, in the settlement of the North Eastern boundary, this valuable bed of iron ore would prove of national importance, since it is close to the military post at Houlton.

By referring to my former Reports, it will be seen that the manufacture of iron is a most profitable business, and those who have sighed for mines of gold and silver, by looking into the history of such mines in the southern States and in Mexico, will find that iron mines are the most profitable, and will pay their workmen five times higher wages than those of gold.

In examining veins and beds of iron ores, contained in rocks, there is no difficulty in ascertaining exactly how many tons of iron are included in the bed or vein, the depth of working being limited by the depth of natural or practicable drainage; but bog ores are more difficult to measure, and the quantity can only be ascertained approximatively, but near enough for all practical purposes. Small deposits of bog ore occur in nearly every town, and I would caution those concerned not to erect furnaces until the quantity of ore has been surveyed by some person conversant with geology, and with the art of working metalic ores; for I have frequently been assured of the existence of inexhaustible beds of such ores, where, on examination, I found only an area of a rod or two square, and but a foot in depth. Persons unacquainted with our profession, are very apt to commit errors of this kind, and they are disposed to believe, that where there is but a mere stain of iron, that if they could only dig deep enough, that they would discover a great mass of iron ore. This is a too frequent error, and one which I have the greatest difficulty in eradicating from the public mind. Those stains of iron rust on the rocks, arise alone from the decomposition of pyrites or bi-sulphuret of iron—a substance never used as an iron ore, and mountain ores, as they are commonly called, never dissolve or run down with the water that flows over them. Pyrites does, however, by its decomposition, furnish all the bog iron—but it would be utterly worthless if it contained any of the pyrites in it. It is, therefore, of great importance to know that this mineral is thoroughly decomposed; and that can be learned only by chemical analysis. It is unusual to find a bed of good bog iron more than two or three feet thick, and more frequently it is but a foot in depth. In order to ascertain the quantity of ore, you must measure the area of land where you know it to exist, and prove its depth over the whole area by digging through it. Then if you multiply the area in feet by the depth in feet, you will have the number of cubic feet of the ore. Ascertain how much a cubic foot of it will weigh, by taking its specific gravity, and analyze the ore, to ascertain its per centage. Then you can calculate the number of pounds of iron in the deposit, and learn whether the supply is ample or not. In the present Report, may be seen examples of such measurements; and where there is a sufficiency of good iron ore for supplying a blast furnace, I have mentioned the fact, and where there was not, I have also noted it, as may be seen in the preceding pages.

Tabular view of the Analyses of Iron Ores collected and analyzed in 1838.

Locality.	Variety.	Water and vegetable matter, per cent.	Insoluble matter, per cent.	Pr. Oxide of Iron, per cent.	Iron, per cent.	Per Oxide of Manganese.
Andover: E. Merrill's,	Brown, resinous and vescicular,	21.0	3.4	75.6	52.3	
Argyle: Hemlock stream,	Brown pan—vesicular, resinous,	29.6	4.6	65.8	45.55	
Bristol: McCobb's,	Yellow—bog iron,	22.0	15.0	63.0	43.	
Bucksport, near Orland,	Yellow—vesicular,	17.8	4.0	56.4	39.	
Clinton: Mr. Foster,	Brownish yellow—pan—resinous,	18.0	13.4	68.6	47.55	
Clinton: Mr. Burrell's,	Yellow—vesicular.	33.0	4.4	62.6	43.3	
Dixfield,	Yellow and brown vesicular,	25.2	3.6	71.2	49.35	
Dover: A. Hinds—No. 5, 11th Range,	Hard pan—yellowish,	20.0	4.0	73.0	50.61	
Dover: Rodger's,	Manganesian iron ore—light—black (bog Manganese,)	34.5	0.7	21.7	14.55	42.0
Do. do.	Bog iron—resincus, vescicular,	13.0	46.5	40.5	28.07	
Farmington: Wyman's Hill,	Yellow—pan,	12.2	18.8	69.0	47.84	
Foxcroft: I. Richardson,	Yellow, containing numerous fragments of slate,	17.0	17.0	66.0	55.76	
Greenwood: Mr. Bradbury,	Brown and yellow—resinous, compact pan,	18.8	6.2	75.0	51.99	
Jay: S. Norton,	Yellowish brown—vesicular,	21.4	8.2	70.4	48.80	
Liberty: B. C. Mathews,	Black—resinous—heavy,	22.0	11.2	59.5	41.24	7.3
Rumford: S. Lufkin's,	Brown,	18.0	2.8	79.2	54.9	
Winslow,	Compact pan—resinous,	15.8	6.2	78.0	53.07	

Dr. Stephenson's Report, and Remarks on the State Boundaries.

Herewith I present the Report of my assistant, Samuel L. Stephenson, M. D., who was charged by me with the exploration of a portion of the Androscoggin and Megalloway sections. His researches will prove very interesting and important to the people of Maine, and shew that we have a good counter claim against the British encroachments upon the territory of Maine—for the north-west angle of Maine, as appears from this Report, is at present fixed at least *ten miles too far south of its true place*, and it is evident that a small brook has been mistaken for the main Megalloway river, in marking the north-west angle of Maine and New-Hampshire. The latter State has also a right to extend the line of its territory farther north than the present limits, as marked by the commissioners.

It is certainly of great importance to the peace of the country, that the whole northern and eastern boundary of Maine should be *forthwith accurately surveyed and permanently marked* by proper monuments, and I trust that so important a national question as the territorial limits of one of the States of this great and glorious Union, will not be allowed to remain unknown and undefined. Before closing this Report, allow me to remark that it is of the greatest importance to both Great Britain and Maine, that the claims of the two countries should be *forthwith adjusted.* Let the British Government at once fairly and honorably acknowledge the claims of Maine, as she ultimately must—for nature has too distinctly marked her boundary in accordance with the letter of the treaty, to admit of a doubt—and then some arrangement, convenient to the two countries, can be easily made, so as to give the British free communication between New Brunswick and the Canadas, while they, in return, can give us the free navigation of the St. John river, with a depot at its mouth. *Now* is the time to adjust this important question; for we have, as yet, not granted lands upon that tract of territory embraced between the Madawaska, St. John, the sources of Restigouche and Metis rivers, and have, therefore, still the right of ceding a portion of it for an equivalent; *whereas if a single settler should receive a grant of land upon that territory, it would be out of the power of Government, without his consent, to alienate his possessions. Delay, therefore, is extremely dangerous to the peace of the two countries; for we do not know the temper that may influence a future Legislature, and it may become their policy to settle the country even to the very extreme north-east angle of Maine.* If the British government arrange matters properly, the people of Maine might be induced to dispose of that trapezoidal tract of country, just mentioned, and take, as an equivalent, the strip of land on the west side of the St. John, extending from the Monument, at the sources of the St. Croix, to the Grand Falls of the St. John, allowing the State of Maine also the free navigation of the St. John river. This is the best arrangement for the welfare of the two countries, and is the best offer that the United States ought to make to Great Britain. This, however, ought to be made *an after consideration, when our whole title shall be acknowledged.*

Another arrangement may also be made, by settling the boundary as claimed by us, and giving to Great Britain the free right of passage on the Frederickton and Quebec road, forever, in exchange for the free navigation of the St. John. Should war hereafter take place between the two countries, the strongest party of course would prevail either in stopping the use of the road or the river; *but during peaceable intercourse, both parties would be gainers by this adjustment.*

In the former proposal, we should gain one very important point, viz. the possession of the Aroostook Falls, which is one of the best water powers in the country, now just within British limits; and these Falls, at the mouth of the Aroostook, could be turned to great account in sawing lumber, or in driving a blast furnace and forges, to work the great bed of iron ore, discovered by me, upon that river, during the last year's survey. *The working of those mines will be of very great advantage, not only to our people, but also to the provincials upon the St. John; for if excellent iron is furnished them at a lower price than they now pay for it, their prosperity will be advanced in no small degree.*

C. T. Jackson.

DR. STEPHENSON'S REPORT.

To Charles T. Jackson, M. D.,
Geological Surveyor of the State.

Sir:—Agreeable to your instructions I have examined such sections of the Androscoggin and Megalloway Rivers, as you for want of time, and other circumstances, have been obliged to omit, and beg leave, most respectfully to submit the result of my observations, hoping that the very limited time allowed for its preparation, will be sufficient apology for its many imperfections.

On the 26th of July I left Augusta in company with Mr. Wall, one of the assistants, and commenced an examination of the route from that place to Lewiston Falls on the Androscoggin River. Little of geological interest occurred till we arrived at East Winthrop Meeting House, where the diluvial scratches were very distinctly observed on the mica slate rocks, the marks were very large and deep, shewing the immense size of the diluvial boulders which have ground the surface of the rocks. The direction of these marks is nearly North and South, the direction of strata of mica slate is N. E. and S. W.

At Lewiston Falls, on the west side the river, there occurs close to the waters edge a dyke of green-stone trap, two feet six inches in width, having been forced up through a stratum of mica slate. Direction of trap dyke N. 80° W., S. 80° E. The rocks at this place consist of coarse granite and mica slate, with so much distortion of strata that it is almost impossible to obtain their direction and dip. The fall of water at this place is about twenty feet, and it is a place of fashionable resort for the people in that vicinity, to witness the waters as they dash from precipice to precipice.

In this town, Danville and Minot, we collected a number of specimens of soil, the analysis of which, see Dr. Jackson's Report. They yield luxuriant crops of grass and grain. On the 31st of July we pursued our course to Poland, where we discovered a bed of limestone on the farm of Mr. N. Bray, is of good quality, and occurs in great abundance. The direction of the bed is N. E. and S. W. This quarry has been opened in one or two places, in one of which we discovered a dyke of greenstone trap two and a half feet wide, runs N. 80° W., S. 80° E. A smaller dyke was also discovered about twenty feet from the first. These trap dykes were not however of sufficient width to change in the least the appearance of the limestone. The exact width of the limestone bed could not well be ascertained without occupying more time than we felt ourselves authorized to spare at this place. We traced it by its outcropping, several hundred feet in length, and I have no doubt that it is of sufficient width to warrant operations. Good lime has been made near this place, and I see no good reason why lime cannot be burned, not only to advantage to the owner, but also to all the people in that vicinity. Lime can be made at this place for fifty cents per cask. Wood costs nothing. Labor costs from nine to ten dollars per month.

Upon the farm of Mr. Waterhouse, about half a mile from Poland Village, a little poor limestone was discovered, but its very limited quantity, and the granite rocks having been forced up through and mixed with it, render it unfit even for agricultural purposes. It cannot be supposed that, by the discovery of limestone in the interior of our State, that it can be furnished to any other market than that within the vicinity where it is discovered. But, as every intelligent farmer considers lime as indispensible to the successful cultivation of the soil, it should be wrought at every locality where it is discovered, in order to supply the increasing demand of this class of community. While in this town, we visited, by invitation, Pigeon Hill, to examine a bed of iron ore, which we were assured existed at that place; but on investigation, proved to be a bed of slate, containing iron pyrites, or the bi-sulphuret of iron, which, by chemical decomposition, had oxidized such rocks as came in contact with it. It also contained arsenical pyrites, which was proved by the distinct garlic odor given out under the blow pipe.

August 2d, continued our course to Turner, and were there requested to examine a locality, where iron and soapstone were thought to abound; but this proved to be a relic of speculation times—as iron pyrites and mica slate were all the indications of iron ore we were able discover.

On the farm of I. Cole, about half a mile from Turner Village, we discovered some excellent specimens of limestone upon the road-side, which had been, at some previous day, blown from a ledge. It crossed the road in a north-east and south-west direction. On further examination of this locality, it was found to out-crop again on the land owned by Mr. P. Burrill; and from appearances here presented, I think there can be no doubt of the existence of a valuable bed of limestone beneath the superincumbent soil, as a well, recently dug at this place, brought to light some fine specimens of the stone. The length of this bed was traced one hundred and fifty feet in length by its out-cropping edges, but want of time prevented our removing the immense body of earth which overlaid the stone, to ascertain its exact width. The direction of limestone bed is north-east and south-west. The rocks in the vicinity are granite, talcose and mica slates. Wood costs but little. Labor costs from eight to ten dollars per month.

Saturday, August 4th, we visited several caves, the entrance of which was from the side of the mountain, situated on the land belonging to Mr. E. Pratt, on the western side of the river. From some cause, the huge blocks of granite which form the walls of these subterranean apartments, have been so arranged as to form spacious halls, and present a striking regularity of appearance. We were furnished by our guide with lamps, &c., by which we were enabled closely to examine each apartment, as we entered. The first cavern we entered, was about twenty feet long, and from ten to twelve feet wide, with high overhanging walls; and the rocks presented the appearance of having been thrown asunder by some wonderful convulsion of nature, and the damp and chilling atmosphere was similar to that on visiting the sepulchres of the dead. From this, we continued our course by slow and cautious steps, down a pathless descent into the second, which did not differ in any respect from the first. We continued our explorations of this cavernous district, descending with great caution from one to the other, until we had visited six of these subterranean halls, situated one above another, and all corresponding in general appearance, but diminishing in size as we descend—when the last would not admit a person, in an erect position, but were obliged to crawl on our hands and knees, taking great precaution not to meet with the misfortune of losing our lamp, which, at this period of our explorations, was of great importance to us; for had we suffered the misfortune to have our light extinguished, we might have been compelled to grope about in darkness, without even a hope of a happy deliverance from such an uncomfortable situation.

The people at Turner, take a lively interest in the subject of geology, as was evinced by their unceasing attentions to us, during our stay at that place. To Col. Andrews and Major Clark, are due our particular acknowledgements, for their aid in exploring the various localities in that town.

South from the village of Turner, there occurred a bed of bog iron ore, on the farm of Mr. T. L. Davis. On examination of this locality, we discovered some good specimens of the bog ore; and by removing the top soil, we were enabled to expose the ore to view, and by the assistance of several gentlemen, were able to remove the ore to the depth of three and a half or four feet, observing at the same time, that the ore was of better quality and more compact, as we descended. The length of this bed is three hundred feet; the width was not ascertained, on account of water in the bogs below. Iron of good quality, was made at this place some fifty years since. What per cent. of iron it yielded, or why it was abandoned, could not be learned in a satisfactory manner.

On the road from Turner to Livermore, near the house of L. Davy, Esq., the out-cropping edges of a limestone bed, are noticed. Some good specimens were obtained, but probably it does not exist in great abundance. This is undoubtedly a part of the same bed discovered at Turner Village, as the direction from that point is exactly north-east. Limestone, in small quantities, was discovered in various parts of the town, and can, without doubt, be burned to great advantage for agricultural purposes. The farmers make use of lime largely as a top-dressing for their soils. The crops of grass and grain at this place, appear as luxuriant as any I have seen in the State. On the farm of Mr. O. Pray, the granite soil yields from twenty to twenty-five bushels of wheat to the acre. On the farm of J. Washburn, on the same road, it yields of clover two tons per acre.

The rocks on the route from Livermore to Jay, assume a more slaty appearance, and some fine specimens of mica slate were obtained. Direction of strata, N. 47° E.; dips S. 43° W. At Jay, on the east side the river, we were requested to examine a coal formation, which some citizens supposed existed there, on the farm of Mr. Savage, but on exploration of this locality, it proved to be a granite formation, in the place of coal, and of course, no coal or indication of it, could exist there. In our examinations at Jay, but little of interest was observed for the extent of country, which we explored. A little limestone was discovered in several parts of this town, but from its limited quantity, and the presence of much foreign matter, it cannot be of much importance to the town.

From Jay to Dixfield, about one and a half miles north-west from the former village, we observed a high bluff of granite, at the base of which, and in the valley below, the Androscoggin once poured its troubled waters. Immense granite boulders are here distributed one above another in the greatest confusion, leaving a space between, that bears evident marks of once having been the river's bed. The rocks, in place, on the road from Jay to Canton Point, are granite and mica slate. Fine specimens of granite were obtained at Canton Point, half a mile north of the village, and blocks of it can be obtained with perfectly smooth surfaces, thirty feet in length, and of any required thickness. This mountain of granite would be of great value, if it were not situated so far from a market, being of superior quality; but as it is, will be of little importance to the community, being only used for underpinning for the buildings in this vicinity. Dixfield is a village situated on the east side of the Androscoggin, and it presents a lively and business-like appearance. The mills for the manufacture of lumber and flour, are in a very prosperous condition. This village is surrounded by many high mountains, the summits of which are granite, and the sides and bases are composed of slate. We visited one of the most prominent mountains, called Tumble-down-Dick—taking its name from the circumstance that an Indian, by the name of Dick, once ascended this mountain, while under the influence of a powerful excitement, (alcoholic?) and venturing too near the edge of the precipice, was thrown from that lofty eminence and dashed to pieces upon the rocks below. Upon the side and summit of this mountain, there are immense diluvial boulders of granite, some of which weigh several tons. The diluvial scratches are very distinct, and run N. 10° W., S. 10° E. In the eastern part of Dixfield, we discovered a small vein of limestone, containing a large proportion of foreign matter. Several other localities of similar character were found in different parts of the town, but at no one place there could I recommend the burning of lime.

At Rumford Falls a fine bed of limestone was found, from which large quantities of lime may be burned at pleasure, and the inhabitants are already making preparations to commence the work. They have long wished for limestone in their own vicinity, by which they can more successfully cultivate their soil. This lime occurs in the bed of the Androscoggin River, and may, by means of an inclined plane, be brought to land and rendered exceedingly useful to all classes of the community. Its direction is nearly N. E. and S. W. Some good specimens of black tourmaline were found at this place, also several specimens of pyritiferous slate and mica.

The paint mines at Dixfield have attracted some attention on account of a quantity of the paint having been used with success. The paint or yellow ochre is formed by the chemical decomposition of the pyritiferous slate, and at this place it can be obtained in very great abundance, and answers very well for common purposes, but as an article for the market, it is of little value, being situated in the interior of the State. The farmers as a general thing in this vicinity, cultivate their soils in a judicious manner, and notwithstanding their lot has been cast in a broken and mountainous section, yet in very many places are to be seen most luxuriant fields of grass and grain, and there is a spirit indicative of a willingness to receive instruction in the art of agriculture.

From Rumford Point we crossed the Androscoggin River and passed up the west side as far as Bethel. In this town there was but little of interest in the rocks, minerals or soils. At Albany, a few miles above Bethel, we obtained some fine specimens of beryl, and also of green and black tourmalines, and after much labor obtained good specimens of felspar and quartz crystals. This locality has, for many years past, been visited by a great number pupils from almost all the literary institutions within the State, for the purpose of collecting specimens not only for themselves, but to supply the institutions with minerals.

This locality, once so rich in mineral productions, is now almost destitute of interest, and unless great labor, and not a little expense is bestowed, few minerals of interest can be obtained. In order to obtain the specimens for the State Cabinet, and the colleges and other institutions provided for by an Act of the Legislature, I was obliged to blast several times for that purpose. The rocks at this place appear to be undergoing a chemical decomposition, which renders it almost impossible to obtain perfect specimens of any mineral occurring at this locality. The rock formation of Bethel corresponds with that of the whole course of the river thus far, it being of the primitive.

On the road from Greenwood to Norway, we observed on the west side of Twitchel's Pond, a dyke of greenstone trap, forcing itself through the granite formation at that place. Just before reaching Norway Village we passed the beautiful lake, called by the Indians, Pinesewasse Pond, lying in, and to the north of Norway. On the borders of this lake, and extending back some distance, there are fine forests of hard wood growth, which must be of importance to the inhabitants of that vicinity, not only for its heavy growth, but for the richness of its soils, and for the powerful inducements afforded to the agriculturalist. It is astonishing, and much to be regretted that similar tracts of country within the grasp of almost every individual, should be suffered to lie neglected and unimproved. There are too many such valuable sections within the borders of our State, which receive but a small share of public attention; but it gives me much pleasure to be able to testify to the change which is being rapidly effected in the minds of the community in regard to agriculture. In almost every section of our State we find a spirit of anxious inquiry in regard to the chemical composition of soils, and the suitable application to different earths in order to render them at once productive. The erroneous opinion that has too long pervaded the minds of the community in regard to the true merits of the agriculturalist, and the prejudice which has existed against "book farming," (as it is erroneously called) is now (happily for the State) fast fading before the lasting effects of truth, and scientific research, as recorded in works containing the concentrated experience of ages and applied to our own soils. On the farm of J. Smith, at Norway Village, the alluvial soil produces 60 bushels of corn to the acre without the aid of lime, beyond that which the soil naturally contains, and but little animal manure is used. In this town was discovered a bed of limestone, and notwithstanding it is not of good quality, and contains a portion of foreign matter, yet it can be used to advantage in that vicinity for agricultural purposes.

Thus having finished this section of the survey, we proceeded to join Dr. Jackson and the remainder of his party, at Andover, where we met in accordance with our previous engagements. The next morning we all proceeded on our way to the Umbagog Lake, where we arrived at 3 o'clock P. M. and where we remained at the foot of the lake till the next morning, when we provided ourselves with a quantity of provisions, a boat and two good oarsmen, for our trip among the lakes. On the 26th of September our whole party left the foot of the Umbagog Lake, and proceeded on our cruise over the lake to the mouth of the Megalloway River, which we ascended to the settlement of Capt. Wilson, who resides on No. 5 of the second Range. For the report on the survey from Andover to Wilson's, on the Megalloway, see Dr. Jackson's report.

From Capt. Wilson's, Dr. Jackson and all the party, excepting myself, turned back for the purpose of making further explorations of the lakes, and the country in that vicinity, and I was requested to make an examination of the Megalloway River as far as the north-west angle of the State, and further if not driven from the work by approaching winter. The principal object of this examination was to ascertain if possible the precise point where the line between Maine and New Hampshire ends, as it is currently reported in this section that the Megalloway River takes it rise beyond the supposed Canada line. With this view, and for the purpose of ascertaining the geological and topographical features of this section, I left my party at Capt. Wilson's on the 27th of September, and continued my course up river in a little skiff, which (most fortunate for my purpose) happened to be at this point of the river; and though small and scarcely sufficient to contain two persons, yet the owner, Mr. B. Hilliard, who was bound on a hunting expedition to the very point I wished to visit, offered me every assistance in his power, and I am happy here to acknowledge the kindness of that gentleman, who acted in the double capacity of guide and boatman.

Capt. Wilson by great perseverance, and suffering many hardships, has cleared a large tract of land on the west side the river, and in a few years will amply repay him for all his privations and hardships. Near his house are situated the Esquahos Falls, upon which he is now erecting mills for the manufacture of lumber, and we were informed that there will soon be erected flour mills on the same falls, to supply the increasing demand of the growing population. Two miles above Esquahos Falls on the east side of the river, the observatory mountain is seen, thickly covered with a mixed growth of hard and soft wood. It is situated to the north of Richardson's Lake, and is the highest mountain in the vicinity of the river. The banks of the river for several miles continue low, and are covered with small trees of spruce and fir, with here and there a birch and maple, till we arrived within half a mile of the Little Megalloway River, which is a small tributary stream from the west, where the banks become more elevated, and at some points of the river can be seen fine growths of hard wood; but farther back from the river are found much superior forests.

We passed up the Little Megalloway one and a half miles, to what is called little falls, where we discovered a ledge of argillaceous slate crossing the river in a north-east direction. This is the first place of geological interest which I have seen since leaving Esquahos Falls. For eight miles previous to reaching the Little Megalloway, we passed a level and swampy region for the distance of eight miles, and is called by those who have visited this section, long meadows. It is a low swampy section of the country, extending back from the river on either side to the distance of one mile, and upon which nothing grows but the tall meadow grass, which is very luxuriant, growing to the height of three or four feet. The river at this point is exceedingly winding in its course, and it often happened that after a toilsome and fatiguing day's work, that we found ourselves, not more than three miles from our morning's starting point.

The banks of the Little Megalloway, and the hills in the rear, are richly covered with a yellow birch and maple growth, and is an indication of a good soil. To this point I have seen but very little good pine timber, none suitable for the manufacture of the different kinds of lumber called for by our markets, but I was informed by my boatman, that back from the river five or six miles there exist fine timber lots.

We were informed by our friend Wilson, that from the eastern side of the Little Megalloway, one mile from its mouth, there had been a path well bushed out, which if we could find, and carry over to Parmachena Lake, would save much labor and trouble on the main river, but we were unsuccessful in our search for it, and were obliged to return to the main river and set our boat up over the rapids to the distance of five or six miles. In some places so powerful was the current, that we were compelled to take our boat from the river and carry by the most formidable of them. We, however, after much trouble, succeeded in landing our boat and provisions at the carrying place from the river to Parmachena Lake, which is one mile. We encamped at the carrying place on No. 5, fourth range of townships. Early the next morning after partaking bountifully of our pork and bread, we commenced the task of carrying our baggage over a long hill to the lake, which occupied more than half the day, as the path, though well bushed out, was exceedinly hard to follow, and we had not the satisfaction of seeing our boat and provisions safely landed, till we had made three trips with no small weight on our backs, at each trip. Parmachena lake is not laid down on the State map, but is a beautiful sheet of water, three miles in length and about one in width. Some granite boulders were found on the borders of the lake, but no rocks in place were seen. The land in the vicinity of this lake is exceedingly fine, and would most undoubtedly prove a valuable tract of country, were it not situated so far north, beyond the reach at least of civilized man. The hills in this section are not high, but gently sloping to the south, clothed as they are, with nature's richest vestments, render it at once valuable and interesting.

After crossing the lake to its head, we set about providing ourselves with as comfortable a camp as the time would allow. It being nearly dark when we arrived we had but little time to prepare for ourselves, even a partial shelter from the chilling atmosphere of approaching night, and as we were not suffering the inconvenience of storms, we cut a few fir boughs of as great a length as possible, and placing one end in the ground, the tops served as a sufficient protection for the head and shoulders, leaving our inferior extremities to the kindly influence of a roaring camp fire. Our bed consisted of fir or cedar boughs, the latter making a most delightful couch from its pleasant fragrance and softness, and with this for a bed, and a knapsack or a pair of boots for a pillow, we passed a very comfortable night. We are now eight miles from the Little Lake situated at the base of the Camel's Rump Mountain, in No. 4, Sixth Range of townships. The next morning we continued our course as fast as rocks and troubled waters would permit, and this day's progress was slow and toilsome, the water being shallow, and rapidly forcing its way amid half covered pebbles on the bottom.

One mile south of the Camel's Rump Mountain, we came in contact with a ledge of argillaceous slate, the direction of which is nearly north and south and dips to the west.

At a little before night fall, we arrived at our place of destination, at the lake, near the base of the Camel's Rump. This lake is about three fourths of a mile in length, and about as wide, and abounds with salmon trout, and other fish, usually found in our fresh water lakes. It was here that the uninterrupted fine weather, with which we were favored the whole route to this point, was followed by long continued storms of rain and snow, which rendered our progress slow and uncomfortable.

On the 8th of October, I started, with my pilot, from the base of the Camel's Rump Mountain, in search of the boundary line between Maine and New-Hampshire—and having, on our course up river, crossed the line several times, I was satisfied that, by taking a north-west course, we must intersect that line in the course of time. We accordingly took provisions sufficient for a two-days cruise, and commenced our march over the north-east side of the Camel's Rump, and at four o'clock, P. M., we struck the line after having walked five or six miles. Our course now, as we thought, must be a plain one; but we were disappointed, and it proved that our difficulties had just commenced, and it was with the greatest trouble that we could follow the line at all, it being so badly spotted by those who were engaged in the survey; and we were constantly annoyed by a variety of spotted lines in almost every direction, which have been made by the hunters in this region, as guides to their traps. In this broken and mountainous region, and in the midst of so many lines of doubtful character, it would have been impossible to have felt any certainty that our course was a correct one, had it not been for one circumstance, which served as a tolerably sure guide. It was on account of the number of spots on the trees—the State line generally having *two* or *three spots*, of different ages. We, however, continued our course in a most diligent manner, being guided entirely by the number of spots on the trees, and by the compass, as we had ascertained the line to run N. 10° E. by the compass, and at the end of two days and a half, we reached the long sought line, over mountains of rocks, that we found it almost impossible to ascend, and through tangled swamps, worse if possible, than precipitous mountains. The tree that marks the north-west corner of our State, is situated on the side of a small hill, surrounded on all sides by lands much higher than that where the boundary is established, and from the brooks coming from the north-west and discharging themselves into the Megalloway, *I was convinced that the high lands dividing the waters are not at this point. The monument at this place consists of three large flat stones, marked, one Maine, one New-Hampshire, and the other L. Canada; and being placed in their proper situations, serve as the boundary.* We now pushed forward, to ascertain, if possible, the distance to the Megalloway river, which we found to be about two miles, and at this point, was between three and four rods wide, and taking a north-west direction, probably has its source some where near the head of Connecticut river. Here I was obliged to end my explorations, on account of an injury received by one of my ankles, and also for the want of provisions, which were now nearly exhausted. *From the size of the Megalloway river at the point, north of the north-west angle of the State, there can be little doubt of the fact that this river takes its rise in Canada, as the boundaries are* *now defined, and that the line dividing Maine and New Hampshire does not run far enough north by eight or ten miles—falling far short of the highlands—thus leaving a large extent of territory in the Canada possessions, that rightfully belongs to these two States.* The question of boundaries is one that demands serious consideration, and the people of every State should see to it, that their *border lines are well defined and established. Recent experience will act as a stimulus to the people to see to it, that their dividing lines are sufficiently defined and marked, and thereby prevent being brought into war with a foreign power, or what is yet more to be dreaded, in collision with a sister State.*

The Megalloway section is one that cannot cease to interest every one; for within a few miles of its northern extremity, rivers of the greatest importance, have their origin. On the one hand, there are the St. Francis and the Chaudiere, winding their way to the St. Lawrence; and on the other hand, there are the Connecticut, the Androscoggin, the Kennebec and the Penobscot, each commencing as with a drop from some wandering cloud, and by continued accession of tributary streams from surrounding highlands, pour their troubled waters amid mountains and interminable forests, till they at last, winding their course through verdant fields, and gratifying the fancy of the happy villager, reach their home in the sea.

We now commenced our return march to the foot of Camel's Rump Mountain, accompanied by alternating stoims of rain, hail and snow, that continued the whole distance. We had now to march the distance which had occupied two days and a half to accomplish, and with the unhappy reflection, that we were entirely destitute of provision. Our whole dependence was, therefore, on the game which hitherto had been abundant; but in this we were disappointed, nothing presenting itself of an eatable nature, till we had nearly accomplished our journey, when we by accident found two red squirrels, which we ate with much eagerness. This section of country abounds with game of all kinds—such as trout, ducks, partridges, and musk-rats, which is one of the most delicious of dishes. The hunters in this region, make fine business with their guns and traps, and Mr. Hilliard informed me that he always made one hundred dollars per month in trapping the bear, moose, otter, beaver and sable. Wolves are abundant in this section; and on one occasion, when my pilot was absent, and I without fire, in a violent rain storm, I was serenaded all night by the unceasing music of one of those animals, which, probably, for a want of taste for music, on my part, I was rendered rather uncomfortable through the night.

Thus, having accomplished, in an imperfect manner, the object of my mission, and being driven from the work by the autumnal snows, I took leave, though not without regret, of my excellent boatman, Mr. Hilliard, and set my face towards Augusta, by the way of the Connecticut river.

The distance from the Megalloway to the Connecticut river, is about ten miles. The most of the distance was accomplished in a violent snow storm. There is much valuable land between these rivers. Having acted as far as possible in accordance with your instructions, I beg leave to submit the above in its present imperfect form.

I shall bear in lasting remembrance the many kindnesses I have received at your hands, and beg you to accept the assurances of esteem and respect, with which I am,

Most respectfully yours,

SAMUEL L. STEPHENSON,

Assistant.

APPENDIX.

BANGOR, Maine, August 31, 1838.

DR. C. T. JACKSON, &c. &c.

My Dear Sir:—I must apologize to you for not having answered your very obliging letter of the 23d inst. sooner, which I was prevented from doing by the necessity of being out of town most of my time, during your stay here, on business which I could not delay. I return you my thanks for the barometrical calculations you kindly furnished me with. They are very interesting, as they refer in a great measure to the line I have travelled upon. I have just reduced the observations I have made for latitudes and longitudes, and herewith enclose you the results. I regret that other duties prevented my observing at a greater number of points. I have the satisfaction to say that my chronometer has performed with an accuracy past all my expectations, considering the great distance it has been transported over rough roads in stages, wagons, &c. On the trip from this place to Moose Head Lake, the Canada line, &c., and back here, a distance transported over land, of about three hundred miles, in seventeen days, it varied only two and a half seconds of time from its previously stated rate; and again on the trip from this to Houlton, Calais, Eastport, and back here, three hundred and sixty miles in stages, &c., over very bad roads for the most part, and in thirty-one days' time, it varied four seconds from the aggregate rate previously given it. I have, therefore, much confidence in the longitudes deduced from its running.

I enclose you herewith a copy of a report of mine, containing some tidal observations, made at the northern extremity of Cape Cod, which may be amusing to you at a leisure moment.

With great regard, I am yours,

Truly and respectfully,

J. D. GRAHAM.

Latitudes and Longitudes of places determined by Major J. D. GRAHAM, *U. S. Corps of Topographical Engineers, within the State of Maine, in* 1838.

	North Latitudes	West Longitudes from Greenwich.	
	d. m. s.	h. m. s.	d. m. s.
Bangor, (at the Bangor Hotel,) .	44 47 54	4 35 04.3	68 46 04.5
Moose River Custom House, (Lowell's,)	45 39 04	4 40 59.	70 14 45
Tachereau's House, on Canada line,	45 48 31	4 41 31.6	70 22 54
Houlton, (Hasey's Tavern,) . .	46 07 28	4 31 13.6	67 48 24
Amity Post Office, (Dunn's,) being 2 1-2 miles due east of Monument designating head of the St. Croix waters,	45 56 38	4 31 16.1	67 49 01.5
Weston Post Office, ...	45 41 23	*	*
Calais, (Thompson's Hotel,) . .	45 11 24	4 29 01.8	67 15 27
Eastport, (Fort Sullivan Flag,) .	44 54 28	4 27 53.3	66 58 20

* Longitude not yet worked.

REMARKS ON THE TABLES OF BAROMETRICAL OBSERVATIONS.

Those who wish to make use of the following barometrical tables, for the purpose of ascertaining the altitude of any of the points where the observations were made, above the sea level, are advised to consult the excellent tables for calculating barometrical heights, which may be found in De La Bèche Manual of Geology, and also in the French *Annuaire par le Bureau des Longitudes*, 1831–2 and 3. Those who prefer the ancient method of logarithmic calculations, will find rules for the operations in Bowditch's Practical Navigator, 1837, and in various other works devoted to civil engineering and surveying.

I have occasionally in the records given the temperature according to the centigrade thermometer, the attached thermometer, which was graduated after Farenheit's scale, having been accidentally broken during our travels. In case Oltman's tables are used, this circumstance will save the trouble of converting the temperature from Farenheit's scale to the centigrade, and hence I have preferred to let them remain just as they were recorded.

In all cases, I allow the barometer to hang in a shady place long enough to acquire the temperature of the surrounding air, so that it was hardly necessary for me to record the temperature of the detached thermometer. Sometimes, however, there was a trifling difference, owing to the reflection of the sun's rays from the rocks and trees, and then it is noted.

Barometrical levelling, after the method which I have adopted, is very accurate, and the errors are always so small that they would be altogether imperceptible in an ordinary sectional profile, the width of a line drawn by the pen being sufficient to cover the greatest variations, renders it impracticable to draw a plan on paper more accurately than our measurements represent.

For canal sections, which must represent on a very large scale, the minutest deviations from the horizontal level, barometry is not sufficiently exact; but for geological profiles, they are all that can be desired.

No error beyond six feet has been found in any of our measurements of the heights of mountains, by this method; and by many nice triangulations, I have tested the accuracy of them in several instances. The general agreement of the results, calculated in divisions, and then added together, and compared with the whole result of the extreme observations, also give the most satisfactory proof of the correctness of the method.

There is also another great advantage in this mode of mensuration, and that is, there is less danger from errors in reading off the instruments, and we can compare the results on single observations, and on the means of many sets—the latter being the most free from fallacious results.

In order to make proper observations, it is necessary to obtain barometers absolutely free from atmospheric air, in which the mercury produces a clear metalic click, when the instrument is gently inclined, so as to allow the mercurial column to strike the summit of the tube, where there is an absolute vacuum, when the barometer is in its perpendicular position. The tube must have a perfectly cylindrical and uniform bore, and the relative capacities of the tube and of the cistern, must be known, so as to allow for the descent of the column from its normal point. A thermometer attached to the instrument measures its temperature, and the record is marked T. A detached thermometer, agreeing in scale with that on the barometer, must be used to determine the temperature of the circumambient air, and the record is marked t.

When you make your observations, those made at the base of the mountain being marked T, t, the observations made at the summit of the height may be marked T' t'. If the height of the barometer, at the base of the mountain, is expressed by h, let that on its summit be marked h', and let c be the centrigrade difference of the thermometers.

If now you look out the numbers in Oltman's tables corresponding with h, and h', you may algebraically express them by a, and b, the letter c denoting the thermometrical difference. Then you have this formula to solve:

$a - b - c = \times =$ the approximate height; or if the air was warmer on the top of the mountain, it would be $+c$.

For more minute corrections for the difference of temperature, in the different strata of air, multiply the $\frac{1}{1000}$ part of the approximate height by the double sum $2(t+t')$; and the correction will be positive or negative, as the $t+t'$ is positive or negative. A correction of the approximate height is also to be made, for the curvature of the earth and diminution of weight in the latitude given; and this is always additive. With a little practice, any person may learn to make these calculations, since they are short and easy to work.

The most common source of errors in barometrical measurements, arise from the neglect to place a series of well-regulated and compared instruments in a line across the country from the sea-port where the chief stationary barometer is kept, to the scene of operations; for it must be evident that there may be local changes in atmospherical pressure, that ought be known and allowed for in the calculations. When all the instruments at the various sections mark their regular range, there can be no doubt of the uniformity of its pressure, and then the results will be more certain.

When I began my journeys for the season, I took especial care to arrange all these matters, and on comparison of barometers with Rev. Solomon Adams, I found that both instruments marked the same height, and the thermometers are reduced to the same standard. Mr. Adams's instrument is placed 121.8 feet above the high water mark in Portland harbor, and that sum must, therefore, be added to all heights calculated from that station.

On returning from a long tour around Moose Head Lake, &c. with my barometer, and comparing it at the Portland station, I found that the alteration of the column was but $\frac{1}{100}$ inch for that length of time, so that we know there can be no appreciable error in our Kennebec and Canada road section.

Several gentlemen have politely aided me in keeping barometrical and thermometrical registers, among whom are some of the most scientific men in the State.

Hon. Daniel Sewall, of Kennebunk, a veteran in meteorology, and extremely accurate in his observations, and nice in his records.

Rev. Solomon Adams, of Portland, a distinguished teacher in that city, and an accurate and scientific observer.

Prof. Parker Cleaveland, of Bowdoin College, Brunswick, a gentleman well known for his scientific attainments, and accurate in his observations in this department of science, as in others.

Robert H. Gardiner, Esq., of Gardiner, a gentleman well known to meteorologists throughout the country, for his indefatigable and valuable labors.

Mr. J. B. Cahoon, Treasurer of State, has also had the goodness to keep a series of observations on one of our barometers, at the State House, and his tables are neatly recorded, and are herewith presented.

At Waterville, it was very important to have a station, and there I was most fortunate in obtaining the assistance of Prof. G. W. Keely, a gentleman of science, whose name is an honor to the College to which he belongs.

With such efficient and generous aid, I feel confident that our work will commend itself to men of science; and I beg leave here to express my thanks to all the above named gentlemen for their kind and free assistance.

The tables above mentioned will be found in this Report, and also some valuable Rain tables, by Prof. Cleaveland and R. H. Gardiner, Esq.

To Prof. Keely's Barom. h, add (inch) 0.08, to make the instrument correspond with mine.

From Mr. Cahoon's deduct (inch) 0.01.

Now when you wish to ascertain the height of any place where I may have made a barometrical observation, note my record, look out the same day and nearest hour when Mr. Adams made his record at Portland—call that h, and mine h'; and if you wish to know whether the pressure was free from local variation, look over the tables of those who took observations nearest to mine, and mark the difference, if it exist. Having worked your problem by the rules before described, and obtained the height in feet above the cistern of Mr. Adams' barometer, add to it the height of his instrument from the sea level, 121.8 feet, and you will have the desired altitude.

The intermediate stations may be calculated to great exactness, by taking means of a whole month's observations, and working those *means* as a set of single observations. This being done, you can select any one of the other stations, the height of which you have ascertained, and calculate from that point any others where I have made mine.

It is unnecessary for me to remark on the value of these researches, for any one who knows enough of the subject to feel an interest in them, will at once perceive the important results which we are attaining.

Rain guages ought also to be established in different parts of the State, in order to learn how much rain falls per annum, or per month, in a given section of the State.

I confidently believe, that a vastly greater quantity of rain falls among the mountains and in the woods, than on open or plain land, and that more rain falls amid lakes than on table land. We want, however, a good set of observations to settle the facts in the case, and to inform us of their relations respectively. Such information I propose to obtain, and it will prove of great importance to science and to the arts, for we shall be able to predict the changes that may take place in the great rivers and lakes of Maine, when the woodlands shall disappear before the axe of the settler.

The most absurd notions are prevalent as to the quantity of rain that falls upon the earth, and farmers, so dependent upon its genial influences, ought to know more upon this very interesting and important subject.

TABLE I.

Barometrical and Thermometrical Observations *made at various points in the State of Maine during the Geological Survey in* 1838. *Intended to serve for calculating the elevations of the various places above the level of the sea, and for sectional profile views.* By C. T. JACKSON.

Date.	Hour.	Where the Observations were made.	Barometer.	Temp. Bar. T.	Temp. air. t.	Remarks.
May 30	3½ P. M.	Sidney road—A. Foot's house.	29.960	61° F	61° F	
"	7 "	Ticonic Falls—Waterville, above.	30.183	58	58	
31	1½ "	" " " "	30.184	69	69	
"	4 "	Waterville, at Prof. Keely's house.	30.070	70	70	
June 2	noon	" " Williams' hotel.	30.050	64	64	
3	"	" " " "	30.030	60	60	
"	1 P. M.	Ticonic Falls, above.	30.130	70	70	
"	1½ "	" " below, at watch rock.	30.170	70	70	
"	2½ "	" " " "	30.170	70	70	
"	3 "	Waterville—Williams' hotel.	30.030	70	70	Clear—pleasant.
4	7 A. M.	" " "	29.980	65	65	
"	11½ "	Skowhegan Falls, above bridge.	30.024	70	70	
"	noon	" " " "	30.050	71	71	
"	"	" " Raymond's hotel.	30.012	71	71	
"	5½ P. M.	Norridgewock—Pike's hotel.	30.000	72	72	
5	12½ "	" " "	29.690	68	68	Rained all day.
"	6½ "	" " "	29.580	68	68	

6	7½ A. M.	" " "	29.680	67	67	
"	6½ P. M.	" " "	29.784	72	72	Cleared a little.
7	8 A. M.	" " "	29.750	65	65	Rained.
"	6½ P. M.	" " "	29.650	64½	64½	"
8	7¾ A. M.	" " "	29.676	60	60	
"	noon	" " "	29.750	64	64	
9	7½ A. M.	Skowhegan Falls,	30.200	62	62	
"	6½ P. M.	" "	30.110	72	72	
10	8 A. M.	" "	30.198	72	72	
"	5 P. M.	Farmington Hotel.	29.820	86	86	Fair.
11	7 A. M.	" "	29.777	73	73	Two feet above ground.
"	noon	" "	29.770	83	83	
"	3 P. M.	Top of Norton's Hill.	29.330	83	83	
"	4 "	Hotel—Farmington.	29.750	84	84	
"	6 "	Top of Powder-house Hill.	29.524	78	78	
12	7 A. M.	Farmington Hotel.	29.750	72	72	Fair—pleasant.
"	9 "	" "	29.750	84	84	" "
"	10 "		29.780	82	82	" "
"	1½ P. M.	Avon—Bates' Tavern.	29.630	84	84	
"	3 "	" "	29.650	84	84	
"	6 "	Base of Mt. Blue—R. Worthley's house.	28.530	78	78	
"	8½ "	Summit of Mt. Blue.	27.030	68	68	
13	5 A. M.	" "	27.000	60	60	
"	7 "	" "	27.000	63	10 ct.	

BAROMETRICAL AND THERMOMETRICAL OBSERVATIONS.

Date.	Hour.	Where the observations were made.	Barometer.	Temp. Bar. T.	Temp. air. t.	Remarks.
June 13	12¾ P. M.	Base of Mount Blue—Ingraham's house.	28.600	73°	23½° c.	
"	1¼ "	" " Dow's house.	28.750	78	78	
"	5¾ "	Phillips—Whitney's hotel.	29.680	80	80	
14	7 A. M.	" " "	29.700	64	64	Rained at 9 A. M.
"	8 P. M.	" " "	29.700	72	72	
15	7 A. M.		29.730	66	66	Cleared.
"	11 "	Humphrey's house, Strong.	29.280	80	80	
"	1½ P. M.	North Salem—Heath's house.	29.400	82	82	Thunder shower on Mount Abraham.
"	3¼ "	" " "	29.400	72	72	
"	7½ "	" " "	29.350	68	68	
16	5½ A. M.	" " "	29.323	69	70	Light N. W. breeze—fair.
"	7 "	" " "	29.322	70	70	
"	8¼ "	Base Mt. Abraham—Robertson's barn.	29.032	74	74	
"	10 "	On the side of Mt. Abraham.	27.520	73	73	
"	11 "	Summit Western peak Mt. Abraham.	26.780	66	18 ct.	
"	11½ "	Summit Eastern peak Mt. Abraham.	26.650	68	18 ct.	

"	3 P. M.	" " "	26.660	72	70° F.	Fair light breeze.
27	noon.	Augusta House, 14 ft above ground.	30.171	74	74	
28	7 A. M.	" "	30.150	70	70	
"	8½ "	Augusta—level of Kennebec river.	30.300	70	70	Fair.
"	8¾ A. M.	" Oak street, over well.	30.180	69	69	
"	9 "	Augusta House, level of ground.	30.162	69	69	
"	9½ "	" room No. 5, 14 feet.	30.150	69	69	
"	4 P. M.	" " " "	29.980	69	69	Violent rain.
"	11 "	" " " "	29.830	66	66	Storm.
29	7 A. M.	" " " "	29.810	68	68	Cleared.
"	noon.	" " " "	29.860	73	73	Light clouds.
"	6¼ P. M.	Waterville—Williams' hotel.	30.030	73	73	Clear—S. W. wind.
"	7½ "	" Prof. Keely's house.	30.030	72	72	Clear.
30	noon	Skowhegan—Somerset House.	30.230	73	73	Clear—pleasant.
"	8½ P. M.	Athens—Lord's Hill, on road.	29.550	60	60	
"	9½ "	Harmony—Bartlett's hotel.	30.080	61	61	
July 1	6½ A. M.	" " "	30.080	65	65	Obscure.
"	11 "	Parkman—Hotel.	29.800	66	66	
"	5 P. M.	Monson—Rice's tavern.	29.450	65	65	Obscure—misty
2	7 A. M.	" " "	29.381	70	70	
"	noon	" " "	29.350	68		
"	4½ P. M.	Barrows' house, Moose Head road, 7 miles S. from Moose H. Lake.	28.910	70	70	
"	5½ "	Mansel's house, five miles S. from M. H. Lake.	28.900	72	72	

Date.	Hour.	Where the observations were made.	Barometer.	Temp. Bar. T.	Temp. air. t.	Remarks.
July 2	8¼ P. M.	Gore's hotel, foot of M. H. Lake.	29.100	70	70°	Thunder shower.
3	6¼ A. M.	Moose H. Lake, at the level with the Lake's surface.	29.100	70	70	Clear—pleasant.
"	7½ "	" " "	29.100	68	18° ct.	Light westerly breeze.
"	7¾ "	" " "	29.100	69½	19¾ ct.	Clear " "
"	9 "	" " "	29.100	72½	20½ ct.	"
"	noon.	Moose Head Lake—Burnt Jacket.	29.090	80	80 F.	"
"	6½ P. M.	Moose Head Lake level.	29.070	78	78	"
"	7 "	" " "	29.060	76	76	"
4	7 A. M.	" " "	29.140	70	70	"
"	9½ "	" " "	29.150	74	74	
5	noon.	Two feet above M. H. Lake level.	29.090	75	75	Gathering clouds.
6	9 A. M.	Moose H. Lake outlet, Lake level.	29.070	75	75	Showers.
"	11 "	Brassau Pond, 3 ft above water.	29.020	74	74	Fresh N. W. wind.
"	12½ P. M.	" " 6 ft " "	29.024	80	80	
"	1 "	" " " "	29.010	75	75	
"	1½ "	" " Level with water.	29.020	76	76	
7	noon.	Long Pond, five feet above water, eight miles from head of Pond.	28.950	75	75	Fair, warm weather—N. W. wind.

“	7 P. M.	Lowell's Custom House, Canada road, 14 miles S. from the Canada line.	28.830	73	73	
8	9 A. M.	“ “	28.918	☉92	22 ct.	“ “
“	noon.	“ “	28.851	79	79	
“	7¼ P. M.	“ “	28.760	82	80	
9	7 A. M.	“ “	28.660	78	24 ct.	Thunder squall.
“	10 “	“ “	28.660	76	24 ct.	Cleared.
“	12½ P. M.	Dividing line between Maine and Canada—Height of land at the monument.	27.890	72	72 F	
“	2¼ “	“ “ “	27.860	74	22½ ct.	
“	3 “	“ “ “	27.880	74	23 ct.	Fair.
“	3½ “	Hilton's house, near sources of W. Branch of Penobscot river.	28.271	74	23 ct.	
“	4¼ “	“ “ “	28.271	79	79 F	Light clouds, (cumuli.)
“	5 “	“ “ “	28.280	76	76	Fair.
10	8 A. M.	Lowell's Custom House.	28.780	70	70	“
“	noon.	“ “	28.750	76	76	Straited clouds.
“	6½ P. M.	Capt. J. Jackman's house, 10 miles south from Moose river.	28.020	70	70	Fair.
“	8¾ “	Boise's house—4 miles south from Jackman's, on Canada road.	28.350	68	68	“
11	5¼ A. M.	“ “ “	28.220	68	68	
“	7 “	“ “ “	28.230	71	21 ct.	

BAROMETRICAL AND THERMOMETRICAL OBSERVATIONS.

Date.	Hour.	Where the observations were made.	Barometer.	Temp. Bar. T.	Temp. air. t.	Remarks.
July 11	$1\frac{3}{4}$ P. M.	J. B. Smith's house, Canada road, three miles above Forks of Kennebec river.	28.790	82°	82° F	
"	$2\frac{1}{2}$ "	Forks of Kennebec river—Burnham's hotel.	29.270	82	27° ct.	Overcast—calm.
"	$5\frac{1}{2}$ "	Forks of Kennebec river.	29.270	83	$28\frac{1}{2}$ ct.	Clear.
"	7 "	" " 15 feet above river.	29.290	82		
12	$6\frac{1}{4}$ A. M.	" " Burnham's hotel.	29.450	72		
"	$7\frac{3}{4}$ "	Forks Kennebec, level of river.	29.460	71		
"	9 "	" " " "	29.470	76	23 ct.	Fair.
"	$6\frac{1}{2}$ P. M.	Bingham Village—Baker's hotel.	29.770	73	73 F.	"
"	7 "	" " " "	29.780	72	$21\frac{1}{2}$ ct.	
"	8 P. M.	" " " "	29.790	70	20 ct.	
13	$7\frac{1}{2}$ A. M.	" " " "	29.950	65	18 ct.	Overcast.
"	noon.	" " " "	29.960	69	22 ct.	Fair.
14	$6\frac{1}{2}$ A. M.	" " " "	30.040	64	16 ct.	"
"	$8\frac{1}{4}$ "	" " " "	30.040	64	16 ct.	
"	$10\frac{1}{2}$ "	" " " "	30 020	71		Fair—West wind.
"	noon.	Solon—Vickare's tavern.	30.000	70	70 F	Clear " "
"	2 P. M.	" " "	29.960	84		

"	5¾ P. M.	Anson Hotel.	30.030	85		Clear—pleasant.
"	6 "	" Carrabasset stream, below Bridge—level of water.	30.080	84		" "
"	6¼ "	" Milldam, 8 in. above water.	30.020	83		
"	7 "	" Hotel.	30.000	80		
15	7 A. M.	" "	29.900	70		Overcast.
"	noon.	" "	29.840	72		
16	6½ A. M.	" "	29.770	68		
"	10½ "	Madison's Falls, below.	29.940	74		
"	5 P. M.	Skowhegan Falls, above.	29.940	80		
"	5½ "	" Somerset House.	29.910	82		
"	7 "	Clinton.	29.980	70		
17	6 A. M.	" Kimball's hotel.	30.050	70		Fair.
"	4¼ P. M.	" Sebasticook, river's level.	30.150	78		
"	7 "	" Reed's hotel.	30.100	75		
18	10½ A. M.	" " "	30.120	68	67	
"	11¼ "	" above falls, at dam.	30.240	76	76	
"	11½ "	" below bridge, river's level.	30.250	76	76	
"	7 P. M.	Waterville—Williams' hotel.	30.030	74	74	
"	9 "	" Prof. Keely's house.	30.010	73½		
"	10 "	" " " "	30.010	72		
19	8½ A.M.	" " " "	30.000	72		
27	7 P. M.	Augusta—Hutchins' hotel, 14 feet above ground.	30.030	72		Fair.
29	noon.	" " "	29.830	89		

BAROMETRICAL AND THERMOMETRICAL OBSERVATIONS.

Date.	Hour.	Where the observations were made.	Barometer.	Temp. Bar. T.	Temp. air. t.	Remarks.
July 29	$2\frac{1}{2}$ P. M.	Augusta—Hutchins' hotel, 14	29.780	90°		
30	7 A. M.	feet above ground.	26.640	92	92°	Thunder shower to the Eastward.
"	1 P. M.		29.550	90	31 ct.	Fleecy clouds.
"	$5\frac{1}{2}$ "	" " "	29.700	82	27 ct.	Violent squall of wind and dark clouds at 2 P. M.—cleared at 5 P. M.
31	$4\frac{1}{2}$ "	Dresden—S. Alley's house.	30.000	82		
"	$7\frac{1}{2}$ "	Wiscasset—Turner's hotel.	29.950	71		
Aug. 1	$9\frac{3}{4}$ A.M.	" " "	29.930	68		
2	$11\frac{1}{2}$ "	Alna—head of tide.	30.200	72	74	
"	3 P. M.	Damariscotta—level of sea.	30.217	78		
"	$4\frac{1}{2}$ "	Newcastle—base of shell cliff.	30.217	78		
"	$4\frac{3}{4}$ "	" summit of shell cliff.	30.200	78		
"	5 "	" base " "	30.235	78		
3	$8\frac{1}{2}$ A. M.	Damariscotta—Borland's hotel.	30.320	78		
4	$2\frac{1}{2}$ P. M.	Pemmaquid Point.	30.240	73		
5	$5\frac{1}{2}$ "	Bristol—Wm. C. House.	30.100	79		
6	$8\frac{1}{2}$ A.M.	Damariscotta Falls. above.	29.980	72		
"	$8\frac{3}{4}$ "	" " below.	30.004	72		

"	9 "	" " middle dam.	29.990	70			
"	9¼ "	Jefferson Pond, Damariscotta.	29.970	82			
7	3 P. M.	Feyler's Quarry, Waldoboro'.	29.880	72			
"	5 "	Ludwig " "	29.870	71			
"	5¾ "	Waldoboro', high water mark.	30.050	68			
"	7 A. M.	Hussey's hotel, Waldoboro'.	30.000	66			
8	2 P. M.	Weatherby's tavern, Warren.	30.050	67			
"	4½ "	St. George river, near bridge, Warren.	30.050	71			
"	noon.	West Thomaston.	30.300	80			
9	5½ P. M.	Beech-wood Quarry.	30.240	71			
10	11½ A.M.	" "	30.250	74			
Sept. 12		Portland—Mr. Solomon Adams' house.	30.258	65			
14	7½ P. M.	Raymond tavern.	30.113	64			Fair; Aurora Borealis, splendid coruscations shoot to zenith.
15	6 A. M.	" "	30.120	61			
"	11½ "	Great Rattle Snake Pond, Raymond.	30.218	73			
"	3 P. M.	Raymond—Iron Mine Hill.	29.850	78			
"	4 "	" "	29.824	72			
"	6 "	" Great Rattle Snake Pond	30.240	70			
16	9½ A.M.	" Longley's tavern.	30.350	58			
17	8 "	" "	30.100	[illegible]			

BAROMETRICAL AND THERMOMETRICAL OBSERVATIONS.

Date.	Hour.	Where the observations were made.	Barometer.	Temp. Bar. T.	Temp. air. t.	Remarks.
Sept. 17	1 P. M.	Otisfield—Knight's tavern.	29.706	68°		Fair.
"	2¾ "	Oxford—Hill on road.	29.639	70		
"	3½ "	" Harris' tavern.	29.900	71		
18	7 A. M.	" "	29.710	52		
"	10 "	Little Androscoggin stream.	29.700	72		
"	noon.	Paris Hill—tavern.	29.210	72		
"	$3^h28'$ P.M	" "			19.9°c.	Eclipse of sun commenced.
"	$3^h52'$ "	" "	29.140	70	21 ct.	
"	$4^h4'$ "	" "	29.130		19.2 c.	Sun eclipsed.
"	$4^h17\frac{1}{2}'$ "	" "	29.120	68		Clouds cover the sun.
"	$9^h20'$ "	" "	29.230	58	58 F.	
19	8 A. M.	" "	29.370	52		
"	11 "	" "	29.380	57		
"	12½ P. M.	" brook, near saw-mill.	29.870	66		
"	12¾ "	" hill, near brook.	29.351	69		
20	11 A. M.	Woodstock.	29.870	61		
"	noon.	Long Pond, Woodstock.	29.154	68		
"	6¾ P. M.	Rumford Hotel.	29.610	58		
21	7 A. M.	" Wardwell's hotel.	29.722	54		
"	9¼ "	" "	29.716	52		

29

"	5¼ P. M	" "	29.690	68		Rained.
22	7 A. M.	" "	29.570	62		Thunder shower.
"	1 P. M.	" "	29.510	66		Rainy.
"	6 "	Andover—Virgin's tavern.	29.350	65		
"	11 "	" "	29.370	62		
23	8 A. M.	" "	29.174		19½ ct.	"
"	5 P. M.	" "	29.130	57		
"	8 "	" "	29.180	65		
24	7 A. M.	" "	29.336	40	40	
"	1 P. M.	Road to Letter B township--West's hill, highest on road.	28.050	50 ct.	10 ct.	
"	2 "	Capt. Bragg's—township B.	28.060	50 ct.	10 ct.	
25	7½ "	" "	28.400	2 ct.	2 ct.	
"	7 A. M.	" "	28.580	1½ ct.	1½ ct.	Fair.
"	7^1 "	" "	28.590	3 ct.	3 ct.	
"	10½ "	Umbagog Lake—4 ft. above Lake.	29.221	9 ct.	9 ct.	
"	noon	Metalluck point—Umbagog Lake.	29.249	55	12½ ct.	
"	5 P. M.	Megalloway river, 4 feet above the water.	29.260	63		
26	7 A. M.	" Lombard's house.	29.334	8 ct.	8 ct.	
"	8 "	" "	29.300	8 ct.	8 ct.	
"	noon	" "	29.440	16 ct.	16 ct.	
"	4½ P. M.	" 8 ft. above river.	29.420	17½ ct.	17½ ct.	
"	5¾ "	" Capt. Wilson's house.	29.316	15 ct.	15 ct.	
27	10½ A. M.	" "	29.200	15 ct.	15 ct.	

BAROMETRICAL AND THERMOMETRICAL OBSERVATIONS.

Date.	Hour.	Where the Observations were made.	Barometer.	Temp. Bar. T.	Temp. air. t.	Remarks.
Sept. 27	1 P. M	Megalloway R.—Wilson's house.	29.100	15° ct.	15° ct	Rained.
"	6½ "	" "	29.064	12 c	12 c	
"	8½ "	" "	29.050	12 c	12 c	
28	7 A. M.	" "	28.966	11¾ c	11¾ c	Rained.
"	11 "	" "	28.960	16 c	16 c	
"	5 P. M.	" Lombard's Landing.	28.984	18 c	18 c	
"	6½ "	" Lombard's house.	28.851	15 c	15 c	
"	9 "	" "	28.816	12 c	12 c	
"	7 A. M.	" "	28.731	14 c	14 c	
29	2 P. M.	Umbagog Lake—4 feet above.	28.800	17 c	17 c	
"	3 "	Township letter B; Bragg's house.	28.300	18 c	18 c	
"	7½ "	" "	28.283	18 c	18 c	Fair—west wind.
30	7 A. M.	" "	28.350			
"	1 P. M.	" "	28.364	17 c	17 c	
"	3 "	" "	28.340	18 c	18 c	
Oct. 1	8½ A. M.	" "	28.520	9 c	9 c	
"	1 P. M.	Andover—Virgin's tavern.	29.550	25 c	25 c	
"	6 "	" "	29.514	17½ c	17½ c	
2	9 A. M.	" "	29.520	11½ c	11½ c	
"	1 P. M.	" "	29.464	26 c	26 c	
"	6 "	" "	29.350	10 c	10 c	Cloudy.

3	7 A. M.	" "	29.176	11°	ct.	11°	ct.	Rained.
4	7 P. M.	Dixfield—Morrill's tavern.	29.584	9	c	9	c	
"	1 "	" "	29.736	13	c	13	c	
"	4 "	Holman's Hill—Dixfield.	29.284	15	c	15	c	
"	7 "	Wilton—Tavern.	29.480	9	c	9	c	
5	7 A. M.	" "	29.330	8½	c	8½	c	
"	10 "	" "	29.380	14	c	14	c	
6	5½ P. M.	Farmington Hotel.	29.250	21	c	21	c	
"	8 "	" "	29.221	18	c	18	c	
7	4 "	" "	29.730	12	c	12	c	
"	10 "	" "	29.820	9	c	9	c	
8	8 A. M	" "	29.800	3	c	3	c	
"	noon	" "	29.750	10½	c	10½	c	
"	5 P. M.	Phillips—Whitney's hotel.	29.470	10½	c	10½	c	
"	7 "	" "	29.430	1	c	1	c	
9	8 A. M.	" "	29.390	1	c	1	c	
"	noon	French's Mountain—Phillips.	28.446	10	c	10	c	
"	1½ P. M.	" "	28.410	11	c	11	c	
"	2¾ "	Phillips—Whitney's hotel.	29.380	12	c	12	c	
10	7 A. M.	" "	29.450	2	c	2	c	
"	11 "	" "	28.870	9¾	c	9¾	c	
"	1¾ P. M.	Hill in Madrid.	27.964	7	c	7	c	
"	5 "	Camp under Saddleback Mt.	27.830	5½	c	5½	c	Thunder squall; snow and hail, and constant rain—snow on Mt.
11	10⅓ A. M.	Phillips Village.	29.334	6	c	6	c	Rain storms.
13	7 "	" "	29.180	6½	c	6½	c	Cloudy—N. E. wind.
"	3 P. M.	" "	29.280	8	c	8	c	

BAROMETRICAL AND THERMOMETRICAL OBSERVATIONS.

Date.	Hour.	Where the observations were made.	Barometer.	Temp. Bar. T.	Temp. air. t.	Remarks.
Sept. 15	7 A. M.	Phillips Village.	29.400			
"	3 P. M.	" "	29.200	4° ct.	4° ct.	Rain storm continues.
"	6 "	" "	29.164	5 c	5 c	"
16	7 A. M.	" "	29.360	5 c	5 c	Cleared.
"	11½ "	North Salem—Heath's house.	29.162	9 c	9 c	Fair.
"	1¼ P. M.	Kingfield—Mr. Pike's house.	29.468	10 c	10 c	"
"	6 "	" "	29.550	8 c	8 c	"
"	9 P. M.	" "	29.570	5 c	5 c	"
17	noon.	" "	29.720	15 c	15 c	"
"	7 P. M.	New Portland Hotel.	29.880	10 c	10 c	
18	7 A. M.	" "	29.930	6 c	6 c	
"	11½ "	" "	29.914	8 c	8 c	
"	4½ P. M.	Anson Hotel.	30.072	7 c	7 c	
19	7 A. M.	"	30.110	2 c	2 c	Overcast—chilly.
"	11 "	"	30.100	4 c	4 c	
Oct. 26	2 P. M.	Union Common.	29.860	11 c	11 c	
27	7 A. M.	Liberty—Light's Corner—Capt. Matthews' house.	29.780	0.5 c	0.5 c	
"	1 P. M.	" "	29.750	9½ c	9½ c	
28	9 A. M.	" "	29.700	14 c	14 c	
"	5½ P. M.	" "	29.580	5 c	5 c	
29	8 A. M.	" "	29.250	4 c	4 c	

TABLE II.

BAROMETRICAL OBSERVATIONS

made at Portland, by Rev. Solomon Adams. *Station* 121.8 *feet above high water mark in Portland harbor.*

Day.--1838.	Hour.	Barom. H.	T.	t.	Wind.	Remarks.
June 1	7	30.20	64	64	S. E.	Foggy.
	1	30.20	66	66	"	Cloudy.
	6	30.19	64	64	S.	Foggy.
2	7	30.09	62	62	S. W.	Gentle rain.
	1	30.	61	61	"	Cloudy.
	6	30.09	63	63	N. W.	Showers P. M.
3	7	30.09	60	60	W.	Clear.
	1	30.06	62	62	N. W.	"
	6	30.02	67	67	"	"
4	7	30.09	62	62	"	Cloudy in the E. and S.
	1	30.07	64	64	S. E.	Showery.
	6	30.05	64	64	"	Overcast.
5	7	29.85	62	62	N. E.	Heavy rain; calm.
	1	29.62	62	62	E.	Mist; moderate wind.
	6	29.58	62	62	N. W.	Cloudy.
6	7	29.60	62	62	N. W.	Clear.
	1	29.81	64	64	S.	"
	6	29.85	65	65	S. W.	Appearance of showers
7	7	29.74	63	63	E.	Steady rain.
	1	29.70	64	64	"	Foggy.
	6	29.60	62	62	"	Rain gentle.
8	7	29.80	60	60	W.	Clear.
	1	29.84	64	64	"	"
	6	30.08	68	68	N. W.	"
9	7	30.27	64	64	"	"
	1	30.29	71	71	W.	"
	6	30.20	70	70	S.	"
10	7	30.19	68	68	S. W.	"
	1	30.20	71	71	S. E.	"
	6	30.10	76	76	S.	"
11	7	30.10	70	70	S. W.	"
	1	30.04	77	77	W.	"
	6	30.02	88	88	"	"
12	7	29.99	77	77	S. W.	Clouds.
	1	30.00	82	82	W.	Clear.
	6	29.99	86	86	"	"
13	7	30.03	74	74	"	"
	1	30.06	81	81	S.	Summer clouds.
	6	30.09	82	82	E.	Slight showers.
14	7	30.17	73	73	"	Broken clouds.
	1	30.19	76	76	"	Cloudy.
	6	30.15	72	72	"	Foggy.

Day.–1838.	Hour.	Barom.	T.	t.	Wind.	Remarks.
June 15	7	30.18	70	70	S. E.	Foggy.
	1	30.15	72	72	"	Clear.
	6	30.08	77	77	N. E.	"
16	7	30.10	74	74	S. W.	Clouds.
	1	30.10	78	78	N. W.	Clear.
	6	30.10	82	82	S. W.	"
17	7	30.01	74	74	"	Overcast.
	1	29.99	76	76	S.	Slight showers.
	6	29.95	77	77	"	Clouds.
18	7	30.02	72	72	N. E.	Cloudy.
	1	30.05	73	73	E.	Clouds.
	6	30.06	72	72	"	"
19	7	30.27	66	66	"	Clear.
	1	30.32	66	66	"	"
	6	30.29	67	67	S.	"
20	7	30.29	62	62	S. W.	"
	1	30.26	66	66	S.	"
	6	30.19	67	67	"	Cloudy.
21	7	30.13	64	64	S. W.	Clear.
	1	30.05	71	71	"	"
	6	29.96	74	74	"	"
22	7	29.98	67	67	N. W.	"
	1	30.05	74	74	S. E.	Clouds.
	6	30.08	72	72	"	Clear.
23	7	30.12	68	68	N. W.	"
	1	30.17	70	70	S. E.	"
	6	30.10	70	70	S.	"
24	7	30.05	69	69	"	Foggy.
	1	30.00	70	70	"	Fog & gentle showers.
	6	29.94	68	68	N. E.	Cloudy.
25	7	29.96	66	66	"	Rain.
	1	29.91	67	67	S. E.	Clouds breaking.
	6	29.87	65	65	E.	Showers.
26	7	29.84	64	64	S. W.	Clear.
	1	29.86	70	70	N. W.	"
	6	29.94	73	73	"	"
27	7	30.16	66	66	"	"
	1	30.19	69	69	S. E.	"
	6	30.18	69	69	"	"
28	7	30.18	66	66	S.	Cloudy.
	1	30.06	67	67	S. E.	Rainy.
	6	29.90	67	67	"	"
29	7	29.85	66	66	S. W.	Clear.
	1	29.89	74	74	N. W.	"
	6	30.00	76	76	N.	"
30	7	30.25	69	69	E.	"
	1	30.30	67	67	"	"
	6	30.28	67	67	"	"

The Thermometer and Barometer, both being in the same exposure, uniformly give the same temperature. Hereafter only the temperature of Barometer will be noted.

Day.–1838.	Hour.	Barom.	T.	Wind.	Remarks.
July 1	7	30.28	67	S. E.	Mist.
	1	30.27	67	"	"
	6	30.22	67	"	"
2	7	30.20	67	"	"
	1	30.14	67	E.	Cloudy.
	6	30.08	68	S.	Foggy.
3	7	30.03	67	S. W.	"
	1	30.03	74	S. E.	Signs of showers.
	6	29.99	75	S.	Clear; shower P. M.
4	7	30.06	71	N. W.	Clear.
	1	30.09	80	S. E.	Cloudy and sultry.
	6	30.05	79	"	Hazy.
5	7	30.02	76	N. E.	Cloudy.
	1	30.03	73	S. E.	"
	6	29.94	73	E.	" showers 8 P. M.
6	7	29.98	71	N. W.	Clear.
	1	30.00	76	"	"
	6	30.00	80	N.	"
7	7	30.03	68	N. W.	"
	1	30.01	77	"	"
	6	30.06	80	N.	Showery.
8	7	30.16	72	W.	Clear.
	1	30.16	74	S. E.	"
	6	30.10	74	S.	Cloudy.
9	7	29.95	72	W.	Clear.
	1	29.90	86	"	Clouds and brisk wind.
	6	29.90	82	N. W.	Light showers.
10	7	30.	76	"	Clear.
	1	30.	78	E.	"
	6	29.98	76	S. E.	"
11	7	29.83	74	S. W.	Cloudy.
	1	29.83	84	W.	Clear; showers.
	6	29.86	86	"	" "
12	7	29.94	79	"	Cloudy; "
	1	29.98	77	N. W.	" "
	6	30.04	77	W.	"
13	7	30.19	71	N. E.	"
	1	30.23	71	"	"
	6	30.25	74	S. E.	Clear.
14	7	30.33	68	N. W.	"
	1	30.31	74	S. E.	"
	6	30.28	78	"	"
15	7	30.15	70	S. W.	"
	1	30.09	80	W.	Cloudy.
	6	30.00	80	S. W.	Clouds.
16	7	30.00	76	N.	"
	1	30.00	75	S. E.	Cloudy.
	6	30.00	74	S. W.	Clear.
17	7	30.09	67	N.	"
	1	30.11	74	S. W.	"

Day.–1838.	Hour.	Barom.	T.	Wind.	Remarks.
July 17	6	30.17	78	N. W.	Clear.
18	7	30.23	70	"	"
	1	30.18	72	S.	"
	6	30.10	72	"	Cloudy.
19	7	30.04	72	N. W.	Clear.
	1	30.06	78	"	"
	6	30.04	80	"	"
20	7	30.06	70	N.	Clouds.
	1	30.00	71	E.	Cloudy.
	6	29.95	70	N. E.	Showery.
21	7	29.89	68	E.	Rain.
	1	29.90	69	"	Clear.
	6	29.98	69	N. W.	"
22	7	30.14	66	N.	"
	1	30.17	67	N. W.	"
	6	30.18	72	"	"
23	7	30.23	68	N. W.	"
	1	30.26	70	E.	"
	6	30.24	70	S. W.	"
24	7	30.23	68	S. W.	"
	1	30.20	70	S.	"
	6	30.14	70	"	Cloudy.
25	7	30.08	66	S.	Rain—brisk wind.
	1	30.01	66	S. W.	Rainy—brisk wind.
	6	29.98	72	"	Clear.
26	7	29.98	66	N. E.	Foggy.
	1	30.00	70	S. E.	Clear.
	6	30.	71	S. W.	Cloudy.
27	7	30.08	68	N.	Clear.
	1	30.13	70	E.	"
	6	30.11	74	S.	"
28	7	30.10	70	N. W.	"
	1	30.00	76	S. W.	"
	6	29.94	80	"	"
29	7	29.94	76	W.	Clouds.
	1	29.89	82	E.	Clear.
	6	29.85	82	S.	"
30	7	29.75	78	S. W.	Overcast.
	1	29.66	85	W.	Clear—brisk wind.
	6	29.78	85	N. W.	" wind abated.
31	7	29.97	72	S. W.	" calm.
	1	29.97	73	W.	" "
	6	29.93	78	"	"
August 1	7	29.93	69	N. W.	"
	1	29.90	74	S.	"
	6	29.88	77	"	Clouds—showers around us.
2	7	30.05	70	N. W.	Clear.
	1	30.10	73	N.	"
	6	30.13	78	N. W.	"
3	7	30.30	73	"	"
	1	30.31	76	S.	"

Day.-1838.	Hour.	Barom.	T.	Wind.	Remarks.
Aug. 3	6	30.31	76	S.	Clear.
4	7	30.31	70	S. W.	"
	1	30.23	76	W.	"
	6	30.19	80	"	" smoky.
5	7	30.11	76	N. W.	" "
	1	30.11	81	S. E.	" very dry.
	6	30.04	80	"	Cloudy.
6	7	29.91	74	N. E.	" rain in the night.
	1	29.96	75	S. E.	"
	6	29.95	74	N. E.	"
7	7	30.	70	S. E.	"
	1	30.	70	"	"
	6	30.	76	S.	Clear.
8	7	30.21	70	N. W.	"
	1	30.30	78	"	"
	6	30.27	77	S.	"
9	7	30.28	72		Perfect calm—cloudy.
	1	30.26	74	S.	Cloudy.
	6	30.19	76	"	"
10	7	30.20	71	S. E.	Rainy.
	1	30.20	72	"	Clear.
	6	30.20	71	S.	Cloudy.
11	7	30.19	69	S. E.	Clear.
	1	30.13	70	"	Cloudy.
	6	30.02	70	"	Showers.
12	7	29.85	71	S. W.	Cloudy.
	1	29.88	76	N. W.	Clear.
	6	29.95	80	"	"
13	7	30.06	67	"	"
	1	30.09	74	"	"
	6	30.14	75	"	"
14	7	30.35	65	"	"
	1	30.34	66	"	"
	6	30.31	69	S. W.	"
15	7	30.34	60	N. W.	"
	1	30.31	69	S.	"
	6	30.25	69	"	"
16	7	30.25	65	N. W.	Cloudy.
	1	30.19	68	S.	Gentle rain.
	6	30.05	67	E.	Rain.
17	7	29.66	66	N. W.	Cloudy, (clearing off.)
	1	29.64	70	"	Clear.
	6	29.77	69	"	"
18	7	29.91	64	W.	"
	1	29.98	70	S. E.	"
	6	29.99	70	N.	"
19	7	30.20	62	"	"
	1	30.27	72	"	"
	6	30.30	70	S. W.	"
20	7	30.47	62	N.	"
	6	30.46	60	S. E.	"

Day.–1838.	Hour.	Barom.	T.	Wind.	Remarks.
Aug. 21	7	30.41	60	S.	Light clouds.
	1				Clearing.
	6				Clear.
22	7				"
	1				"
	6				"
23	7	30.34	70	N. W.	"
	1	30.32	78	S. W.	"
	6	30.27	76	"	"
24	7	30.18	70	W.	"
	1	30.10	80	S. W.	Light clouds.
	6	29.99	80	"	Clear.
25	7	30.00	74	N. W.	"
	1	29.95	77	S.	"
	6	29.85	76	"	Light clouds.
26	7	29.80	68	N.	"
	1	29.84	68	"	"
	6	29.91	66	"	Clear and windy.
27	7	30.01	58	W.	Clear.
	6	29.90	60	S. W.	Cloudy.
28	7	29.76	60	N.	Rainy in the night.
	1	29.80	66	N. W.	Clear.
29	7	30.19	61	"	"
	1	30.27	63	S. E.	"
	6	30.24	63	"	Foggy.
30	7	30.14	60	S. E.	Cloudy.
	1	30.04	64	S. W.	Shower—thunder.
31	7	30.19	66		
	1	30.15	68	S.	Clear.
	6	30.07	66	S. W.	Cloudy.
Sept. 1	7	29.88	60	S.	Rainy.
	1	29.80	64	S. E.	"
	6	29.78	64	"	Foggy.
2	7			W.	Clear.
	1	30.00	66	N. W.	"
	6	30.10	64	"	"
6	7	30.39	65	N. E.	"
	6	30.37	68	S. W.	"
7	7	30.26	63	N. W.	"
	1	30.26	75	S. W.	"
	6	30.24	73	"	"
8	7	30.43	65	N. E.	Light clouds.
	1	30.44	66		" "
	6	30.41	62	S. W.	" "
9	7	30.39	59	"	Cloudy.
	1	30.35	61	S.	"
	6	30.30	60	S. W.	Clear.
10	7	30.30	59	"	"
	1	30.16	70	"	"
	6	30.10	68	"	"

Day.–1838.	Hour.	Barom.	T.	Wind.	Remarks.
Sept. 11	7	30.09	65	S. W.	Clear.
	1	30.10	68	N. E.	Cloudy.
	6	30.10	68	S. E.	"
12	7	30.22	65	N. E.	"
	1	30.23	64	"	Rainy.
	6	30.19	64	E.	"
13	7	29.78	60	N. E.	Copious rain, and wind.
	1	29.57	61	N.	Drizzly rain.
	6	29.90	63	N. W.	Clear.
14	7	30.30	58	"	"
	1	30.32	63	S.	‘
	6	30.28	63	"	"
15	7	30.25	62	N. W.	"
	1	30.30	66	S.	"
	6	30.33	68	"	"
16	7	30.48	62	N. W.	"
	1	30.45	62	S. E.	"
	6	30.38	62	"	"
17	7	30.28	60	N. W.	
	1	30.14	61	S. E.	"
	6	30.10	61	"	"
18	7	29.94	60	N.	Cloudy.
	1	29.89	60	S. E.	"
	6	29.80	60	"	Foggy.
19	7	29.75	60	N. W.	"
	1	29.79	62	"	Clear.
	6	29.86	62	"	"
20	7	30.11	60	S. W.	"
	1	30.14	61	W.	"
	6	30.14	62	S. W.	" chilly.
21	7	30.28	60	N. W.	"
	1	30.30	61	S.	"
	6	30.28	61	S. E.	Rainy.
22	7	30.18	62	S. E.	Foggy.
	1	30.07	63	S.	"
	6	30.07	64	S. W.	Clear.
23	7	29.89	66	"	Foggy.
	1	29.85	68	W.	Showery.
	6	29.80	66	N. W.	"
24	7	30.06	60	N. W.	Clear.
	1	30.04	60	"	"
	6	30.14	60	"	"
25	7	30.40	58	S.	"
	1	30.45	62	"	"
	6	30.50	61	S. W.	"
26	7	30.67	60	N. E.	Cloudy.
	1	30.70	60	E.	"
	6	30.66	60	S. E.	Foggy.
27	7	30.48	59	N. E.	Rainy.
	1	30.40	59	"	"

Day.–1838.	Hour.	Barom.	T.	Wind.	Remarks.
Sept. 27	6	30.35	59	N. E.	Drizzle, drizzle.
28	7	30.29	59	N.	Cloudy.
	1	30.26	62	S. W.	Clear.
	6	30.20	63	"	Cloudy.
29	7	30.10	61	E.	Foggy.
	1	30.02	62	"	Cloudy.
	6	29.98	62	"	Foggy.
30	7	30.01	61	N. W.	Clear. } delightful days.
	1	30.06	64	"	"
	6	30.03	66	"	"
Oct. 1	7	30.16	64	"	Clear. } do. do.
	1	30.19	66	S. E.	"
	6	30.19	66	S. W.	"
2	7	30.19	64	"	"
	1	30.19	67	S.	"
	6	30.05	67	"	"
3	7	29.90	65	S. W.	Cloudy.
	1	29.87	64	N. W.	"
	6	29.94	63	"	Clear.
4	7	30.16	56	"	"
	1	30.19	56	"	"
	6	30.11	58	S.	"
5	7	29.95	54	S. W.	"
	1	29.95	56	N. W.	"
	6	29.99	59	"	"
6	7	29.93	58	S.	Cloudy.
	1				Absent.
	6				"
7	7	29.87	61	N. W.	Cloudy.
	1	30.03	58	"	Clear.
	6	30.15	56	N.	"
8	7	30.22	52	"	" (first frost.)
	1	30.10	51	S. E.	"
	6	30.07	52	"	"
9	7	29.98	48	N. E.	"
	1	29.99	50	S. E.	"
	6	30.	51	"	"
10	7	30.01	51	S. W.	Cloudy.
	1	30.07	52	E.	"
	6	30.00	54	N. E.	"
11	7	29.67	52	"	Rainy.
	1	29.61	51	S.	Clear.
	6	29.61	52	S. W.	"
12	7	29.95	52	"	"
	1	29.96	53	"	Cloudy.
	6	29.86	54	S. E.	Rainy.
13	7	29.75	52	N. W.	Cloudy.
	1	29.84	52	"	Hazy.
	6	29.95	52	"	Clear.
14	7	29.98	48	W.	Cloudy.

Day.–1838.	Hour.	Barom.	T.	Wind.	Remarks.
Oct. 14	1	29.94	48	S. W.	Cloudy.
	6	29.94	48	W.	"
15	7	29.94	48	N. E.	Rainy.
	1	29.79	48	"	"
	6	29.70	50	N.	Cloudy.
16	7	29.99	48	W.	Clear.
	1	30.06	50	N. W.	"
	6	30.12	50	"	"
17	7	30.23	48	"	"
	1	30.30	48	"	"
	6	30.37	48	"	"
18	7	30.47	48	N.	Cloudy.
	1	30.40	50	S. E.	"
	6	30.38	51	"	"
19	7	30.40	46	N.	"
	1	30.35	46	E.	"
	6	30.24	47	"	Rainy.

TABLE III.

Barometrical Table kept at Kennebunk, (Me.,) by Hon. Daniel Sewall, 1838.

1837.	Thermometer in open air.				Barometer.			Ther. attc'd to Barom.			Wind.	Weather.
		☉ ris.	1 P M	☉ set	☉ rise.	1 P. M.	☉ set.	☉ ris.	1 P M.	☉ set		
Dec. 1		31	43	43	30.30	30.18	30.16	40	41	42	S'y.	Overcast—small rain.
2		36	41	40	16	17	17	41	42	42	S. E.	Rainy—overcast.
3		40	46	44	29.74	29.70	29.72	43	43	44	Calm, W.	Foggy, cl. fair evening, N. Light.
4		35	40	37	30.00	30.00	30.00	40	42	42	W.	Overcast—fair.
5		25	37	33	23	33	31	37	46	41	W. N. W.	Fair.
6		11	37	32	41	36	30	32	39	37	W. S. W.	Fair—cloudy.
7		23	42	36	16	15	10	34	45	41	N. W.	Fair.
8		27	41	31	29.77	29.65	29.65	36	42	39	W.	Cloudy—fair—showers of snow.
9		15	29	22	30.22	30.23	30.20	29	38	34	N. W. N.	Fair—lowery.
10		18	20	22	03	29.85	29.80	29	30	30	N. E.	Snow-storm.
11		19	30	27	29.70	69	69	28	31	31	Calm.	Moderate snow—four or five inches.
12		12	37	22	82	94	93	28	41	36	N. W.	Fair.
13		10	34	38	90	90	94	28	36	33	"	Overcast—fair.
14	–8		23	19	30.00	98	95	22	36	30	"	Fair. } Coldest mornings—8° below zero.
15	–8		25	21	29.99	30.14	30.18	18	31	27	" calm.	Fair. }

16		1	25	18	30.30	31	30	20	33	27	W. N. W.	Fair—lowery.
17	–2		24	22	33	32	31	18	23	23	N. W. calm.	Lowery—overcast.
18		32	39	34	29.72	29.01	28.80	27	31	32	N. E. N.	Rain-storm.
19		27	36	32	59	65	29.65	32	37	36	W. S. W.	Fair—cloudy.
20		18	22	15	67	80	79	32	39	32	N. W.	Fair.
21		0	22	14	92	99	97	21	33	28	"	"
22	–6		18	14	30.08	30.17	30.15	16	28	23	"	"
23	–1		25	23	39	42	39	16	22	22	N.W.W.S.W.	Cloudy—fair.
24		23	33	31	30	20	14	23	27	28	S. W.	Overcast.
25		12	41	32	20	25	24	26	40	34	W. S. W. S.	Fair.
*26		28	45	41	29.85	29.75	29.75	32	40	37	S. W.	Cloudy—fair.
27		10	26	20	30.44	30.58	30.57	30	38	33	N. W. N.	Fair.
28		17	36	31	32	17	15	28	31	32	S. calm.	Overcast—N. Light.
29		11	44	34	20	19	10	28	39	35	S. W.	Fair—hazy—cloudy.
30		31	44	39	05	05	13	34	36	37	W.	Overcast—fair.
31		32	38	34	30	36	39	35	36	37	Calm.	Overcast.
'28–Jan.1		31	41	37	30.50	30.51	30.50	34	38	38	"	"
2		32	43	39	37	29	25	37	41	40	S. W.	Overcast—cloudy.
3		36	68	50	08	07	07	39	49	46	"	Fair.
4		40	37	36	40	47	47	42	42	42	N. E'y.	Moderate rain-storm.
5		30	40	43	28	05	29.95	39	40	41	S.	Foggy—overcast.
6		39	44	40	15	24	30.30	41	44	43	"	Fair—cloudy.
7		20	42	38	37	27	20	36	42	40	"	Fair.
8		41	44	37	29.90	29.92	10	41	48	44	S. S. W.	Overcast—small rain.

* Mrs. Judith Oaks died at Kennebunk, aged ninety-seven years and seven months.

BAROMETRICAL TABLE KEPT AT KENNEBUNK.

1838.	Spirit Ther. in open air.			Barometer.			Temp. of Barom.			Wind.	Weather.
	☉ ris.	1 P. M.	☉ set.	☉ rise.	1 P. M.	☉ set.	☉ ris.	1 P. M.	☉ set.		
Jan. 9	20	25	26	30.50	30.48	40	35	35	34	N. E.	Fair morning—overcast.
10	28	31	24	10	12	12	34	37	34	N.	Cloudy—fair.
11	9	19	16	23	29	28	26	37	29	N. W. N.	Fair.
12	12	30	25	23	36	37	24	36	31	W.	"
13	16	36	33	43	35	32	28	38	34	N. W. S.	"
14	19	40	35	25	12	00	30	33	34	S.	Lowery—sprinkling rain, night.
15	39	44	34	29.60	29.59	29.58	36	48	41	W.	Fair—cloudy—squalls of snow.
16	22	44	42	30.07	30.05	30.00	34	45	35	S. W.	Fair.
17	38	56	53	29.96	29.76	29.73	38	44	48	S. W.	Fair—cloudy—sprinkling rain.
18	33	31	25	30.10	30.10	30.15	43	41	41	N. E.	Overcast—sprinkling snow.
19	29	29	30	29.76	29.46	29.37	42	38	37	N. E.	Overcast—Misty.
20	8	22	18	30.10	30.30	30.33	27	43	32	W'y.	Fair.
21	6	25	23	33	27	23	25	27	28	S. W.	Hazy—lowery.
22	5	20	16	40	46	45	25	31	29	S. N. E.	Fair—lowery.
23	8	31	24	43	45	39	25	41	32	N. S.	" "
24	9	40	36	39	44	42	30	41	36	S. W.	Fair.
25	24	44	35	50	60	59	36	43	40	S. W. S.	Fair—foggy.
26	39	43	42	20	05	08	39	41	42	S.	Moderate rain storm—foggy.
27	32	37	33	42	41	40	39	42	40	N. N. E.	Fair—overcast—snow and rain, night.

28		24	35	33	29.27	29.43	29.44	37	39	39	S. W.	Fair—overcast.
29		22	28	21	73	64	65	34	35	34	W.	Fair—cloudy.
30		1	9	6	86	83	83	23	24	23	N. W.	Fair—clear.
31		0	22	14	30.04	30.10	30.14	18	24	24	"	" "
Feb. 1		12	28	22	30.28	30.25	30.20	21	25	25	N. E. calm.	Overcast.
2		10	24	15	03	29.95	29.90	24	28	28	N. N. W.	Cloudy—fair.
3		3	25	16	29.89	86	76	22	25	26	N.	Fair—lowery. N. Light.
4		9	27	18	68	68	68	23	29	28	N. N. W.	Fair—cloudy—hazy.
5		3	27	18	68	72	72	23	30	29	N. W.	Fair.
6		4	30	24	94	30.02	30.00	22	28	20	"	Fair—cloudy. [3 inches.
7		3	37	25	30.17	20	12	24	28	20	N. W. S.	Fair ; lowery ; overcast ; snow in night, about
8		23	39	33	29.74	29.70	29.69	22	35	35	N.	Overcast—fair—pleasant—overcast.
9		24	32	28	69	63	59	33	34	34	Calm.	Overcast—misty—small snow.
10		18	28	22	59	65	70	32	33	34	N. W.	Fair—cloudy.
11	−5		33	22	78	79	76	26	29	27	N.	Lowery--overcast--springling snow at night.
12		10	39	19	30.01	30.13	30.14	27	33	32	N. W. W.	Fair.
13		16	48	28	17	20	11	30	34	35	W. S. E.	Fair—lowery—overcast—snow at night,
14		26	37	20	29.89	29.95	30.05	25	38	37	N. N. W.	Overcast—fair. [about 4 inches.
15		4	23	11	30.22	30.17	11	28	29	28	N. Calm.	Overcast—small snow.
16		10	17	13	29.90	29.68	29.43	25	26	26	N. E.	Overcast—storm of snow.
17		2	9	3	84	79	90	23	25	22	N. W. hard.	Fair.
18		2	29	18	87	71	66	18	26	25	N. W. W.	"
19		10	20	13	60	50	44	21	28	26	W. hard.	" [towards morning.
20		9	19	12	57	55	55	19	26	24	N. W. hard.	Fair—clear—no cloud to be seen. N. Light
21		4	23	16	65	69	74	19	26	25	N. W.	Fair—clear. N. Light all night.

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BAROMETRICAL TABLE KEPT AT KENNEBUNK.

1838.	Thermometer.				Barometer.			Temp. of Barom.			Wind.	Weather.
		☉ ris.	1 P. M.	☉ set	☉ rise.	1 P. M.	☉ set.	☉ ris.	1 P. M.	☉ set		
Feb. 22		7	32	24	95	30.00	98	26	28	29	W.	Fair—some clouds.
23		8	34	24	30.00	29.95	90	24	32	31	N. W.	Fair.
24		9		21	29.88	88	88	26	31	30	N.	Fair—cloudy—fair—cloudy.
25		2	17	13	95	94	89	22	27	25	N. W.	Fair.
26	10		16	9	98	30.03	30.04	18	25	24	"	"
27	13		28	17	30.14	14	10	16	24	25	"	"
28		2	32	28	13	12	08	20	26	28	N.	Fair—lowery.
March 1		22	34	26	30.12	30.13	30.13	27	32	32	N. N. E.	Overcast—cloudy—fair.
2		6	31	28	16	20	22	16	34	33	N. W. N.	Fair—clear.
3		20	34	30	37	44	45	30	27	27	N.	Fair—no cloud to be seen.
4		16	44	28	47	50	43	30	37	37	N. W.	Fair—clear. [Thermometer highest after 1 P. M.—49°]
5		7	39	36	31	20	04	32	34	34	S. E.	Hazy—overcast—rain, evening and night.
6		34	49	42	29.65	29.85	29.98	36	45	43	N. W.	Fair—clear.
7		32	39	32	30.15	30.16	30.16	40	41	40	N. E. E.	Overcast—small rain afternoon.
8		30	34	29	19	18	13	38	39	38	N. E.	Overcast— misty—snow-storm evening and [night.
9		15	38	32	04	10	13	36	38	39	N. E. N. W.	Stormy morning—fair.
10		22	49	36	23	29	24	35	42	42	N. W. S.	Fair.
11		25	57	36	17	10	05	36	40	40	S.	Overcast.
12		26	51	37	05	15	19	38	46	41	N. W. calm.	Fair—clear.

13	17	42	32	31	33	31	38	43	41	S. E.	Fair—foggy.
14	24	48	38	29	28	23	38	42	43	Calm.	Foggy morning—fair.
15	37	51	47	10	00	29.93	40	44	46	N. E.	Cloudy—lowery—fair.
16	34	51	44	29.94	00	30.04	42	46	37	"	Fair.
17	30	43	37	23	32	30	41	43	43	"	Fair—cloudy.
18	31	30	27	20	15	06	40	37	37	"	Overcast—snow
19	28	40	38	29.80	29.69	29.61	35	38	40	N.	Overcast—fair.
20	31	51	42	61	72	79	36	42	43	W.	Fair—cloudy.
21	34	45	36	97	30.14	30.26	39	41	42	N. E. N.N.W.	Overcast—fair.
22	20	44	36	30.47	52	48	38	41	40	N. E. S. E.	Hazy—overcast.
23	31	47	36	42	48	41	39	41	41	N. E. E.	Foggy—overcast.
24	35	66	51	00	29.85	29.91	40	45	47	S. W. W.	Overcast—fair.
25	28	42	37	25	30.23	30.25	40	43	43	N. W.	Fair and clear.
26	22	44	40	25	25	20	38	43	43	N. W. S. E.	Fair.
27	20	36	25	34	32	30	37	39	38	N. E. S. E.	Fair—lowery.
28	14	38	27	28	30	17	34	35	35	E. S.	Fair—cloudy—sprinkling snow.
29	27	44	30	29.71	60	60	34	37	37	S. E.	Moderate snow-storm.
30	24	48	39	55	56	56	35	40	41	W.	Overcast—fair.
31	24	44	37	70	71	68	37	43	43	N. W.	Fair.
April 1	24	41	36	29.70	29.64	29.59	37	40	40	N. W.	"
2	21	43	33	58	53	49	36	41	40	"	"
3	24	42	36	50	50	50	36	41	40	"	"
4	24	50	44	63	70	73	37	43	43	W.	"
5	25	55	40	30.00	30.07	30.09	30	46	46	S.	"
6	28	64	50	05	29.99	00	40	49	49	W.	Fair—hazy—overcast.

BAROMETRICAL TABLE KEPT AT KENNEBUNK.

1838.	Thermometer. ☉ ris.	Thermometer. 1 P M.	Thermometer. ☉ set	Barometer. ☉ rise.	Barometer. 1 P. M.	Barometer. ☉ set.	Temp. of Barom. ☉ ris.	Temp. of Barom. 1 P M.	Temp. of Barom. ☉ set	Wind.	Weather.
7	26	48	38	15	18	18	43	47	46	W. S.	Fair.
8	20	50	39	23	29	22	41	46	45	S.	Fair—rain, night.
9	40	55	49	29.73	63	60	43	46	47	"	Overcast—fair.
10	33	50	38	63	63	66	43	46	45	S. W. N. W.	Overcast—sprinkling rain—fair.
11	26	42	35	91	97	90	41	43	42	S. E.	Fair—overcast—misty—snow.
12	31	50	38	30.00	30.10	30.11	40	44	43	N. S.	Fair. N. Light.
13	30	57	42	15	16	17	39	45	46	W.	Fair—overcast—snow, night.
14	25	34	30	23	17	13	41	41	41	N. E.	Snow-storm.
15	12	47	39	13	02	29.92	36	40	41	N. W.	Fair.
16	17	32	28	06	16	30.18	36	38	37	"	Fair and clear.
17	17	45	36	32	30	22	33	39	38	N. W. S.	Fair—lowery—small snow, night
18	31	52	45	29.95	29.80	29.78	38	41	42	S.	Overcast—small rain, night.
19	41	49	44	66	64	64	43	45	45	N.	Overcast—misty.
20	30	44	32	85	30.00	30.12	41	44	43	N. W.	Fair.
21	19	39	34	30.23	26	12	38	41	41	S.	Fair and clear.
22	31	54	50	29.92	29.75	29.69	40	46	47	"	Fair.
23	27	47	37	98	30.05	30.05	43	45	45	N. W. N. S.	"
24	18	36	30	30.23	23	19	37	41	40	N. S.	"
25	16	45	38	23	24	20	36	41	42	N. W. S.	"

26	30	49	38	18	13	00	39	40	41	S. E.	Overcast—misty—foggy.
27	36	62	51	29.73	29 74	29.91	40	47	49	S.	Overcast—fair.
28	32	65	46	93	96	91	45	51	51	W. S.	Fair—cloudy.
29	42	53	40	85	86	82	48	49	48	N. E.	Overcast. N. Light.
30	34	55	41	86	95	30.09	43	48	47	W. N. W.	Fair. N. Light.
May 1	28	61	55	30.20	30.19	30.15	43	49	51	N. W.	Fair and clear.
2	30	63	47	19	15	10	47	53	52	N. E. S.	Fair—lowery.
3	42	47	44	29.95	29.95	29.94	49	49	49	N. E.	Overcast—small rain.
4	40	46	40	96	30.09	30.13	47	46	46	"	Overcast.
5	38	42	38	30.15	10	00	45	44	43	"	Overcast—rain-storm—plentiful rain, night.
6	41	58	42	29.90	29.90	29.92	44	46	47	N. E. E.	Overcast—fair—foggy.
7	40	65	52	82	86	85	46	51	52	S.	Overcast—foggy—fair.
8	36	59	47	89	92	90	49	54	52	"	Fair—cloudy.
9	38	61	45	88	89	87	48	52	52	N. E. S.	Cloudy—fair.
10	41	58	43	88	93	94	49	52	52	E. S. E.	Cloudy—fair—foggy.
11	40	63	50	96	96	95	47	51	52	Variable.	Fair—some clouds and few drops of rain.
12	32	62	48	95	84	88	46	52	51	S.	Fair.
13	37	59	52	86	88	99	49	54	54	W. S.	Fair—frost, night.
14	31	62	49	30.16	30.25	30.25	50	55	53	N. E. S.	Fair—bright N. Light—frost.
15	31	66	58	31	31	24	48	57	53	N. W. S.	Fair.
16	50	85	59	15	00	29.90	54	58	59	W. S. W.	Fair—hazy—smoky—sprinkling rain.
17	56	77	62	29.89	29.91	96	59	65	65	W.	Fair.
18	42	40	42	90	88	90	58	52	51	N. E. N.	Rain-storm.
19	27	50	46	97	30.00	96	45	50	50	S.	Fair.
20	47	77	59	95	87	90	50	56	60	S. W. S.	"

BAROMETRICAL TABLE KEPT AT KENNEBUNK.

1838.	Thermometer.			Barometer.			Temp. of Barom.			Wind.	Weather.
	☉ ris.	1 P M	☉ set	☉ rise.	1 P. M.	☉ set.	☉ r.s.	1 P M.	☉ se		
May 21	46	56	50	30.02	12	30.12	56	62	60	N. E. E.	Fair.
22	47	57	56	14	11	04	56	5[illegible]	[illegible]8	E. S.	Rain, morning—overcast—foggy.
23	40	79	56	07	17	12	58	63	5[illegible]	S.	Fair—cloudy.
24	52	72	57	29.92	29.93	29.86	57	63	61	"	Foggy—overcast—fair—cloudy.
25	54	62	53	87	89	81	50	60	57	E. N. E.	Overcast—misty.
26	47	58	48	79	86	87	55	55	55	S.	Cloudy—fair.
27	33	62	51	92	93	92	51	56	57	E. S.	Fair.
28	46	66	54	87	87	88	53	58	57	S.	Rain, morning—fair.
29	43	67	57	95	30.01	30.07	53	60	59	"	Fair.
30	46	56	56	30.10	14	09	54	57	58	N. E.	Foggy—overcast—cloudy.
31	52	78	62	09	10	10	56	63	54	N. E.	Cloudy—fair.
		82									
June 1	48	75	53	30.17	30.20	30.19	59	63	59	E. S.	Foggy—cl.—overcast—foggy—some rain, [night.
2	50	64	60	09	03	04	57	58	60	S.	Overcast—shower—fair.
3	49	78	63	06	05	04	56	61	6[illegible]	W.	Fair.
4	50	69	50	05	07	00	56	60	60	N. E. S. E.	Fair—cloudy.
5	54	59	59	29.87	29.68	29.68	59	59	59	N. E. N.	Rain-storm.
6	50	79	62	69	79	81	57	66	52	W. S.	Fair—shower.

*7	51	64	56	71	64	60	61	62	61	E. S.	Rain, morning—overcast—-shower—-thun-[der—brilliant rainbow.
†8	52	76	68	74	85	30.04	57	63	64	W. fresh.	Fair.
9	50	88	65	30.19	30.26	20	59	67	66	S. W.	Fair.
‡10	54	86	78	18	19	10	60	72	70	"	Fair—small shower, night.
‖11	63	98	87	11	08	08	68	77	81	"	Fair.
12	71	96	82	04	04	03	73	81	79	W.	"
13	67	97	79	03	05	10	71	80	77	"	"
14	66	78	64	13	15	17	70	73	70	E.	Fair—small shower.
§15	49	82	82	16	16	10	67	72	75	E. S. S. E.	Foggy—fair.
**16	60	94	73	11	14	10	70	79	72	S. W.	Fair.
17	64	92	70	03	03	29.97	70	76	69	S.	Cloudy—fair—thunder-shower.
18	63	72	61	29.98	30.04	30.04	68	68	69	N. E.	Overcast—misty—fair—cloudy.
19	46	69	57	30.20	34	34	61	64	68	N. E. S.	Fair.
20	47	75	63	33	31	22	58	61	65	S.	"
21	52	81	77	18	14	04	61	70	73	S. W. S.	"
††22	67	82	66	00	07	09	69	73	68	N. E. E. S.	Fair—small shower.
23	55	79	62	12	16	14	63	68	65	N. E. E.	Fair.
24	59	70	66	09	02	29.98	64	66	68	S. variable.	Foggy—overcast—shower.
25	55	69	57	30.00	00	91	64	64	64	S. E.	Overcast—thunder-shower.
26	54	80	68	29.90	29.90	30.00	62	69	70	W. fresh.	Fair. N. Light.
27	51	80	65	30.13	30.20	20	64	68	68	E.	Fair—lowery.
28	53	62	62	21	10	29.93	63	65	65	S. S. E.	Cloudy—rainy.

* Thermometer highest, after 1. P. M., 80°
† " " forenoon, 77
† " " after 1 P. M., 80
‡ " " " 88

‖ Thermometer highest, after 1 P. M., 101°
§ " " forenoon, 87
** " " after 1 P. M., 98
†† " " forenoon, 92

BAROMETRICAL TABLE KEPT AT KENNEBUNK.

1838.	Thermometer. ☉ ris.	1 P. M.	☉ set	Barometer. ☉ rise.	1 P. M.	☉ set.	Temp. of Barom. ☉ ris.	1 P. M.	☉ set	Wind.	Weather.
June 29	64	86	69	29.87	29.91	30.04	64	74	71	W. fresh.	Fair.
30	56	75	61	30.20	30.31	29	61	67	66	S. E.	"
July 1	60	68	62	30.29	30.30	30.25	66	65	65	S.	Small rain—foggy.
2	60	82	70	19	18	11	66	67	68	"	Foggy—overcast—fair—thunder-shower.
3	57	87	75	08	06	05	65	72	71	"	Fair.
4	62	95	77	05	10	10	67	77	75	S. W. S.	"
5	66	90	77	08	08	00	69	76	75	S. E.	Fair—cloudy—lightning, evening.
6	62	85	72	29.99	03	05	66	74	76	N. W. fresh.	Fair.
7	57	89	57	30.07	06	06	65	76	74	"	"
8	50	80	69	12	16	10	64	74	70	S.	"
9	67	98	85	29.97	29.94	29.90	68	82	82	S. S. W.	"
10	69	91	72	96	30.01	30.00	72	76	70	S.	"
11	66	102	84	88	29.82	29.83	70	80	81	S. W.	Fair—shower, afternoon.
12	73	88	75	90	30.00	30.06	75	75	73	W. N. W.	Cloudy—fair.
13	66	77	65	30.16	24	28	70	69	66	W. N. E. S. E.	Overcast—fair.
14	49	86	72	31	37	29	62	76	72	W. S. W. S.	Fair.
15	63	97	80	18	12	06	68	77	76	S.	Fair—cloudy.
16	56	85	70	00	00	02	70	74	69	"	" "
17	60	85	68	04	11	15	66	71	70	S. W.	Fair.

32

18	48	81	72	22	20	10	60	68	70	S.	Fair—small shower.
19	62	92	72	04	04	03	68	74	73	W. N. W.	Fair.
20	52	81	62	04	02	29.92	65	69	67	N. N. E. S.	Fair; showers; thunder; rain, night.
21	60	76	65	29.89	29.90	95	66	67	67	N.E.W. N.W.	Overcast; fair.
22	49	80	64	30.10	30.16	30.19	64	67	68	N. W. N. S.	Fair.
23	48	83	66	22	24	24	63	69	68	N. W. S.	"
24	51	80	65	24	23	15	61	66	66	S.	Fair; lowery; overcast; rain, night.
25	61	69	67	10	02	29.98	64	65	68	"	Mod. storm; fair; N. Light.
26	57	82	68	29.98	00	30.00	65	70	69	"	Foggy—fair.
27	52	83	68	30.04	13	12	64	72	67	W. S.	Fair.
28	58	90	81	08	02	29.93	66	75	77	S.	Fair—small shower.
29	66	97	76	29.94	29.90	86	71	81	76	"	Fair—[Ther. highest, 29th, forenoon, 102°.]
30	71	98	74	77	70	79	72	83	78	S.S.W. N. W.	Fair; N. Light.
31	68	84	70	94	96	96	66	71	71	N. W.	Fair.
Aug. 1	47	84	76	29.95	29.89	29.88	66	76	76	S. W. S.	"
2	52	88	66	30.03	30.10	30.14	66	71	72	N. S.	"
3	59	85	67	25	32	32	66	71	67	N. W. S.	"
4	49	95	82	33	27	20	64	76	78	S. W.	"
5	30	98	43	14	14	10	70	81	74	S.	"
6	67	78	67	29.92	29.94	29.96	72	72	69	N'ly.	Overcast.
7	63	77	69	30.00	30.02	30.00	68	68	70	S. W.	Overcast—fair.
8	60	87	72	20	30	29	67	72	72	N. W. N. S.	Fair.
9	60	75	69	29	25	20	67	69	70	Calm. S.	Overcast—small rain, evening.
10	64	80	66	18	20	20	68	70	69	N. E. E.	Overcast—fair. [11 h. forenoon 80°.
11	56	74	64	20	12	03	66	68	67	N. E. E. S.	Fair—overcast—rain.—[Therm. highest at

BAROMETRICAL TABLE KEPT AT KENNEBUNK.

1838.	Thermometer.			Barometer.			Temp. of Barom.			Wind.	Weather.
	☉ ris.	1 P M.	☉ set	☉ rise.	1 P. M.	☉ set.	☉ ris.	1 P M.	☉ set		
Aug. 12	66	85	76	29.88	29.90	29.98	67	73	73	W.	Foggy —fair.
13	56	82	70	30.05	30.11	30.16	65	71	70	"	Fair.
14	48	74	62	34	37	35	64	66	66	N.	"
15	40	76	66	36	35	28	60	67	66	N. E. S.	Fair—lowery.
16	50	69	59	22	18	05	62	65	65	S.	Overcast—rain storm, afternoon.
17	59	80	69	29.66	29.66	29.77	64	70	69	N. N. W.	Rain—fair.
18	56	78	65	92	30.00	30.03	65	68	68	N. W. W.	Fair.
19	48	82	62	30.19	27	30	62	67	65	N. W. E. S.	"
20	49	74	71	41	48	47	62	67	66	N. E. S. E.	"
21	60	78	67	45	40	35	61	66	65	S. E.	Cloudy and fair.
22	55	86	72	33	36	35	64	73	72	N. W. S.	Fair and clear. Aurora Borealis.
23	55	86	75	34	33	26	64	76	73	W. S.	Fair—smoky.
24	62	100	77	20	12	05	68	80	77	S. W.	Fair—smoky—hazy.
25	64	92	73	05	01	29.90	72	79	70	W. S.	" small shower.
26	60	70	57	29.80	29.86	96	69	66	66	N.	" shower—frost in some places.
27	38	72	56	30.02	30.02	30.00	58	62	61	N. N. W. W.	" cloudy—rain, night.
28	55	77	67	29.80	29.81	29.92	59	65	67	W.	" Aurora.
29	39	73	59	30.17	30.26	30.25	59	64	64	N. E. S.	"
30	50	63	67	21	05	07	60	64	66	S. N.	" thunder shower. Aurora.

31	48	75	63	18	17	12	60	65	65	N. W. S.	Fair.
Sept. 1	57	65	59	29.89	29.80	29.79	60	63	63	S. calm.	Moderate rain-storm—foggy.
2	59	65	55	90	30.04	30.14	60	62	63	W.	Fair—frost.
3	32	68	54	30.31	38	37	56	60	60	N. W. N. S.	" "
4	40	71	51	41	39	35	55	61	62	N. S.	Fair.
5	42	83	73	32	28	23	56	67	71	S.	" [Thermom. highest at 3 P. M.—86°]
6	47	74	63	35	43	36	62	67	66	N. W. S.	"
7	43	92	72	30	29	28	59	75	70	Calm. S.	"
8	54	68	54	42	46	45	64	64	62	N. E. E.	Hazy—cloudy—fair.
9	50	69	59	42	39	34	57	62	63	S.	Overcast—fair.
10	52	84	69	26	19	11	58	66	68	"	Fair.
11	55	80	66	10	10	12	65	70	68	S. E.	Fair—cloudy.
12	54	57	51	23	23	22	61	61	59	N. E.	Overcast—small rain—stormy night.
13	53	58	61	29.82	29.62	29.93	57	58	61	N. E. N. N.W.	Stormy—cloudy—fair. Aurora B.
14	46	74	61	30.27	30.35	30.32	57	66	65	W. S.	Fair. Aurora.
15	45	81	64	26	31	35	59	60	60	N. W. N. E. S.	" "
16	44	68	54	47	48	42	61	64	64	N. W. N. E.	" "
17	42	71	57	28	17	10	57	60	60	N. E.	Hazy—fair. Aurora.
18	46	77	58	29.98	29.90	29.83	57	62	62	Varia.—calm.	Foggy—overcast—some sunshine—sun
19	57	73	61	74	77	90	60	65	65	W.	Fair—clear. [eclipsed, partly visible.
20	37	75	58	30.12	30.16	30.16	57	62	63	S.	Fair. Aurora.
21	36	74	59	26	30	27	57	60	59	"	Fair—cloudy—hazy—rain at night.
22	62	72	66	18	11	07	61	65	65	"	Overcast—cloudy—fair.
23	62	64	58	29.93	29.89	29.83	64	66	66	"	Foggy—sunshine and clouds—rainy even'g.
24	36	67	57	30.05	30.04	30.15	55	60	59	W.	Fair.

1838.	Thermometer. ☉ ris.	Thermometer. 1 P. M.	Thermometer. ☉ set	Barometer. ☉ rise.	Barometer. 1 P. M.	Barometer. ☉ set.	Temp. of Barom. ☉ ris.	Temp. of Barom. 1 P. M.	Temp. of Barom. ☉ set	Wind.	Weather.
Sept. 25	32	68	60	40	47	50	53	63	50	S.	Fair.
26	50	59	52	66	71	69	56	58	57	N. N. E.	Overcast—small rain.
27	51	58	54	48	42	38	57	59	59	N. E.	Moderate rain-storm.
28	52	66	57	30	25	24	58	61	61	S. S. E.	Overcast—cloudy—fair—cloudy.
29	55	70	60	10	03	01	59	59	59	Calm.	Overcast—small rain—foggy. Aurora.
30	50	76	68	02	04	04	58	66	66	W.	Fair.
Oct. 1	47	34	66	30.16	30.22	30.22	59	70	68	N. W.	Fair—clear.
2	43	73	62	20	18	10	57	68	65	S.	" "
3	57	64	55	29.90	29.90	29.93	62	63	63	S. W.	Overcast—sprinkling rain—fair.
4	36	62	52	30.13	30.20	30.16	55	59	57	N. W. S.	Fair.
5	48	72	64	29.97	29.98	00	54	65	61	N. W. W.	"
6	38	79	63	95	83	29.78	55	71	65	S. W.	Fair—small rain, night.
7	50	58	46	80	30.06	30.17	60	61	57	N. W.	Fair.
8	29	54	45	30.24	13	10	50	54	53	N. E. calm.	Fair—white frost.
9	27	59	46	01	02	02	47	53	52	N. S.	Fair.
10	36	58	46	01	03	02	48	50	51	N. E.	Cloudy—overcast—rain-storm, night.
11	46	64	53	29.66	29.65	29.65	50	54	54	S.	Cleared off fair—cloudy.
12	39	54	51	96	97	84	51	52	52	"	Fair—overcast—rain-storm.
13	41	53	43	80	84	93	51	53	52	W.	Cleared off fair.

14	30	44	42	98	96	90	47	47	46	S.	Overcast—rain, night.
15	42	45	43	94	80	70	47	47	48	N. E. N.	Rain-storm.
16	40	56	49	98	30.10	30.11	47	52	52	W.	Fair.
17	30	54	46	30.26	33	40	47	51	51	N. W.	"
18	25	55	42	48	48	38	45	49	49	N. S.	Fair—hazy—lowery.
19	34	42	41	40	37	27	46	45	45	N. E. E.	Overcast—rain-storm.
20	45	56	48	29.71	29.74	29.74	46	54	52	N. W.	Fair—faint Aurora.
21	30	53	56	86	90	88	47	50	50	W.	Fair—cloudy.
22	36	52	46	98	30.04	30.06	47	50	49	"	Cloudy—fair.
23	29	55	44	30.30	34	30	45	50	50	N. W. S.	Fair.
24	36	44	42	15	29.95	29.80	47	47	47	S. N. E.	Rain storm.
25	36	47	47	29.67	70	78	45	46	48	W.	Overcast—fair.
26	28	56	57	89	98	30.03	45	51	50	"	Fair.
27	27	47	42	30.13	30.04	29.95	45	45	45	S.	Overcast—rain-storm.
28	30	48	40	29.96	29.98	85	43	44	43	"	Fair—cloudy—small rain.
29	36	47	37	62	70	81	45	48	47	W. N. W.	Fair.
30	24	44	37	30.01	30.07	30.05	41	45	45	S.	"
31	29	31	29	04	04	09	41	41	40	N. E.	Snow-storm.
Nov. 1	13	34	27	30.38	30.38	30.28	35	39	40	N. W.	Fair—sprinkling snow, night.
2	28	48	43	29.94	29.97	00	38	44	43	S. W. W.	Fair.
3	32	53	44	30.20	30.23	23	42	48	48	S.	Fair—pleasant.
4	49	50	50	11	05	00	47	48	47	"	Moderate rain-storm.
5	48	52	50	29.91	29.80	29.65	49	50	50	S. N. E.	Rain-storm.
6	48	48	41	54	70	86	50	52	50	W. fresh.	Fair.
7	24	45	39	30.41	30.41	30.41	42	42	42	N. W. E.	Fair—cloudy—overcast.

BAROMETRICAL TABLE KEPT AT KENNEBUNK.

1838.	Thermometer.			Barometer.			Temp. of Barom.			Wind.	Weather.
	☉ ris.	1 P. M.	☉ set	☉ rise.	1 P. M.	☉ set.	☉ ris.	1 P. M.	☉ set		
Nov. 8	47	52	53	16	29.92	29.89	43	45	46	S.	Rain storm.
9	44	48	39	29.70	85	93	50	51	50	S. W. W.	Overcast—fair.
10	23	34	28	30.37	30.56	30.67	41	43	42	N. W.	Fair.
11	11	39	29	95	96	90	36	39	39	N. W. N. S.	" Aurora.
12	20	47	40	77	59	52	36	41	41	S.	" bright Aurora, ev'g.*
13	36	46	47	36	25	20	40	42	43	"	Overcast.
14	49	62	54	13	20	23	45	53	52	S. W. W.	Fair—pleasant—Aurora.
15	31	38	39	39	39	30	46	45	45	N. E.	Moderate rain storm.
16	36	42	44	03	29.83	29.80	45	45	45	Calm.	Overcast—foggy.
17	30	37	32	20	30.27	30.29	41	44	43	N. W.	Fair.
18	19	36	29	40	33	27	37	38	37	N. E.	Lowery—overc.—snow at night, about 8 in.
19	26	41	28	29.91	06	16	36	42	41	W.	Fair.
20	8	42	29	30.16	10	16	32	39	39	W. S. W.	" cloudy.
21	20	40	30	16	14	11	33	40	40	W.	"
22	32	42	31	29.87	29.85	29.90	37	39	39	"	Cloudy—overcast—fair.
23	13	35	27	30.01	30.01	30.01	34	35	34	"	" fair.
24	7	20	7	03	10	13	32	33	32	W. N. W.	Fair—clear.
25	−8	42	16	16	14	12	22	28	28	N. W.	Fair.
26	−2	39	20	12	15	15	23	29	29	"	"

27	13	37	22	15	06	03	25	26	27	Calm.	Overcast.	
28	24	40	31	29.96	29.95	29.95	29	32	33	N. W.	"	fair.
29	1	27	24	30.12	30.10	30.07	28	30	31	"	Fair	
30	21	16	30	01	29.99	29.99	30	36	36	W.	"	

11th, at 10h forenoon Barometer 30.97, highest for many years.

* Center of Aurora about 10° E. of true North.

CORRECTIONS IN LAST YEAR'S PUBLICATION.

June 3. Column of Barometer. For 30.17—30.02—29.88, read 30.02—29.88—29.72.

" 23. Column of Thermometer. For 64°, read 54°.

July 29. Column of Barometer. Sunrise—For 30.12, read 30.02.

August 18. Column of Weather. For fair, cloudy, fair, read fair, cloudy, foggy.

September 18. Column of Thermometer. For 76°, read 74°.

October 19. " " For 56°, read 46°.

" 10. Column of Barometer. For 30.50, read 30.60.

" 22. " " For 30.3c, read 30.30.

November 29. Merc. Thermometer temperature, sunrise. For 38, read 33.

TABLE IV.

BAROMETRICAL TABLE, kept at Waterville. By Professor G. W. Keely.

[Commenced June 2.]

1838	7 h. A. M.			10 h. A. M.			Noon.			5 h. P. M.		
Day	h. Eng. in.	T centig.	t centig	h	T	t	h	T	t	h	T	t
2	29.96	* 16.67	*15.	29.94	* 16.33	* 13.33	29.89	*16.	*13.	29.88	*15.5	* 15.33
S	29.9	15.5	14.	29.91	18.	18.25	29.89	18.	18.75	29.86	19.	21.
4	29.94	15.	13.5				29.92	19.5	22.5	29.88	19.5	21.33
5	29.74	16.	15.	29.64	16.	13.75	29.53	16.	14.5	29.43	16.5	15.5
6	29.53	16.5	17.				29.64	20.	26.	29.68	21.5	24.5
7	29.65	18.	14.5	29.6	18.5	16.	29.57	18.5	16.67	29.45	18.	16.5
8	29.58	16.	16.	29.63	17.	20.	29.67	17.5	21.	29.79	17.5	20.
9	30.08	16.5	19.67	30.11	20.	25.	30.09	21.	26.	30.04	22.67	27.
S	30.07	20.5	22.	30.07	23.3	29.	30.05	24.	31.5	29.98	28.5	32.
11	29.95	22.5	23.5	2			29.93	27.	29.5	29.87	28.5	33.5
12	29.87	23.5	25.75	29.87	24.	30.	29.87	27.	31.5			
13	29.90	23.5	24.75	29.93	26.	29.	29.95	26.	28.3	29.98	25.5	27.25
14	30.08	21.	20.25	30.08	22.	26.	30.06	23.	28.	30.03	24.	27.25
15				30.03	22.5	28.	30.02	25.3	30.5	29.98	25.	23.03
16	29.96	22.	23.67	29.97	25.	29.5	29.98	26.	33.	29.93	27.	30.5
S	29.92	23.	21.5				29.86	24.	28.5	29.83	23.	23.25
18	29.93	18.5	18.5	29.95	19.67	24.	29.94	21.	23.			
19	30.17	16.67	16.67				30.17	20.67	22.			
20	30.15	17.	14.	30.15	20.	23.	30.14	22.5	27.	30.07	24.	26.5
21	30.02	19.67	18.5	29.97	23.	27.	29.94	25.5	30.3	29.86	26.	28.5
22	29.91	23.5	25.	29.96	21.5	24.5	29.97	23.	25.5	29.94	24.5	29.
23	30.03	18.5	17.	30.04	21.	26.				29.98	22.5	25.5
S	29.97	18.	16.	29.93	19.	17.	29.89	20.	18.75	29.88	19.	16.
25	29.86	17.	15.	29.86	19.	17.25	29.83	19.5	20.67	29.79	18.5	18.
26				29.73	20.5	25.	29.73	21.67	25.5	29.79	22.	22.5
27	30.05	18.5	28.5	30.07	20.5	25.	30.06	22.5	25.75			
28	30.05	18.	17.	30.04	20.	22.	30.02	19.5	19.67	29.86	19.	17.5
29	29.72	18.	18.33	29.77	20.	25.	29.79	21.5	25.75			
30				30.19	20.5	22.5	30.19	21.33	23.33			
1	30.18	18.	20.	30.18	19.	20.	30.18	19.5	20.	30.14	19.5	18.5
2	30.06	19.	19.3	30.06	19.5	21.5	30.03	20.5	25.	29.96	22.	24.(*a*)
3	29.94	21.	21.67				29.92	24.5	28.	29.87	26.	28.5
4	29.97	22.5	23.67	29.98	29.	32.5	29.97	27.5	34.67	29.95	27.5	30.67
5	29.96	22.	23.5	29.96	23.	25.67	29.93	24.	28.67	29.86	22.5	23.33
6	29.87	21.5	23.	29.87	24.	28.	29.86	24.5	28.	29.87	24.	25.3
7	29.89	20.	21.3				29.89	25.	29.3	29.92	24.	25.3
S	30.04	20.	22.				30.02	24.5	27.25	29.96	23.	24.67
9	29.8	22.	22.	29.78	24.	28.	29.78	26.5	31.5	29.73	27.3	29.67
10	29.89	22 5	24.	29.9	24.	29.3	29.89	24.5	31.5	29.85	25.	26.3

(*a*.) At 6 P. M. the last.

1838	7 h. A. M.			10 h. A M.			Noon.			5 P. M.		
Day	Barom	T	t	Barom	T	t	Barom	T	t	Barom	T	
11	29.71	21.	22.	29.68	25.	30.	29.68	26.5	32.3	29.68	27.3	31.
12	29.85	24.	23.67	29.86	24.	25.5	29.88	24.67	29.75	29.93	25.	27.67
13				30.14	20.	23.	30.15	25.5	24.	30.13	22.5	24.5
14	30.21	18.	16.5	30.25	21.	27.	30.19	24.	28.			
S	30.03	21.5	25.5	29.99	24.	29.3	29.95	26.	32.	29.86	26.	29.3
16	29.89	21.5	23.	29.89	23.67	28.	29.89	25.	27.	29.86	25.67	28.
17	29.98	20.	19.				30.1	23.	25.3	30.03	23.67	25.5
18	30.13	18.	16.5	30.09	21.3	27.	30.06	24.	28.	29.96	23.5	26.3
19	29.91	21.	24.	29.92	23.	25.	29.89	23.	26.5	29.88	24.5	26.5
20	29.93	18.5	19.5	29.9	20.	25.5						
(Sept.) 7	30.15	17.	17.5				30.15	24.	24.	30.15	25.5	27.5
8	30.39	17.	13.				30.39	18.	18.			
9												
10	30.11	16.	16.	30.08	19.	20.	30.04	20.	23.			
11	29.96	20.	19.	30.01	21.	23.3	30.03	21.				
12	30.20	16.5	13.	30.20	19.	18.	30.18	18.	17.			
13							29.56	16.	13.5	29.73	18.	15.5
14	30.18	16.	15.	30.23	18.	22.	30.22	20.	23.5	30.17	21.	21.3
15	30.17	14.	12.3									
16	30.41	15.	8.	30.41	17.	15.5	30.39	18.5	18.	30.30	19.	18.
17	30.15	13.5	7.5	30.08	16.	18.5	30.06	19.	21.	29.96	19.5	20.
18				29.83	15.	17.5	29.78	18.	22.	29.72	18.	19.
19				29.67	18.66	18.	29.68	19.5	18.			
20	29.97	13.5	10.5	29.99	16.5	16.66	30.02	18.	21.5	30.02	19.	20.
21	30.04	17.5	18.5	30.17	16.	15.5	30.17	19.	22.5	30.17	19.	20.
22							29.98	20.5	23.5			
23												
24	29.9	14.	9.	29.87	15.	13.5	29.89	15.5	14.			
25	30.32	10.	6.5	30.35	12.	13.5	30.36	14.5	16.	30.38	16.	18.5
26	30.63	13.	9.	30.64	15.	13.5	30.62	17.	16.5			
27	30.40	14.5	12.	30.35	15.	15.						
28	30.17	15.	15.	30.15	17.	18.5				30.08	18.	20.
29							29.91	19.5	20.66	29.88	19.75	21.
30	29.94	17.5	15.5	29.96	20.	20.	29.94	21.5	22.	29.9	20.5	22.5
(Oct.) 1	30.04	16.3	12.	30.08	19.5	22.3	30.08	21.3	25.	30.05	21.	23.5
2	30.08	15.5	8.5	30.07	18.5	18.	30.03	22.5	21.	29.93	22.	23.
3	29.74	17.	17.66				29.74	17.5	16.3			
4	30.04	12.	5.				30.04	13.5	12.5	29.96	15.	14.
5	29.78	12.5	12.	29.81	15.	17.66	29.81	15.5	19.	29.84	16.	18.
6	29.80	12.	5.5				29.64	16.	21.33			
7	29.73	16.	9.5							30.03	14.3	9.
8	30.11	8.	-3.5	30.1	11.	7.	30.05	13.	9.5	29.93	12.	9.3
9	29.87	6.5	-2.	29.88	9.5	6.3						
10							29.95	10.5	14.5	29.93	11.	11.
11	29.59	11.	9.5	29.50	11.	12.5	29.47	12.3	18.	29.49	15.	14.5
12				29.83	13.	13.5	29.84	14.	15.	29.79	12.	10.66
13	29.63	10.33	7.5							29.77	10.5	8.
14	29.84	6.	0.5				29.78	6.	6.	29.79	6.5	6.

1838	7 h. A. M.			10 h. A. M.			Noon.			5 h. P. M.		
Day	Barom	T	t	Barom	T	t	Barom	T	t	Barom	T	t
15				29.83	7.	5.3	29.77	7.	6.	29.58	7.5	6.5
16	29.82	7.5	3.5				29.92	11.5	12.5			
17	30.08	7.	2.	30.12	9.	9.3						
18	30.34	5.	-1	30.33	10.3	7.	30.33	13.	8.3	30.28	14.5	8.
19	30.33	7.	-5	30.32	9.5	6.3	30.29	12.	8.	30.22	12.	4.5
20				29.56	14.0	8.	29.59	14.	8.5			
21	29.76	9.3	2.5	29.77	12.5	11.				29.79	11.	8.3
22	29.88	8.5	4.5	29.91	13.5	8.3	29.93	14.5	10.66	29.97	15.5	7.3
23	30.21	9.	-1	30.24	11.5	6.66	30.24	15.3	8.5	30.19	14.	8.
24	30.03	10.	5.	29.97	12.5	8.	29.78	13.	10.3			
25	29.61	10.	5.	29.60	12.	7.5	29.57	13.	7.5	29.58	13.	7.
26				29.82	12.5	7.5	29.85	14.5	12.			
27							29.95	10.	11.3			
28	29.85	9.5	2.				29.83	14.5	10.5			
29	29.46	9.3	3.3	29.55	14.	5.5	29.58	14.	6.			
30	29.87	5.3	-3	29.91	8.5	3.	29.93	11.	3.			
31				29.99	4.5	-0.66	29.97	4.5	0.			

Where no sign is prefixed to the temperature, + is meant.

TABLE V.

BAROMETRICAL TABLE, kept at Brunswick, Me. By Professor PARKER CLEAVELAND.

Day.—1838.	H. 7 A.M.	H. 1 P.M.	15 m. after ☉ set.	Day.—1838.	H. 7 A.M.	H. 1 P.M.	15 m. after ☉ set.
May 21	29.80	29.95	30.00	June 22	29.89	29.88	29.88
22	30.00	29.93	29.80	23	29.96	29.96	29.96
23	29.90	29.98	30.00	24	29.90	29.90	29.90
24	29.74	29.72	29.70	25	29.90	29.81	29.80
25	29.70	29.70	29.70	26	29.80	29.80	29.83
26	29.67	29.69	29.71	27	30.01	30.01	30.01
27	29.77	29.77	29.77	28	30.01	30.00	9.85
28	29.70	29.70	29.70	29	29.68	29.70	29.80
29	29.80	29.80	29.80	30	30.10	30.10	30.11
30	29.80	29.80	29.91	July 1	30.11	30.11	30.00
31	29.91	29.91	29.91	2	29.98	29.90	29.90
June 1	30.00	30.00	29.92	3	29.98	29.98	29.98
2	29.91	29.85	29.85	4	29.99	29.99	29.99
3	29.85	29.85	29.85	5	29.91	29 91	29.91
4	29.87	29.87	29.87	6	29.83	29.83	29.83
5	29.86	29.85	29.85	7	29.88	29.88	29.89
6	29.68	29.51	29.51	8	30.00	30.00	29.91
7	29.51	29.51	29.45	9	29.78	29.78	29.78
8	29.51	29.61	29.71	10	29.83	29.84	29.84
9	30.06	30.06	30.06	11	29.70	29.70	29.76
10	30.00	30.00	30.00	12	29.77	29.77	29.81
11	30.00	29.88	29.88	13	30.03	30.03	30.03
12	29.84	29.84	29.84	14	30.17	30.17	30.17
13	29.86	29.90	29.90	15	30.00	29.93	29.84
14	30.02	30.02	30.02	16	29.84	9.84	29.86
15	30.02	30.02	29.92	17	29.90	29.95	29.95
16	29.96	29.96	29.96	18	30.10	30.03	30.00
17	29.83	29.83	29.82	19	29.87	29.87	29.87
18	29.86	29.86	29.90	20	29.87	29.84	29.84
19	30.09	30.13	30.23	21	29.80	29.80	29.80
20	30.12	30.12	30.12	22	29.98	30.00	30.00
21	29.98	29.91	29.91	23	30.03	30.04	30.08

Day.—1838.	H. 7 A.M.	H. 1 P.M.	15 m. after ☉ set.	Day.—1838.	H. 7 A.M.	H. 7 P.M.	15 m. after ☉ set.
July 24	30.08	30.08	30.08	Sept. 2	29.73	29.88	29.90
25	29.98	29.98	29.96	3	30.06	30.16	30.16
26	29.96	29.95	29.95	4	30.22	30.22	30.22
27	29.91	29.95	29.95	5	30.13	30.10	30.09
28	29.95	29.85	29.85	6	30.24	30.24	30.24
29	29.77	29.73	29.73	7	30.11	30.11	30.16
30	29.60	29.61	29.64	8	30.21	30.21	30.22
31	29.80	29.80	29.80	9	30.25	30.25	30.19
August 1	29.80	29.80	29.86	10	30.08	30.00	30.00
2	29.90	29.93	29.93	11	29.91	29.90	29.90
3	30.15	30.15	30.15	12	29.91	29.91	29.92
4	30.15	30.00	30.00	13	29.67	29.47	29.80
5	29.96	29.96	29.90	14	29.94	29.96	29.96
6	29.79	29.78	29.78	15	30.10	30.10	30.12
7	29.83	29.85	29.85	16	30.31	30.31	30.31
8	30.08	30.10	30.10	17	30.10	30.10	30.10
9	30.12	30.12	30.03	18	29.80	29.75	29.75
10	30.03	30.05	30.05	19	29.66	29.60	29.60
11	30.05	29.96	29.85	20	29.85	29.85	29.90
12	29.70	29.70	29.80	21	30.11	30.11	30.10
13	29.90	29.91	30.10	22	30.00	30.00	30.00
14	30.10	30.20	30.20	23	29.73	29.70	29.65
15	30.20	30.15	30.12	24	29.75	29.75	29.85
16	30.05	30.01	29.87	25	30.25	30.30	30.30
17	29.51	29.51	29.62	26	29.90	29.90	29.96
18	29.66	29.71	29.71	27	29.83	29.85	29.85
19	30.05	30.10	30.10	28	30.13	30.13	30.06
20	30.19	30.29	30.29	29	29.93	29.87	29.87
21	30.25	30.15	30.15	30	29.87	29.87	29.87
22	30.14	30.05	30.05	Oct. 1	29.86	29.86	29.86
23	30.05	30.05	30.05	2	29.84	29.84	29.84
24	30.00	30.00	29.87	3	29.72	29.72	29.83
25	29.87	29.87	29.87	4	29.99	29.99	29.98
26	29.68	29.68	29.85	5	29.76	29.76	29.76
27	29.85	29.83	29.83	6	29.74	29.74	29.74
28	29.76	29.76	29.80	7	29.72	29.88	30.05
29	30.04	30.04	30.04	8	30.05	30.05	30.05
30	30.03	29.91	29.91	9	29.83	29.83	29.84
31	30.01	30.01	30.01	10	29.86	29.91	29.91
Sept. 1	29.76	29.70	29.70	11	29.52	29.52	29.55

Day.—1838.	H. 7 A.M.	H. 1 P.M.	15 m. after ☉ set.	Day.—1838.	H. 7 A.M.	H. 1 P.M.	15 m. after ☉ set.
Oct. 12	29.78	29.81	29.81	22	29.83	29.90	29.90
13	29 81	29.84	29.89	23	30.16	30.16	30.10
14	29.89	29.89	29.89	24	30.00	29.87	29.87
15	29.80	29.62	29.62	25	29.77	29.77	29.77
16	29.84	29.91	29.98	26	29.78	29.80	29.80
17	30.08	30.12	30.12	27	29.99	29.99	29.94
18	30.20	30.28	30.28	28	29.91	29.80	29.75
19	30.28	30.21	30.20	29	29.58	29.58	29.63
20	29.86	29.86	29.80	30	29.84	29.84	29.84
21	29.72	29.72	29.72	31	29.91	29.91	29.98

TABLE VI.

Professor CLEAVELAND's Table of the quantity of RAIN which fell at Brunswick from 1808 to 1818.

	1808. inches.	1809. inches.	1810. inches.	1811. inches.	1812. inches.	1813. inches.	1814. inches.	1815. inches.	1816. inches.	1817. inches.	1818. inches.	Monthly means. inches.
January,	2.000	3.500	3.000	1.900	2.500	3.500	.750	2.272	2.800	5.300	2.500	2.729
February,	1.900	2.300	3.000	4.100	4.300	2.200	1.800	1.500	2.820	4.010	1.710	2.695
March,	.800	1.200	5.500	1.500	1.000	5.010	2.700	1.157	1.830	2.000	3.700	2.400
April,	3.033	1.500	3.000	2.100	4.500	1.990	4.932	3.155	1.320	2.138	2.300	2.724
May,	6.854	2.928	2.770	4.300	4.401	2.743	11.410	1.800	4.153	.510	5.800	4.334
June,	4.514	3.600	2.889	2.000	7.730	2.128	3.660	4.751	1.410	5.090	3.174	3.722
July,	5.049	3.470	2.992	4.990	5.020	2.650	3.650	1.490	1.600	2.155	2.976	3.276
August,	.569	2.481	3.579	3.610	3.690	2.144	7.314	3.020	2.130	3.350	.155	2.913
September,	3.432	3.051	1.384	.510	1.000	.673	5.065	6.212	.300	2.150	5.070	2.622
October,	4.091	2.150	1.403	2.623	4.577	6.068	.540	2.232	6.165	2.550	.200	2.963
November,	3.607	1.659	4.470	7.470	3.292	6.065	3.976	1.670	5.664	4.800	1.500	4.016
December,	7.045	6.011	1.201	1.300	1.500	1.450	3.000	2.410	.200	4.233	2.000	2.760
Totals,	42.894	33.850	35.188	36.403	43.510	36.621	48.797	31.669	30.392	38.286	31.085	37.154*

* Annual average for eleven years.

NOTE.—May, 1814, was a remarkable month. Nearly one half of the quantity of rain fell during one week of almost continued storm. The rise of the Androscoggin was nearly unprecedented, and productive of much damage. In addition to this rainy week, there were nine thunder showers during the month.

TABLE VII.

BAROMETRICAL REGISTER kept at the State House, Augusta. By J. B. Cahoon, Esq.--1838.--Bar. 1.

Date.	9 A. M.		Noon.		5 P. M.		Observations.
	Barom.	T	Barom.	T	Barom.	T	
June 29	29.769	72°	29.771	72°	29.880	71°	Fair—fleecy clouds—wind S. W.
30	30.200	69	30.209	69	30.200	66	Clear—wind S. E.
July 2	30.160	68	30.150	68	29.950	70	Cloudy—E. S. E.
3	29.920	71	29.920	73	29.872	74	Fog in morning—fair at 9—light clouds, noon—W.—at 3,
4	29.980	70	29.980	70	29.981	71	Fair, half past 4 P. M. [rain—at 5, clear.
5	29.950	75	*29.900	76	29.876	75	9, appearance of rain—wind S. W.—showers.
6	29.969	75	29.870	76	29.870	74	9, fair—wind N. W.—12, high wind, light clouds—5, same.
7	29.900	74	29.900	75	29.900	75	Fair at 9, wind W.—Fair at 12, wind N.—4, high wind, rain.
9	29.770	76	29.770	76	29.750	78	9, wind S., cloudy—sun obscured most of the day—wind
10	29.892	78	29.900	75	29.869	76	9, light clouds, wind S. W.—5, light clouds. [S. W. at 5.
11	29.700	77	29.680	80	29.690	79	Light fleecy clouds, wind S. W.—showers.
12	29.850	75	29.880	75	29.912	75	Wind S. W., rainy, stormy.
13	30.130	70	30.130	70	30.130	72	Wind N. W., cloudy—5, clear.
14	30.250	72	30.220	74	30.150	76	Wind S. W., clear.
16	29.900	72	29.950	73	29.880	75	Wind W., showers—5, wind S. W., light fleecy clouds.
17	30.000	73	30.000	71	30.020	73	Wind S. W., clear.
18	30.170	74	30.160	75	30.000	74½	S. fleecy clouds.
19	29.930	74	29.900	73			Fleecy clouds.
20	29.950	71	29.970	71	29.870	69	" "

*20 minutes before 3.

BAROMETRICAL REGISTER KEPT AT THE STATE HOUSE, AUGUSTA.

Date.	9 A. M.		Noon.		5 P. M.		Observations.
	Barom.	T	Barom.	T	Barom.	T	
21	29.800	69°	29.800	69°	29.800	69°	Rainy.
23	30.170	69	30.170	71	30.120	71	Clear.
24	30.120	69	30.120	70	31.000	71	Wind S., cloudy.
25	29.964	68	29.930	68	29.870	66	Rainy day—11, wind S. E.
26	29.900	68	29.900	69	29.880	71	Wind N. E., fair—12, wind N. W.
27	30.000	72	30.000	72	30.000	74	Wind W., hazy.
Aug. 13	29.980	73	29.980	72	30.000	71	" " clear.
14	30.250	67	30.230	68	30.210	68	Wind N. W., clear—5, fleecy clouds.
15	30.226	70	30.210	71	30.150	70	Wind W., hazy.
16	30.100	69	39.076	71	30.000	70	9, fog—1, commenced raining, wind S.
17	29.500	67	29.500	69	29.550	70	Rainy at 9—fair at 12.
18	29.820	70	29.820	69	29.850	68*	Wind W., hazy.
20	30.370	68	30.370	68	30.328	68	Wind N., clear.
21	30.300	67	30.300	69	30.250	69	" S., cloudy.
22	30.250	70	30.250	73	30.200	74	Light clouds, wind W.
23	30.210	72	30.200	73	30.150	76	Wind S. W., fair.
24	30.020	75	29.980	78	29.900	78	Wind S., fleecy clouds—rain at 5, wind S. W.
25	29.900	77	29.886	76	29.800	76	Wind S. W., light clouds—some rain.
27	29.900	64	29.888	76	29.820	76	Wind W., fair.
28	29.700	76	29.700	76	29.760	66	Wind W., light clouds—rain at 5.
29	30.128	65			30.128	67	Wind W., light clouds.
30	30.050	65	30.000	66	29.928	66	Wind S., flying clouds—rain at 12—showers.
31	30.050	66	30.050	64	30.000	65	Wind W., fleecy clouds.
Sept. 1	29.770	63	29.728	64	29.672	64	Wind S. W.—rain at 7 P. M.
3	30.230	63	30.230	62	30.230	62	Wind W.—light clouds—at 5, wind N. W.

4	30.300	62°	30.300	63°	30.230	62°	Wind N., fair.
5	30.180	64	30.160	66	30.160	68	" S. W., fair.
6	30.300	66			30.226	68	" W., fair.
7	30.176	68	30.170	71			" S. W., light clouds.
8	30.384	65	30.400	67	30.350	65	" N., fleecy clouds.
10	30.112	64	30.050	66	26.950	66	" S. W., hazy.
11	29.990	66	29.990	66	30.026	68	" S. W., cloudy.
12	30.170	64	30.170	64	30.130	64	" N. cloudy.
13	29.700	64	29.550	66	29.672	67	" N. E., heavy rain at 9—wind N. W., 12 o'clock—wind W., 5.
14	30.218	66	30.218	66	30.180	66	" W., fair—wind at 5, S. W.
15	30.180	64	32.000	66	30.218	66	" N., fair.
17	30.150	61	30.080	63	29.968	63	At 9, fog.
18	29.880	62	29.800	68	29.726	66	Wind S. E.—fog—at 12, cloudy—sun obscured all day.
19	29.630	66	29.650	65	29.688	62	" N. W., clear.
20	30.000	62	30.000	63	30.000	62	Clear, wind S. W.
21	30.180	60	30.178	62	30.156	62	S. E., fleecy clouds, A. M.—cloudy, P. M.
22	30.016	62	30.000	63	29.918	65	S. W., thick, misty, A. M.—clear, P. M.
24	29.900	65	29.900	64	29.970	64	S. W., cloudy.
25	30.350	59	30.368	64	30.376	62	Clear.
26	30.616	60	30.620	64	30.550	62	Fleecy clouds.
27	30.372	59	30.350	62	30.276	63	E. S. E., rainy.
28	30.162	62	30.130	65	30.080	65	Cloudy, N. W.
29	29.966	62	29.934	65	29.868	65	Cloudy, A. M.,—S. E.—Clear, P. M.
Oct. 1	30.050	65	30.050	65	30.050	66	Clear.
2	30.070	65	30.032	66	29.934	66	Clear, N. W.
3	29.718	62	29.718	64	29.816	64	Rainy, A. M.—changeable, P. M.
4	30.064	60	30.070	60	29.980	58	

* 4 o'clock.

TABLE VIII.

BAROMETRICAL and THERMOMETRICAL REGISTER, kept at Gardiner, by R. H. GARDINER, Esq. From 1st of June to 1st of November, 1838.

1838.	8 A. M.			3 P. M.			10 P. M.		
	Barom	Ex. Thr	Winds.	Barom	Ex Thr	Winds.	Barom	Ex Thr	Winds.
June 1	30.	67°	S. E.	29.98	73	S S W	29.97	57	S W
2	29.90	52	"	29.84	55	S W	29.85	52	Calm
3	29.85	61	N. W.	29.83	65	N W	29.85	52	"
4	29.86	63	Calm.	29.85	68	S W	29.83	55	S W
5	29.66	55	N. E.	29.45	58	N E	29.45	56	Calm
6	29.50	68	N. W.	29.—			29.67	60	"
7	29.56	56	N. E.				29.47	53	"
8	29.56	64	W.	29.70	66	N W	29.86	57	N W
9	30.03	69	N. W.	29.98	83	W N W	29.96	60	S W
10	29.98	68	Calm.	29.94	83	S W	29.93	69	Calm
11	29.88	74	S. W.	29.81	85	" "	29.80	72½	S W
12	29.78	78	Calm.	29.78	91½	N W	29.78	70½	W
13	29.81	80	N. W.	29.84	81	"	29.92	68	S W
14	29.97	67	E. N. E.	29.95	78	S E	29.93	62	S E
15	29.95	68	S. E.	29.90	81	S	29.88	66	S W
16	29.88	76	"	29.87	90	N	29.84	70½	N W
17	29.82	70	Calm.	29.77	80	S E	29.76	65	S W
18	29.83	65	N. E.	29.83	74	E	29.88	58	"
19	30.06	64	S. E.	30.08	67	S E	30.05	51	"
20	30.07	60	S. S. E.	30.—	73	S S E	29.99	58	S
21	29.92	67	S.	29.84	76	S W	29.76	64	S W
22	29.82	76	N.	29.85	78	Calm	29.87	59	Calm
23	29.93	66	"	29.90	78	N W	29.90	60	S W
24	29.86	59	S. E.	29.80	62	E S E	29.80	58	N E
25	29.79	58	N. E.	29.73	66	"	29.70	57½	S E
26	29.685	67	S. E.	29.70	74	N	29.82	60	S W
27	29.98	67	N.	29.96	81	W S W	29.98	58	"
28	29.95	68	S. W.	29.84	60	S E	29.71	59	"
29	29.65	69	W. S. W.	29.72	76	N E	29.86	59	N W
30	30.07	65	S. E.	30.08	73	S E	30.09	55	S S W
July 1	30.07	62	"	30.05	65	"	30.03	59	S E
2	29.96	63	E. S. E.	29.88	74	S	29.87	64	S
3	29.84	70	S.	29.79	78	W	29.82	68	Calm
4	29.85	75	Calm.	29.88	90	S W	29.86	69	"
5	29.85	75	E.	29.80	78	S S W	29.76	67	"
6	29.78	70	N. N. W.	29.78	78	N W	29.80	64	N N W
7	29.80	76	N.	29.81	83	N	29.88	63	Calm
8	29.93	69	S. W.	29.90	71	S	29.84	66	S by W
9	29.73	73	S.	29.66	88	N N W	29.70	75	W S W
10	29.79	78	N.	29.79	84	W N W	29.79	68	W
11	29.74	78	W. S. W.	29.61	84	S W	29.64	73	S E

1838.	8 A. M. Barom	Ex. Thr	Winds.	3 P. M. Barom	Ex Thr	Winds.	10 P. M. Barom	Ex Thr	Winds.
July 12	29.74	73	N W	29.77	79	S W	29.88	68	S W
13	29.98	67	"	30.01	74	Calm	30.05	58½	"
14	30.10	68	Calm	30.05	83	W N W	30.02	64	"
15	29.92	73	S W	29.80	82	W S W	29.78	72	W S W
16	29.80	72	N E	29.79	82	W N W	29.80	62	Calm
17	29.90	70	N	29.90	76	N	29.98	58	"
18	30.02	71	E	29.92	76	W S W	29.85	68	S S E
19	29.82	75	N N E	29.82	81	N W	29.85	60	W N W
20	29.85	66	N	29.80	69	S E	29.78	58	S W
21	29.73	59	S E	29.72	71	N W	29.81	59	N W
22	29.93	64	N N E	29.94	72	N E	29.99	58	"
23	30.03	64	N	30.02	76	Calm	30.02	58	S W
24	30.02	65	Calm	29.80	74	W	29.94	63	S S W
25	29.88	58	S W	29.82	65	S S W	29.79	64	S E
26	29.79	67	N	29.79	78	N	29.83	61	Calm
27	29.88	71	"	29.90	82	W S W	29.90	64	S
28	29.87	73	Calm	29.78	86	"	29.84	72	Calm
29	29.72	74	"	29.70		Calm	29.66	73	"
30	29.53	77	S	29.44	82	N W	29.62	66	N W
31	29.72	64	W N W	29.70	75	N N W	29.72	63	Calm
Aug. 1	29.73	68	S	29.79	79½	S	29.56	66	S W
2	29.84	73	N N E	29.88	76	N	29.98	64	Calm
3	30.08	69	N	30.08	81	Calm	29.99	64	W S W
4	30.00	72	S S E	29.99	86	S S W	29.95	68	Calm
5	29.92	76	Calm	29.89	88	N	29.85	70	"
6	29.76	68	E	29.76	73	Calm	29.78	64	"
7	29.79	66	W S W	29.79	70	"	29.84	65	W S W
8	30.03	69	N N E	30.04	80	N	30.05	63	Calm
9	30.06	69	Calm	30.—	76	S	30.00	64	S
10	29.99	67	S W	29.98	80½	S W	29.99	62	Calm
11	29.97	67	S	29.88	67	S E	29.78	63	S E
12	29.68	72	S E	29.73	78	N W	29.79	61	Calm
13	29.83	68	N W	29.84	79	"	29.99	60	"
14	30.03	65	N	30.01	71	N	30.12	56	"
15	30.12	64	Calm	30.04	76	W	30.03	58	"
16	29.99	70½	S W	29.92	63	S	29.79	55	S E
17	29.46	64	Calm	29.46	72	W N W	29.59	60	N N W
18	29.72	69	N N W	29.76	74	N	29.86	51	Calm
19	30.00	66	N	30.04	72	"	30.11	51	"
20	30.24	72	E	30.22	71	W S W	30.24	53	"
21	30.20	62	W	30.19	71	S	30.12	60	"
22	30.11	69	S	30.09	83	N	30.09	66	"
23	30.10	72	Calm		88	S	30.01	67	"
24	29.92	79	S S W	29.82	86	S S W	29.80	68	"
25	29.80	78	S W	29.76	81	S S E	29.65	69½	"
26	29.64	69	N E	29.68	65	N N W	29.78	50	N N W
27	29.80	55½	N W	29.75	68½	W N W	29.73	56	W S W
28	29.64	60	N E	29.66	71½	N W	29.81	55	W N W
29	30.02	60½	"	30.04	66½	S E	30.07	53	S S W
30	29.96	58	S E	29.84	71	N N W	29.93	55	N N W

1838.	8 A. M.			3 P. M.			10 P. M.		
	Barom	Ex Thr	Winds.	Barom	Ex Thr	Winds.	Barom	Ex Thr	Winds.
Aug. 31	29.97	66	N	29.92	68	N W	29.—	54	Calm
Sept. 1	29.72	58	S	29.64	59	S S E	29.65	58	S W
2	29.71	59	W S W	29.84	59½	N W	30.03	45	N W
3	30.11	51	N	30.14	63½	N N E	30.19	45½	N
4	30.21	50	"	30.14	65	N	30.12	48	Calm
5	30.09	64	Calm	30.07	79½	N W	30.07	59	"
6	30.20	64	N N E	30.15	76	Calm	30.10	54	"
7	30.07	65	Calm	30.04	84	N	30.11	66	"
8	30.27	64	N	30.245	62	N E	30.25	52	"
9	30.19	56	Calm	30.13	64	S W	30.12	52	W S W
10	39.03	59	S W	29.92	73	S	29.87	62½	S W
11	29.90	64	Calm	29.92	73	N	30.04	58	N
12	30.07	58	N E	30.07	64	N E	30.04	55	N E
13	29.66	54	N W	29.49	59	N	29.90	54	Calm
14	30.10	63	Calm	30 09	71	S W	30.08	54	"
15	30.08	72	"	30.12	73	N N E	30.20	52	"
16	30.29	70	N N E	30.22	66½	S	30.17	47	"
17	30.05	47	Calm	29.92	68	S S W	29.88	47	"
18	29.76	51½	"	29.67	64	"	29.65	56	"
19	29.58	59	North	29.64	63	N	29.78	48	"
20	29.91	54	South	29.90	63	S W	30.03	51	"
21	30.17	51	Calm	30.08	67	S	30.07	58	"
22	29.98	64	S S W	29.87	71	"	29.84	65	S W
23	29.71	66	S W	29.64	67	N E	29.66	54	N W
24	29.82	49	"	29.84	60	N N W	30.06	44	"
25	30.22	46	Calm	30.25	64	S W	30.35	52½	Calm
26	30.49	51	N E	30.46	63	S E	30.44	54	S W
27	30.30	52	"	30.33	58	E S E	30.16	56	"
28	30.09	58	Calm	30.05	68½	N N W	30.03	57	"
29	29.90	57	N N E	29.84	68	S	29.83	57	Calm
30	29.85	57	Calm	29.82	69	N E	29.87	57	"
Oct. 1	29.96	56½	"	29.96	74	W S W	30.01	55	"
2	30.—	53	"	29.93	70	S W	29.83	58	S W
3	29.68	59	S S W	29.71	58½	N	29.84	45	N W
4	29.96	44	N N E	29.94	58	W	29.85	50	S W
5	29.74	52	Calm	29.74	64	N	29.83	46	Calm
6	29.74	52	"	29.45	67	S	29.53	57	S
7	29.69	49	N N W	29 88	52	N W	30.05	35	S W
8	30.04	38	N W	29.90	50	N N W	29.85	34	Calm
9	29.82	37	N N E	29.80	53	W S W	29.85	40	"
10	29.86	46	"	29.83	54	E N E	29 81	48	N E
11	29.52	50	N E	29.47	59	S S W	29.55	49	S W
12	29.76	46	S S W	29.77	52	S W	29.65	50	S S W
13	29.60	47	N N E	29.66	51	N W	29.77	39	N W
14	29.78	36	S W	29.76	41	S E	29.78	41	S W
15	29.80	42½	N E	29.60	45	N E	29.60	45	Calm
16	29.80	45	S W	29.87	52	N W	29.99	39	N W
17	30.05	35	"	30.13	51	N N W	30.26	37½	Calm
18	30.26	37	Calm	30.22	50	N	30.24	35½	"
19	30.25	37	"	30.18	42	E S E	30.03	39	E

1838.	8 A. M.			3 P. M.			10 P. M.		
	Barom.	Ex Thr	Winds.	Barom	Ex Thr	Winds.	Barom	Ex Thr	Winds.
Oct. 20	29.54½	47	N	29.59	56	N W	29.64	43	W
21	29.70	45	N W	29.72	50	Calm	29.78	43½	Calm
22	29.72	42½	Calm	26.86	49	N	29.99	40	N W
23	30 13	45	"	30.11	52	Calm	30.10	40	S W
24	29.95	41	"	29.77	47	S E	29.58	42	N E
25	29.57	41	W S W	29.54	46	S W	29.57	48	Calm
26	29.73	38	S W	29.77	54	W N W	29.90	40	"
27	29.95	35	Calm	29.71	44	S E	29.80	39	"
28	29.81	38	South	29.75	45	"	29.63	40	"
29	29.44	39	N N W	29.58	42	N W	29.77	29	"
30	29.80	40	N W	29.97	40	"	29.90	32	"
31	29.89	31	N E	29.91	32	N E	30.05	29	N N W

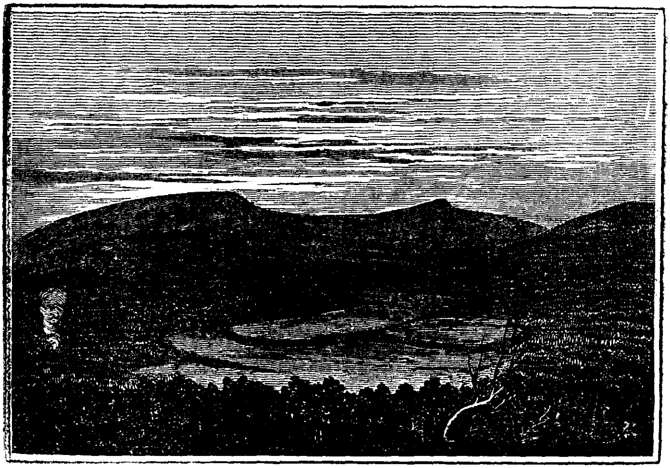
TABLE IX.

RAIN TABLE. By R. H. Gardiner, Esq., of Gardiner.

1838.	in. 12th 144th
June 2	0. 3. 6¼
3	0. 1. 4
5	0. 3. 8¾
6	0. 7. 8
7	0. 6. 0
8	0. 0.10
11	0. 0. 1½
13	0. 0. 2
14	0. 0. 2
16	0. 6. 5¼
17	0. 0. 2½
18	0. 6. 0¼
23	0. 0. 1½
25	0.11. 8
26	0. 0. 4
29	0. 7. 3
	in.
	4. 7. 5=4.6108 in.
July 2	0. 0. 1¾
3	0. 0. 3
4	0. 0. 7
5	0. 2. 1
12	0. 0. 7½
13	0. 1. 8¾
16	0. 0. 1
21	0. 7. 9½
25	0. 2. 0
26	0. 7. 1
	1.10. 4½=1.8646
Aug. 6	0. 2. 0
8	0. 0. 8
10	0. 4. 2
12	0. 0.11½
17	1. 0. 6

1838.	in. 12th 144th
Aug. 25	0. 1. 9
26	0. 0. 0½
28	0. 0. 4¾
29	0. 0. 0¾
31	0. 1. 9
	2. 0. 3½=2.024 in.
Sept. 1	0. 3. 4
2	0. 0. 0¼
13	1. 0. 3
14	1. 9. 7
19	0. 0. 7
22	0. 4. 0
24	0. 4. 8¼
27	0. 3. 6
28	0. 1. 5½
	4. 3. 5=4.285 in.
Oct. 4	0. 1. 3
7	0. 2.10
11	0. 4. 3½
12	0. 1. 8¾
13	0. 4. 1½
15	0. 1. 3
16	0.10. 0¾
20	0. 8. 1
22	0. 0. 8¾
24	0. 7. 0¼
26	0. 0. 5½
28	0. 1. 8
29	0. 2. 2
31	0. 2. 0 snow = to 0.2.0 rain.
	3.11. 8=3.972 in.

The two following wood cuts were not finished by the engraver in season to be inserted where they ought to have been printed in the body of the Report. They are therefore here presented, with reference to the descriptions of the localities.

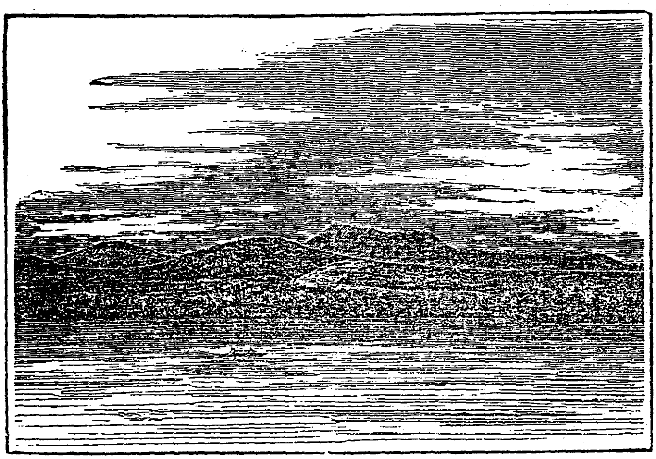


View of Saddleback Mountain from French's Hill, Phillips.

This mountain is evidently more lofty than Mt. Abraham, and forms a long ridge with a hollow or saddle shaped outline, from which it evidently derives its descriptive name.

From Umbagog Lake there may be seen numerous high mountains, which are described in the Report upon the Androscoggin and Megalloway station (which see.)

Speckled Mountain is a lofty broken cone apparently of granite, rising high above the neighboring hills, and is said to be situated in a township called Holmes. It is probably more elevated than Mt. Abraham, and ranks as one of the highest mountains in the State.



Speckled Mountain seen from Umbagog Lake.

The following prices current of Slates in Wales, was handed to me by Captain Isaac Gage, and may be useful to those who engage in working the Slate Quarries of Maine.

Prices and particulars of Slates, at Port Penrhyn, Bangor, North Wales.

Imperials—20, 24, 27 and 30 inches long, and various breadths,	50*s* per Ton.	} of 20 cwt. and 112lb. per cwt.
Queen's—27, 30, 33 and 36 inches long, and various breadths, if assorted *without specifying quantities of each,*	41*s* "	
35 Ditto—30 and 33 inches, *if both or either sizes be particularly ordered,*	43*s* "	
Princesses—24 inches, by various breadths,	41*s* "	
Ton Slates or Rags—irregular lengths and breadths,	31*s* 6*d* "	

Duchesses,	24 in.	by	12 in.	weighing per *m.*	66	cwt. of	112 lb.	140*s* per Thousand.	} of 1200 Slates.
Ditto, (small)	22	"	11	" "	50	"	"	105*s* "	
Countesses,	20	"	10	" "	44	"	"	95*s* "	
Viscountesses,	18	"	9	" "	32	"	"	60*s* "	
Ladies, (large)	16	"	10	" "	32	"	"	45*s* "	
Ditto,	16	"	8	" "	27	"	"	40*s* "	
Ditto, (small)	14	"	8	" "	22	"	"	25*s* "	
Doubles,	13	"	$6\frac{1}{2}$	" "	17	"	"	17*s* 6*d* "	
Singles,	11	"	$5\frac{1}{2}$	" "	13	"	"	9*s* "	

INFERIORS.

Duchesses,	24 in.	by	12 in.	weighing per *m.*	86	cwt. of	112 lb.	110*s* "	} of 1200 Slates.
Countesses,	20	"	10	" "	55	"	"	70*s* "	
Ladies,	16	"	8	" "	35	"	"	27*s* 6*d* "	
Doubles,	13	"	$6\frac{1}{2}$	" "	21	"	"	13*s* "	
Moss Slates,	11 to 15 in.	by	6 to 15 in.					15*s* "	

Ton Slates,	none	
Slabs sawn of promiscuous lengths and breadths in Lots as under :—		
Lot 1.—½ in. ¾ in. 1 in., and 1¼ in. thick, and in lengths, from 3 ft. to 6 ft. *Lot* 2.—¾ in. 1 in., 1½ in., 2 in. and 2½ in. thick, do. from 4 ft. to 8 ft. and upwards,	57*s* per Ton.	
Ended Slabs sawn of promiscuous lengths and breadths in Lots as under :—		
Lot 1.—¾ in., 1 in., and 1¼ in. thick, and in lengths from 3 ft. to 6 ft. *Lot* 2.—1½ in., 2 in., and 2½ in. " " from 4 ft. to 8 ft. and upwards,	52*s*	"
N. B. In ordering any of the above Slabs, it will only be necessay to mention which Lot, and the weight and thickness required, *as any specified lengths* and *breadths* will be charged *as Slabs cut to order*.		
Slabs sawn to order, not under 2 ft. long, nor exceeding 8 ft. long and 3 ft. 6 in. wide,	63*s*	"
Ended Slabs, ditto ditto	58*s*	"
Slabs and Ended Slabs exceeding 3 ft. 6. in. wide, if specially ordered, charged 5*s* per ton extra.		
Slabs or Skirting under 12 ins. wide, and various lengths, not less than ½ in. thick,	57*s*	"
Ditto ditto ditto of specified lengths,	63*s*	"
Unsawn Slabs,	50*s*	"

(of 20 cwt., and 112 lb. per cwt.)

Shipping Expenses on Slates, 6*d* per Ton ; on Slabs, 1*s* per Ton ; Bills of Lading, 3*s* 6*d*.

N. B. As an allowance of one Cwt. over in every Ton, and 60 Slates over in every Thousand, is made at the time of delivery of the Slates here for shipment, to cover breakage, no abatement, or other allowance can be made for any deficiency of breakage, that may occur in the shipment of the Slates or otherwise.

Vessels are always loaded according to the date of their arrival here, and not according to the date of the order, and when there is a stem or detention for Slates, vessels must wait their regular turn in loading.

About 147 feet superficial of Inch Slab, is computed to weigh a Ton.

Owing to the limited and uncertain supply of inferior Duchesses, any order for them can only be executed to the extent the supply will admit of at the time of the vessels loading.

Orders received here for Chimney Pieces and Cisterns, at the following prices.

No. 1—Plain Jambs, Mantle, and turned blocking, with plain edge shelf,	10*s*	each.
2—Moulded Jambs, Mantle, turned blocking, with "	18*s*	"
3—Moulded Jambs, &c. with bead Mould,	21*s*	"
4—Grecian Fret Jambs and Mantle,	30*s*	"
5—Moulded Truss Jambs and Mantle,	30*s*	"
6—Pannelled Jambs and Mantle,	30*s*	"
Coves for Chimney Pieces,	2*s* 6*d*	per set.

						In. thick.		$1\frac{1}{2}$ *In. thick.*	
Cisterns,	with sides and ends,	not less than	5 ft.	and under	15 ft, cubic contents,	2*s* 6*d*	per foot.	3*s*	per foot.
"	"	"	15	"	20 "	2*s* 4*d*	"	2*s* 8*d*	"
"	"	"	20	"	25 "	2*s* 3*d*	"	2*s* 6*d*	"
"	"	"	25 ft.	to	30 ft. and upwards,	2*s* 2*d*	"	2*s* 5*d*	"

Tomb Stones complete from £4 10*s* and upwards.

Slabs Faced or Smoothed at 3*d* per foot, superficial.

N. B.—In any order for Chimney Pieces it will be quite sufficient to send the numbers only, as above, without any other description.

Prices of Writing Slates.

Sizes.	*Framed.*	*Unframed.*	
5 by 3	2*s* per doz.	10*d* per doz.	30 dozen in a Box.
6 by 4	2*s* 3*d* "	11*d* "	24 "
7 by 5	2*s* 9*d* "	1*s* 2*d* "	20 "
8 by 6	3*s* 6*d* "	1*s* 8*d* "	20 "
11 by 7	4*s* 6*d* "	2*s* 3*d* "	15 "

Prices of Writing Slates.

Sizes.	*Framed.*	*Unframed.*	
12 by 8	5*s* 6*d* per doz.	2*s* 9*d* per doz.	12 dozen in a Box.
13 by 9	7*s* 6*d* "	3*s* 6*d* "	12 "
14 by 10	9*s* 6*d* "	4*s* 6*d* "	10 "
16 by 11	12*s* "	5*s* 6*d* "	8 "

Book or Log Slates.

Sizes.		
11 by 7	24*s* per dozen.	5 dozen in a Box.
12 by 8	28*s* "	
13 by 9	35*s* "	
14 by 10	44*s* "	
16 by 11	55*s* "	

Boxes Framed Slates, 4*s* each.
" Unframed " 2*s* "

Discount off the above prices of Slate, 35 per cent.

CATALOGUE

OF

GEOLOGICAL SPECIMENS,

IN THE

STATE CABINET, MAINE,

Collected in the years 1836, 1837 *and* 1838.

BY CHARLES T. JACKSON.

SPECIMENS COLLECTED IN THE YEAR 1836.

ROCKS UNSTRATIFIED AND OF IGNEOUS ORIGIN.

Greenstone Trap is a rock composed of hornblende, feldspar and oxide of iron. Its name is from its green color, and the word trap from a Sweedish word meaning step or stair, as this often resembles, when columnar, steps. It resembles lava in its origin and its effects upon other rocks.

1. Columnar Greenstone Trap, from a dyke intersecting sienite rocks; Jonesport.
2. Columnar greenstone trap ; Buck's Harbor, Machias.
3. Rhomboidal column of trap; Eastport.
4. Column of trap; Morton's Cove, Lubec.
5. Compact greenstone trap from a dyke ; Morton's Cove, Lubec.
6. Greenstone trap, from a dyke in granite, near the vein of magnetic iron ore; west side of Marshall's Island.
7. Greenstone trap; Raymond.
8. Greenstone trap, (variety); Raymond.
9. Greenstone trap; Buck's Harbor, Machias.

10. Greenstone trap, coated with epidote, (a green mineral)—Point of Maine, Machias.

11. Greenstone trap—a crystalline variety, with distinct crystals of hornblende; Cross Island, Machias.

12. Porphyritic greenstone trap; Lawrence's Creek, Lubec.

Obs. A rock is *porphyritic*, when it contains distinct crystals of feldspar.

13. Amygdaloidal or scoriaceous trap rock, taken from the point of contact of the sandstone and a trap dyke; Loring's Cove, Perry.

Obs. Trap is *amygdaloidal* when it contains cavities, caused, as in cinders, slags, lavas, &c. by the escape of steam or gas, while in a melted state. The cavities are afterwards often filled by the infiltration of other minerals, as in specimens 22, 23, 24, 25, &c.

14. Same as 13, only that it contains a mass of scoria, formed from the sandstone, which has thus been altered by the fiery state of the trap; Perry.

15. Amygdaloidal trap, from a dyke in red sandstone; Friendship's Folly Island, N. B.

Obs. A *dyke* signifies a wall or vein of rock, which intersects another rock. *Dykes* are formed during earthquakes, by the bursting open of the earth, forming cracks or fissures, which are immediately filled up with the melted lava or trap—the cause of the earthquake. Dykes of trap are common on the eastern coast, and at Thomaston, where they run in nearly straight lines, cutting through the quarries that lie in their course; and when large, materially altering the appearance of the limestone, which is in contact with them. (See specimens from 191 to 193.)

16. Amygdaloidal trap, connected with a mass of red sandstone. In this specimen, the sandstone has the appearance of having been burnt. It differs essentially from the sandstone found near it, (No. 325,) not in contact with the trap; Loring's Cove, Perry.

17. Vescicular trap; Perry.

Obs. *Vescicular* is nearly the same in meaning as amygdaloidal, viz. full of cavities.

18. A red amygdaloid of trap, in which the cavities have been filled with a green mineral called chlorite. (Nos. 467, 468, 469.)

19. Amygdaloidal trap, from point of contact with the brecciated limestones of Point of Maine, Machias. (Nos. 291 to 300.)

20. Scoriæ of trap and sandstone; Perry.

Obs. *Scoriæ* is synonymous with cinders. It is generally applied to volcanic cinders.

21. Greenstone trap, containing a vein of calcareous spar; above Loring's Cove, Perry.

Obs. *Calcareous spar* is carbonate of lime, or limestone crystalized.

22. Amygdaloidal trap, the cavities filled with calcareous spar. (See obs. to Nos. 13 and 21;) Gin Cove, Perry.

23. Same as 22; Gin Cove, Perry.

24. Amygdaloidal trap, cavities filled with calcareous spar and chlorite; Perry. (See Nos. 18 and 21.)

25. Same as 18.

26. Same as 22; Baileyville.

27. Amygdaloidal trap, containing prehnite, a simple mineral of a green color; above Loring's Cove, Perry.

28. Amygdaloid, formed by junction of trap with sienite; Jonesport.

29. Scoriæ of trap and sandstone, (see 20); above Loring's Cove, Perry.

30. Same as 29.

31. Breccia of trap and porphyry; Hog Island, Lubec.

Obs. *Breccia* is a name given to rocks that have been violently broken up, and the fragments cemented together by another rock, which was in a melted state. It differs from sandstones, being formed of *angular* fragments, while sandstones are of pebbles, rounded off by the action of water.

32. Same as 31.

33. Same as 31; Eastport.

34. Breccia of trap and red feldspar rock; Buck's Harbor, Machias.

35. Finer variety of the same.

36. Breccia of trap and sienite; Jonesport.

Obs. *Sienite*—a rock like granite, from which it differs in having hornblende instead of mica. In this, and the three following specimens, the sienite has been broken up and cemented by the trap.

37. Same as 36.

38. Same.

39. Same.

40. Breccia of trap and slate; Seward's Neck, Lubec.

41. Breccia of trap and limestone; South side Rogers' Island, Lubec.

42. Breccia of trap and limestone; Morton's Cove, Lubec.

43. Column of porphyry; Seward's Neck, Lubec.

44. Same.

45. Columnar porphyry; Seward's Neck.

46. Same; Gove's Point, Seward's Neck.

47. Vescicular porphyry; Seward's Neck. (See No. 17, Catalogue.)

48. Porphyry; East side of Little Kennebec Bay, Machias.

49. Porphyry, containing crytals of iron pyrites (sulphuret of iron, see Nos. 25, 26, 27,) in cubic form—found beneath the trap; Eastport.

50. Same.

51. Porphyry, with crystals of iron pyrites, in the form of pentagonal dodecædron; Eastport.

52. Porphyry—from junction with trap dyke; Seward's Neck, Lubec.

53. Porphyry, with iron pyrites; Davis', Raymond.

54. Same.

55. Clinkstone porphyry; Dennysville river.

Obs. Called *Clinkstone* because it gives a metalic sound when struck with a hammar.

56. Red feldspar rock; Buck's Harbor, Machias.

57. Same.

58. Same.

59. Red feldspar rock; Neutral Island, St. Croix River.

Obs. *Red feldspar rock* is little different from porphyry.

60. Compact feldspar rock; N. E. Harbor, Mt. Desert.

61. Jasper; Little River, Eastern Head, Cutler.

Obs. This mineral is produced at the contact of trap and slate rocks.

62. Jasper breccia; Starbord's Creek, Machias.

63. Same.

64. Fine compact breccia; Starbord's Creek.

65. Same.

66. Same, with flinty slate.

67. Same, with coating of epidote.

68. Ribbon jasper; Jasper Head, near Buck's Harbor, Machias.

Obs. This rock was evidently once a stratified rock—but since its formation it has been semifused, and the stripes are the remains of the lines of stratification.

69. Same.

70. Same.

71. Brecciated ribbon jasper; same locality.

Obs. In this specimen, the stripes have been violently broken up by protrusion of a trap dyke.

72. Same.

73. Same.

74. Red sienite; Jonesport. (See Catalogue No. 36, obs.)

75. White sienite, from a vein cut off by a trap dyke; Jonesport.

76. Sienite; Mt. Desert.

77. Red sienite; Neutral Island, St. Croix river.

78. Same.

79. Same.

80. Red sienite; Robbinston.

81. Sienite; Davis', Raymond.

82. Granite; Raymond.

83. Granite; Lincoln.

84. Granite; Benj. Brown's, Vassalborough.

85. Granite; Harrington.

86. Granite; McHerd's Quarry, Bluehill. (See specimens 538, 539.)

87. Granite; on the road between Calais and Houlton.

88. Porphyritic granite; St. Stephens, N. B. (See Catalogue, No. 12, obs.)

89. Granite; Whidden's Quarry, Calais. The feldspar red, the mica black.

90. Same.

91. Granite, with red felspar and black mica; Black's Island, Mt. Desert.

92. Same.

93. Granite, dark color, with white veins near its junction with trap; Burnt-coat Island.

94. Granite, including a piece of stratified rock changed into mica slate; N. E. Harbor, Mt. Desert.

95. Hornblende rock; Calais.

96. Hornblende rock; Cape Split, Addison

PRIMARY STRATIFIED ROCKS.

Originally deposited from water; some of which have since become crystalline by the action of heat.

97. Gneiss—a kind of granite, from which it differs in the materials lying in regular strata or layers; Hallowell.

98. Gneiss; Megunticook Mt., Camden.

99. Mica slate; Megunticook Mt., Camden. (For varieties, see Nos. 584, &c.)

100. Mica slate, containing staurotide and garnets; Searsmont.

101. Mica slate, containing graphite and staurotide; Mr. Potter, Sebago.

102. Mica slate, containing staurotide; near the base of Saddle-back Mountain.

103. Mica slate, containing staurotide and garnets; Jackson, Mr. Brown.

104. Mica slate; North Yarmouth. Contains garnets.

105. Mica slate; Corinth.

106. Mica slate, containing macle; found on the beach at Camden—loose. (See No. 449.)

107. Same.

108. Talcose slate; taken from the walls of a limestone quarry at Thomaston.

109. Talcose slate; Lime Islands, Penobscot Bay.
110. Talcose slate, altered by trap—contains epidote; Lime Islands, Penobscot Bay.
111. Plumbaginous slate; Brigadier's Island.

Obs. *Plumbaginous* is when a rock contains plumbago or graphite, commonly, but incorrectly, called black lead.

112. Plumbaginous slate; Patricktown Plantation, Eph. Rice.
113. Plumbaginous slate; Searsmont.
114. Graphite or Plumbago; Searsmont.
115. Plumbaginous slate; Belfast—Judge Read's farm.

TRANSITION SERIES.

116. Argillaceous slate; Haycock's Harbor, Trescott.

Obs. The common roofing and writing slates are *argillaceous*. (See Nos. 123, 124, 626, 627, &c.)

117. Same as 116.
118. Argillaceous slate; West Quoddy Head, Lubec.
119. Argillaceous slate; Lubec.
120. Argillaceous slate; Samuel Ward, Penobscot.
121. Same.
122. Argillaceous passing to mica slate; contains iron pyrites; East Thomaston.
123. Common writing slate; from slate quarry at Foxcroft, Penobscot County—Benj. Leavitt.
124. Same.
125. Pyritiferous slate; Vinalhaven, Hancock—J. A. Amesbury.

Obs. *Pyritiferous*—containing iron pyrites, yellow crystals composed of sulphur and iron. When slate contains this sulphuret of iron, it is used for making alum and copperas, specimens of which may be seen (Nos. 843, 844) made from the pyritiferous slates of Jewel's Island, Casco Bay. (Nos. 127, 610, 611.)

126. Same.
127. Pyritiferous slate; Jewel's Island, Casco Bay. (See obs. to No. 125.)
128. Pyritiferous slate; West Quoddy Head, Lubec.

129. Pyritiferous slate; Haycock's Harbor, Trescott.

130. Ferruginous slate; West Quoddy Head, Lubec.

Obs. *Ferruginous*—containing iron.

131. Flinty slate; Haycock's Harbor, Trescott.

132. Same, in contact with trap.

133. Breccia of slate; Munroe's Island. (See No. 31, obs.)

134. Blue slaty limestone, with fossil shells; Broad Cove, Moose Island.

135. Chert—from junction of calciferous slate and trap rock; Trescott.

Obs. This mineral is often produced by the action of trap rocks upon slate containing lime, or *calciferous* slate.

136. Greywacke, with calciferous slate; Leighton's farm, Pembroke.

Obs. *Greywacke* is a rock composed of various pebbles, united by an argillaceous or clayey cement. It frequently includes valuable beds of anthracite coal.

137. Same.

138. Calciferous slate; East side of East Bay, Perry.

139. Same.

140. Same.

141. Calciferous slate; Lawrence's Creek, Lubec.

142. Same.

143. Compact limestone; Comstock's, Lubec.

144. Compact blue limestone; Morton's farm, Lubec.

145. Same.

146. Same—strata contorted.

147. Argillo-ferruginous limestone; near the Lead Mines, Lubec. Contains impressions of terebratulæ, a fossil shell.

148. Same.

149. Reticulated limestone; Morton's farm, Lubec.

Obs. *Reticulated*—like net work, which this specimen resembles in its veins of calcareous spar. (See obs. No. 21.) A polished specimen.

150. Same—not polished.

151. White granular limestone; Thomaston.

152. Same; Meadow Quarries, Thomaston.
153. Same.
154. Same, of a darker color and clouded.
155. Same—polished, making a fine clouded marble.
156. Clouded limestone, or marble; State Prison Quarry, West Thomaston.
157. Blue limestone; Blackington's corner, East Thomaston.
158. Same.
159. Same.
160. Blue limestone; Hope.
161. Compact limestone; Hope.

Obs. It is from this rock the lime sold under the name of "Lafayette Lime," is made.

162. A specimen of the same—polished.
163. A delicate marble, made from the same.
164. Dark colored marble with white veins, polished; Hope.
165. Blue limestone, with white veins; taken from near a trap dyke, western part of Hope.
166. White granular limestone; Lilly Pond Quarry, Camden.
167. Same—blue and white.
168. Blue and white specimen of the same—polished.
169. Blue granular limestone; North from Lilly Pond Quarry, Camden. Contains crystals of tremolite.
170. White granular limestone; Lincolnville.
171. Limestone; Brooks, by Dr. Roberts'.
172. Compact limestone; St. John, New Brunswick.
173. Blue marble; Thomaston—polished.
174. Clouded marble; Thomaston—polished.
175. Same—polished.
176. Black marble, containing iron pyrites; Thomaston—polished.

Obs. The pyrites are an injury to the limestone, because if exposed to dampness, they are liable to decompose and stain the stone with an iron rust.

177. Grey marble—State Prison Quarry—polished; West Thomaston.
178. Clouded marble; Hallowell—polished.

Dolomites, or Magnesian Limestones.

179. Granular Dolomite; Hope.

180. Same.

181. Brecciated Dolomite; Carlton's Quarry, Camden. (See obs. No. 31.)

182. Same.

183. Granular Dolomite; Dr. Cochran's Marsh Quarry, East Thomaston.

184. Same—polished. (Statuary marble.)

185. Dolomite; St. George's River, Thomaston.

Specimens shewing the action of Trap Rocks upon the Limestones.

186. Greenstone trap; from a dyke in Crockett's Quarry, East Thomaston.

187. Same.

188. Limestone, connected with trap dyke; Beech-wood Quarry, Thomaston.

Obs. The dyke of trap, from which this was taken, was too narrow that the limestone in contact with it should be materially altered, as it is in Nos. 194, 195, 196. Its whole width is seen in the specimen. For explanation of *Dyke* and its effects, see obs. No. 15. (See obs. 191.)

189. Same.

190. Same as 188 and 189.

191. Limestone, intersected by trap dyke and become white and chystalline at point of contact.

Obs. The limestone is found to be more altered, and at greater distances from the trap dyke, in proportion as that increases in width. In this specimen it has been sufficiently wide to cause heat enough to melt and render crystalline the limestone in immediate contact with it. Sir James Hall has found by experiment that limestone can be subjected to the most intense heat, without burning it to lime. It is only necessary to confine it under great pressure, so that the carbonic acid gas and water cannot escape; and the stone is melted, altering it precisely as the limestone is altered in this and the few succeeding specimens. In specimens 188, 189, 190, the dyke was too small to cause sufficient heat to alter the stone.

192. Limestone, rendered white and crystalline by trap—(See obs. 191;) Whitefield.

193. Same; from Pierce's Quarry, Hope.

194. Same; from Snow's Quarry, Thomaston.

195. Same; from Crockett's Quarry, Thomaston.

196. Limestone, in contact with talcose slate; Hope.

197. Same.

198. Same.

199. Limestone and trap—refuse rock; State Prison Quarry, West Thomaston.

200. Limestone, altered by trap—refuse rock; Snow's Quarry, Thomaston.

201. Limestone, altered by trap; Morton's Cove, Lubec.

202. Trap and limestone intermixed, the latter being rendered crystalline; Morton's Cove, Lubec.

203. Limestone trap, mica, and actynolite; State Prison Quarry, West Thomaston.

204. Limestone containing graphite, (a simple mineral, called also plumbago and black lead;) Goose River Quarry, Camden.

205. Limestone containing Tremolite; Beech-wood Quarry, Thomaston.

206. Same.

207. Limestone containing sulphuret of iron; Beech-wood Quarry.

208. Same.

209. Calcareous spar, (crytalized carbonate of lime;) Achorn's Quarry, East Thomaston.

210. Calcareous spar, in six sided prisms. Crystals large and perfect; Beech-wood Quarry, Thomaston.

211. Calcareous spar, in low six sided crystals, striped with white; taken from near trap dyke, Achorn's Quarry, East Thomaston.

212. Same—bronzed with sulphuret of iron.

213. A single crystal of the calcareous spar of No. 210.

214. Calcareous spar and trap—a mass in amygdaloidal trap; Broad Cove, Eastport.

215. Foliated calcareous spar; Lubec.

Slates connected with the Limestones.

216. Talcose slate; walls of Marsh Quarry, East Thomaston.

217. Rhomboidal plate of talcose slate; walls of Marsh Quarry, East Thomaston.

218. Grey compact limestone and compact talc; Marsh Quarry, Thomaston.

219. Quartz rock and talcose slate, forming the western wall of the Marsh Quarry.

220. Mica Slate; half a mile north of Marsh Quarry.

221. Quartz rock; Marsh Quarry, East Thomaston.

222. Talcose slate; north from Lily Pond Quarry, Camden.

Fossil Shells of Transition Series.

223. *Trilobite*—asaphus—in slate; Clark's farm, Pembroke. [Plate 1, fig. 1.]

Obs. The trilobites are an extinct race of animals, somewhat resembling the "Horse-shoe" or King Crab.

224. Same as 223.

225. *Trilobite*, calymene; Pembroke.

Obs. This species of the trilobite had the power of rolling himself up into a round ball as in this specimen.

226. The external cast of the same.

227. Tribolite and terebratulæ; Pembroke.

Obs. The terebratula is common as a fossil shell; but rarely found living. There is one specimen of a recent species among the shells in the Cabinet.

228. Trilobite, terebratulæ, &c. in fossiliferous limestone; from a boulder found on the St. John River, N. B.

229. A piece of the same boulder, containing terebratulæ and encrinites.

230. *Lutruria*, in calciferous slate; Clark's farm, Pembroke.

231. Same.

232. Terebratulæ; Pembroke. [Plate 1, fig. 9.]

233. Terebratulæ in argillo-ferruginous limestone; near the Lead Mines, Lubec.

234. Terebratula; Lubec. [Plate 1, fig. 10.]

235. Terebratula; Trescott's farm, Lubec.
236. Terebratula; Pembroke.
237. Terebratulæ in greywacke, (loose;) Troy.
238. Terebratulæ and producti; Pembroke.
239. Same
240. Productus; Pembroke.
241. Producti; Pembroke.
242. Producti and spiriferæ; Pembroke.
243. Same.
244. Turritella; Clark's farm, Pembroke. [Plate 3, Fig. 5.]
245. Turritellæ, in argillo-ferruginous limestone; Pembroke.
246. Turritellæ and terebratulæ; Pembroke.
247. Same.
248. Saxicava; Pembroke.
249. Saxicavæ; Pembroke.
250. Same.
251. Mytili or lingulæ; Lawrence's Creek, Lubec.
252. Mytili or lingulæ; Lawrence's Creek, Lubec.
253. Mytilus; Pembroke. [Plate 1, fig. 12.]
254. Mytilus; Pembroke.
255. Anomiæ; opposite Rogers' Island, Lubec.
256. Same.
257. Same.
258. Same.
259. Unknown. [Plate 3, fig. 9.]
260. Unknown. [Plate 3, fig. 12.]
261. Unknown. [Plate 3, fig. 5.]
262. Unknown. [Plate 2, fig. 5.]
263. Aviculæ ? Clark's farm, Pembroke.
264. Same.
265. Same.
266. Unknown. [Plate 2, fig. 1.]
267. Tellinæ?
268. Unknown.
269. Unknown.
270. Nautilites?

271. Avicula; Pembroke.

272. Encrinite, &c.; Pembroke.

273. Orthoceratite; Pembroke.

274. Hippurite and Terebratulæ, from boulder; River St. John, New Brunswick.

275. Fuci, in calciferous slate; Hersey's Head, Pembroke.

Obs. *Fuci* are the remains of sea plants, such as common sea weed, &c.

276. Fuci and fossil shells, in calciferous slate; Denbo's Neck, Lubec.

277. *Gorgonia*—Jacksoni; Pembroke.

Obs. *Gorgonia* is a species of the sea-fan.

SECONDARY SERIES.

278. Limestone, containing fossil shells, (Natica socialis;) Starbord's Creek, Machias. A large polished slab. The shell may be seen more distinctly in specimen 343.

279. Limestone, formed of fossil shells; Starbord's Creek, Machias.

280. Same.

281. A specimen of the same, in which the shells are rendered more distinct by action of the weather.

282. Same.

283. New red sandstone, and limestone composed of shells; Starbord's Creek.

284. Same.

285. Sandstone and limestone—half melted together by the action of trap; Starbord's Creek.

286. New red marl or sandstone, indurated by trap; Starbord's Creek.

287. Limestone, suitable for making hydraulic cement; Starbord's Creek.

288. Calciferous slate; Starbord's Creek. This passes into the hydraulic cement stone.

289. Same.

290. Brecciated marble, composed of fragments of limestone, sandstone, &c.; Point of Maine, Machias.

291. Same.

292. Same.

293. Same—polished.

294. New red marl or sandstone, hardened by trap; Point of Maine.

295. Same.

296. Limestone which has been formed by fusion of the shell marble, like that from Starbord's Creek, [278, 279.] It contains some indistinct traces of shells, but the limestone is crystalline. Found a large mass in trap dyke; Point of Maine, Machias.

297. Same.

298. A specimen in which the shells are more distinct.

299. A specimen of the same, connected with the trap, by which it is altered.

300. Limestone and trap interfused; Point of Maine.

301. Spotted limestone, suitable for marble; L'Etang, N. B.

302. Clouded marble; L'Etang, N. B.

303. Same.

304. Compact blue and grey limestone; L'Etang.

305. Same.

306. Cellular limestone; L'Etang.

307. Greenstone trap; from a dyke in the limestone, at L'Etang, New Brunswick.

308. Limestone and talcose slate, containing iron pyrites (crystals of sulphuret of iron;) L'Etang, N. B.

309. Talcose slate, containing pyrites—found in connexion with the secondary limestone; L'Etang.

310. Calcareous spar, in rhomboidal form; L'Etang.

311. Same.

312. New red sandstone or red marl, indurated by trap; Great Island.

313. Indurated marl; Great Island.

314. Same—containing fossil shells; shells indistinct.

315. Indurated red marl, containing fossil shells; Great Island.

316. Same.

317. Same.

318. New red sandstone (freestone;) Nutter's Head, Pembroke.

Obs. This rock, under the name of freestone, is well known in architecture. It is used in building, and for jambs for fire-places.

319. Same.

320. Compact sandstone, suitable kind for whetstones; Nutter's Head, Pembroke.

321. Sandstone, altered by trap, being hardened by the heat and cracked; Nutter's Head, Pembroke.

322. Large sheet of sandstone.

323. Red sandstone—fine grained; Perry.

324. Same; Lewis' Cove, Perry.

325. Variegated red sandstone; near Pulpit Rock, Perry.

Obs. The green spots are caused by silicate of iron.

326. Same.

327. Coarser variety of red sandstone; Perry.

328. Same.

329. Very coarse sandstone; Liberty Point, Robbinston.

330. New red sandstone; Tobique River, N. B.

331. Grey sandstone; Perry, near Pulpit Rock.

332. Grey sandstone; Joe's Point, St. Andrews.

333. Coarse conglomerate or sandstone; Joe's Point, St. Andrews, N. B.

334. Same.

335. Red sandstone, altered by trap, (See 15 and 16;) Friendship's Folly Island, N. B.

336. Same.

337. Sandstone, with veins of calcareous spar; Perry, Loring's Cove. (See obs. 21.)

338. Alabaster or gypsum (sulphate of lime;) Dorchester, New-Brunswick.

Obs. These specimens (338 and 339) were obtained at the Plaster Mills, Lubec. The stone is carried there in large quantities from New Brunswick, and ground up and calcined, to make plaster and the nicer kind of stucco. It is also useful for working into vases and other ornaments, and the poorer kinds are much used, under the name of "Plaster," as a manure.

339. Alabaster, (see 338); Dorchester, N. B.

340. Bituminous coal; from the Coal Mines above St. John, Grand Lake, N. B.

Fossils of the Secondary Series.

341. Fuci (see obs. 275) in new red sandstone; above Pulpit Rock, Perry.

342. Same.

343. Natica (socialis?) from the Starbord's Creek limestone, Machais. [Plate 3, fig. 20.]

344. Limestone, containing the Natica (socialis ?) Starboard's Creek, Machias.

345. Mytili or lingulæ; from the limestone of Starbord's Creek, Machias.

346. Remains of fossil shells; Point of Maine, Machias.

347. Same—shells unknown.

348. Bivalve shell, resembling the Venus; Starbord's Creek, Machias.

349. Mytilus; Point of Maine.

350. Tellina? Point of Maine.

TERTIARY SERIES.

351. Plastic clay; Madawaska.

352. Same, containing blue phosphate of iron—a substance used for making a blue paint.

353. Blue phosphate of iron; found in the clay of Madawaska.

Obs. This substance is found filling the inside of hollow sticks, preserved in clay. Sometimes the sticks have entirely decomposed, leaving only the phosphate of iron. It is used for making a blue paint.

354. Clay; Lubec—found under a peat bog on the "Carrying Place."

355. Same.

356. Peat; Lubec—Carrying Place.

357. Same. (See 360, obs.)

358. Peat; Lubec—Carrying Place.

359. Compact peat; Thomaston.

360. Same.

OBS. Peat is a substance which, in other States, is valued as fuel, and a manure. In Massachusetts, it is worth about five dollars a cord. Mixed with a little animal manure, it answers well for all soils; but with lime alone, it is injurious.

361. Bog iron ore; Greenwood.

362. Bog iron ore; Dover.

363. Bog iron ore; Black's Island.

364. Same.

365. Bog iron ore; Strong.

366. Bog iron ore; Strong.

367. Bog iron ore; Clinton.

368. Bog iron ore; Kennebec River.

369. Bog manganese; Thomaston.

370. Bog manganese; Bluehill.

Fossils of the Tertiary Series.

371. Pectens-Poelii; taken from a clay bank, twenty-six feet above the level of the highest tides, near the Plaster Mills, Lubec.

372. Saxicavæ-distortæ; same locality.

373. Same.

374. Patellæ; same locality.

375. Fragments of Balani, &c.; same locality.

376. Concretion, inclosing mya-mercenaria; North Yarmouth.

OBS. *Concretions* are formed by clay adhering around any substance, which acts as a nucleus, until that substance is concealed by the clay. (See No. 378.)

377. Concretion, enclosing natica-heros; North Yarmouth.

378. Concretions enclosing nucula portlandica; banks of Cousin River, North Yarmouth.

OBS. In these specimens the shell is entirely concealed, but may be found on breaking open the concretion.

379. Nucula-portlandica—a shell found only in the clay in this State. No such animal has ever been seen living; Presumpscot Falls, Portland.

380. Nucula; found in the clay, Presumpscot Falls.

381. Nucula—new species; Presumpscot Falls.

382. Saxicavæ and Mactræ; Presumpscot Falls.

383. Specimens of siphoniæ—a fossil animal; found in the clay at Bangor. Little is known concerning them.

Simple Minerals.

384. Crystals of quartz; Castine Harbor.

385. Crystals of quartz, colored by iron.

386. Quartz crystals, calcareous spar, analcime, and apophyllite, from the lining of a basin-shaped cavity, or geode of agate in amygdaloidal trap; Gin Cove, Perry.

387. Quartz crystals, from same geode; Perry.

388. Agate of amethystine quartz, carnelian and chalcedony; Perry.

389. Quartz, calcareous spar, and green chalcedony; Perry.

390. Granular quartz; Liberty—B. C. Matthews.

OBS. This stone is well suited for the manufacture of glass, it being a very pure kind of quartz, and easily reduced to powder by heating and plunging in cold water.

391. Granular quartz; Liberty. (See 390.)

392. Granular quartz; Whitefield.

393. Hornstone in greenstone trap; Trescott.

394. Jasper; Little River, Cutler.

395. Quartz and feldspar; Jonesport.

396. Calcareous spar in hexagonal prisms, surmounted by three sided pyramid; Thomaston. (See 21, obs.)

397. Single crystals of the same.

398. Calcareous spar, in low hexagonal prisms; Tolman's Quarry, Thomaston.

399. Same, in decomposing trap rock.

400. Same, in lenticular crystals; Achorn's Quarry, Thomaston.

401. Rhomboidal crystal of calcareous spar; Cross Island.

402. Same.

403. Rhomboidal calcareous spar.

404. Calcareous spar, containing sulphurets of lead and copper; Kelley's Cove, Trescott.

405. Same.

406. Calcareous spar and trap; from the Lubec Lead Mines.

407. Blue limestone, with veins of calcareous spar; Ramsdell's farm, Lead Mines, Lubec.

408. Blue limestone, with remains of terebratulæ; Lubec Lead Mines.

409. Same.

410. Tremolite; Thomaston.

411. Same.

412. Crystals of hornblende; Thomaston.

413. Laumonite in Nodule of limestone; Point of Maine, Machias.

414. Sphene; Thomaston.

415. Epidote and quartz in trap; Lubec.

416. Garnet and hornblende; Freeport.

417. Green fluor spar, in octahedral crystals; Bluehill.

Obs. This substance is used in chemistry in the manufacture of fluoric acid, and for some other purposes. (See Nos. 812, &c.)

418. Arsenical iron; Bluehill.

419. Arsenical iron; Fairfield.

420. Arsenical iron; Bluehill.

421. Arsenical iron; Owl's Head, Thomaston.

Obs. These crystals of arsenical iron contain about fifty-four per cent. of arsenic—the remainder iron.

422. Arsenical pyrites and arsenical iron; Owl's Head.

Obs. The former is a combination of sulphur, arsenic and iron—the latter of arsenic and iron.

423. Same.

424. Same.

425. Iron pyrites in red porphyry; Eastport.

426. Iron pyrites, or sulphuret of iron; Eastport.

427. Iron pyrites in feldspar; Raymond.

428. Iron pyrites in slate; Industry—Mr. Davis.

429. Pyrites and galena, or sulphuret of lead; East Thomaston.

430. Iron pyrites bronzing slate; West Quoddy Head, Lubec.

431. Sulphate of iron, resulting from the decomposition of sulphuret of iron in slate; Jackson.

432. Sulphuret of molybdenum—useful for manufacturing molybdic acid; Bluehill.

433. Galena, or sulphuret of lead—first drift; Lubec Lead Mines. Contains eighty-three per centum of lead.

434. Same.

435. Same.

436. Galena and copper pyrites, or sulphuret of copper—second drift; Lubec Lead Mines.

437. Blende, or sulphuret of zinc—first drift; Lubec Lead Mines.

438. Black Blende—third drift.

439. Black blende with phosphate of lead—second drift; Lubec Lead Mines.

440. Galena and blende—first drift.

441. Same.

442. Galena, blende and copper pyrites—third drift.

443. Galena, blende, copper pyrites and trap.

444. Same—first drift.

445. Sulphurets of lead and zinc; West Quoddy Head, Lubec.

446. Same.

447. Andalusite; Searsmont.

448. Same.

449. Macle, crystals of andalusite in mica slate; Camden.

450. Magnetic iron ore—a specimen possessing strong polarity—contains seventy-two per cent. of iron; Marshall's Island, off Mt. Desert.

451. Same.

452. Same.

453. Same.

454. Magnetic iron ore in compact feldspar; Marshall's Island.

455. Magnetic iron ore; Patricktown.

456. Magnetic iron ore; John Davis—Raymond.

457. Magnetic iron ore; Mt. Desert.

458. Same.

459. Veins of magnetic ore in sienite; northeast Harbor, Mt. Desert.

460. Brown pyrites, (sulphuret of iron,) Mt. Desert.

461. Specular iron ore; West side of Seward's Neck, Lubec.

462. Same.

463 Same, with quartz.

464. Magnetic iron ore, containing remains of terebratulæ; Nictaure, N. S.

Obs. Fossil remains were never before found in magnetic iron ore. Circumstances lead to the conclusion that the shells were imbedded in a comparatively recent deposit of hydrate of iron, or bog iron ore, and the whole was afterwards subjected to intense heat from the trap, and changed into magnetic iron ore. This ore was formerly worked at Pembroke, Me., where these specimens were obtained.

465. Same.

466. Oxide of iron and manganese in slate; East Thomaston.

467. Prehnite and calcareous spar, in amygdaloidal trap; above Loring's Cove, Perry.

468. Chlorite; Cross Island.

Obs. This mineral is soft and tough—is wrought into inkstands, vases, &c. It is also used for making a green dye. The Indians carve it into tobacco pipes. It takes a good polish. (See 470.)

469. Same.

470. Same—polished.

471. Same, with calcareous spar; Cross Island.

472. Chlorite in sienite; Raymond.

CATALOGUE

OF SPECIMENS

COLLECTED IN THE YEAR 1837.

ROCKS UNSTRATIFIED AND OF IGNEOUS ORIGIN.

473. Columnar Trap; Bond's Mt., Newfield. (See obs. before No. 1.)
474. Columnar trap; White-head, St. George.
475. Columnar trap; Jewel's Island, Casco Bay.
476. Greenstone trap, with carbonate of lime; U. S. Quarry, Kennebunk Port.
477. Greenstone trap; Thing's Mt., Newfield.
478. Greenstone trap, containing iron pyrites; U. S. Quarry, Kennebunk Port.
479. Greenstone trap; Jewel's Island.
480. Porphyritic trap; Kennebunk Port. (See obs. No. 12.)
481. Same.
482. Greenstone trap, vescicular; Kennebunk Port. (See obs. No. 17.)
483. Greenstone trap, containing calcareous spar; Owl's Head, Thomaston.
484. Greenstone trap; Western Island, Penobscot Bay.
485. Greenstone trap; Bald Head, York.
486. Same.
487. Porphyritic trap, with hornblende and iron pyrites; Cape Neddock, York.
488. Greenstone trap; Cape Neddock.
489. Greenstone trap, vescicular; White-head, St. George. (See obs. No. 17.)
490. Greenstone trap; Kennebunk Port.

Obs. This specimen shows the effects of heat in its cracked and broken surface.

491. Amygdaloidal trap and slate; Little Deer Island. (See obs. No. 13.)

492. Same.

493. Porphyritic trap and slate; Cape Neddock.

494. Hornblende rock, or greenstone trap, composed of crystals of hornblende; White-head, St. George.

495. Serpentine; Deer Island, Penobscot Bay.

Obs. This rock being susceptible of a high polish, (see 499, 500,) is much used in the manufacture of vases, boxes, chimney ornaments, and for a variety of other purposes.

496. Same.

497. Serpentine, containing carbonate of lime; Deer Isle.

498. Serpentine, containing veins of asbestus—(see No. 747;) Deer Isle.

499. Serpentine; Deer Isle—polished.

500. Serpentine, with veins of asbestus—polished.

501. Serpentine, with carbonate of lime—polished.

502. Mica and quartz rock; St. George.

503. Amygdaloidal quartz and mica; Herring Island, St. George. (See obs. No. 13.)

504. Junction of trap and granite; Owl's Head.

505. Junction of trap and sienite; Thing's Mt., Newfield.

506. Junction of trap and granite; U. S. Quarry, Kennebunk Port.

Obs. The three last specimens are designed to shew the effects of trap in melting and becoming united to other rocks.

507. Breccia of trap, slate, and limestone; Vinalhaven. (See obs. No. 31.)

508. Mica, quartz, and hornblende; Cape Neddock, York.

509. Sienite, (see obs. No. 36,) composed principally of green feldspar; Wells.

510. Same.

511. Compact sienite; York.

512. Coarse sienite; York.

513. Same—shewing the surface that was exposed to the action of the weather decomposed.

514. Sienite; Wayne.
515. Sienite; Cape Neddock.
516. Sienite; Agamenticus.
517. Porphyritic sienite; Wells.
518. Granite, composed principally of black mica; Bath.
519. Granite, composed chiefly of feldspar and black mica; Boothbay.
520. Granite with veins of quartz; Herring Island, St. George.
521. Granite; Thomas's Quarry, Eden.
522. Granite; Waterford.
523. Granite; Edgecomb.
524. Same.
525. Same—shewing hewn surface.
526. Granite; Whitehead, St. George.
527. Granite; St. George.
528. Granite; Hill farm, Biddeford—Mr. Emery.
529. Same.
530. Same.
531. Granite; Biddeford.
532. Granite; Emmons' Quarry, Biddeford.
533. Granite; Ocean Quarry, Kennebunk Port.
534. Granite; Kennebunk Port.
535. Granite; U. S. Quarry, Kennebunk Port.
536. Same.
537. Granite; Kennebunk Port.
538. Granite; McHerd's Quarry, Bluehill.
539. Same.
540. Granite; N. Y. Quarry, Bluehill.
541. Same.
542. Same, with hewn surface.
543. Granite; Darling's Quarry, Bluehill.
544. Granite; Pitch Pine Hill, Phipsburg.
545. Same.
546. Granite; Phipsburg Basin.
547. Granite; Buck's Harbor, Brooksville.

548. Granite; Musquito Mt., Frankfort.
549. Same—shewing hewn surface.
550. Same—half polished.
551. Granite; Frankfort—another quarry.
552. Same. This variety is of the kind called granite gneiss.
553. Same.
554. Granite—vein in gneiss; Frankfort.
555. Same.
556. Granite; Owl's Head, Thomaston.
557. Granite; Paris.
558. Granite; North Berwick.
559. Granite; Mt. Waldo.
560. Granite; Deer Isle, Penobscot Bay.
561. Granite; New Meadows, near Bath.
562. Granite.
563. Granite—hewn block; Hallowell.
564. Granite; Hallowell.
565. Eliptical column of granite; taken from a Quarry at Hallowell.
566. Granite—composed chiefly of feldspar; Hallowell.
567. Graphic granite; Paris.
568. Graphic granite; Brunswick.
569. Same.
570. Same.

Obs. The name *Granite* has been usually applied to this stone, although it seldom contains any mica—being composed only of quartz and feldspar. *Graphic* denotes its resemblance to written characters.

PRIMARY STRATIFIED ROCKS.

Originally deposited from water; some of which have since become crystalline by the action of heat.

571. Gneiss; Hallowell.

Obs. The materials of gneiss are similar to those of granite, but they lie in regular strata or layers.

572. Gneiss—strata contorted by the action of heat and mechanical force; Bluehill.

573. Same.

574. Mica slate; Acton.

OBS. This slate, when of good quality, (as Nos. 584, 585, &c.) is useful for sidewalks, flagging stone, &c. It is composed of quartz and mica.

575. Same.

576. Mica slate; Hallowell.

577. Mica slate; Hockamock.

578. Mica slate; Salmon Falls, Lebanon.

579. Mica slate; Lebanon:

580. Same.

581. Mica slate; Bath.

582. Mica slate; Winthrop.

583. Mica slate; Belfast.

584. Mica slate; Phipsburg.

OBS. This slate answers exceedingly well for flagging stone. It can be got out in sheets, perfectly true, twenty feet long, and of any desired thickness.

585. Same.

586. Same.

587. Same.

588. Same—but a poorer variety.

589. Mica slate—a sheet bent at right angles, by the action of heat and pressure; Phipsburg.

590. Talcose slate; Scarborough.

591. Talcose slate; Jewel's Island.

592. Manganesian slate; Dodge's Mt., Thomaston.

593. Same.

594. Siliceous or flinty slate; Kittery Point.

595. Same.

596. Siliceous slate; Piscataquis Falls.

597. Same.

598. Novaculite; Little Deer Isle.

Obs. This is a compact kind of slate, which will make excellent oil stones, hones, &c.

599. Same.

600. Same.

601. Slate, partly changed to jasper; Western Isle, Penobscot Bay.

602. Same.

603. Chert—a mineral produced by the action of trap upon slate containing lime; Deer Isle.

604. Jasper and chert; Little Deer Isle.

605. Quartz rock; Kennebunk.

606. Calciferous quartz rock; Biddeford.

607. Same.

608. Quartz rock; Biddeford.

609. Quartz rock; Bangor.

TRANSITION SERIES.

610. Pyritiferous slate; Jewel's Island

Obs. The alum and copperas of commerce is made chiefly of this rock. Nos. 843 and 844, are specimens of alum and copperas made at Jewel's Island. (See obs. 125.)

611. Same.

612. Pyritiferous slate, or alum rock; Brooksville.

613. Veins and crystals of iron pyrites in argillaceous slate; Brooksville.

614. Pyritiferous slate; Brooksville.

615. Pyritiferous slate; Brooksville.

616. Native alum and copperas in slate, resulting from the decomposition of iron pyrites, or sulphuret of iron; Brooksville.

617. Pyritiferous slate; Hampden.

618. Pyritiferous slate—slate coated with iron pyrites; Portland.

619. Pyritiferous slate; Fort Point, Penobscot River.

620. Pyritiferous gneiss; Buckfield.

621. Slate; Palmyra—Mr. Coolidge.

622. Argillaceous slate; Castine.

623. Argillaceous slate; Penobscot river—north from Belfast.

624. Slate; Limerick—loose piece.

625. Argillaceous slate; Brewer.

626. Argillaceous slate; large sheet from Barnard.

Obs. This is an excellent slate for roofing and writing slates. It is found in large quantities at Barnard, Williamsburg, Foxcroft, and Brownville—and now sells at Boston, for twenty-seven dollars a ton. This is the price of the Welch slate, which has hitherto been exclusively used.

627. Same.

628. Same, smoothed and framed—presented by Edward Smith, agent to the Co.

629. Roofing slate; Barnard.

Obs. These are the common size, used for roofing—one thousand of them make a ton, which will cover four hundred square feet.

630. Same.

631. Same.

632. Same.

633. Same.

634. Slate; from Wales, Great Britain.

635. Same.

636. Blue limestone; Crockett's Quarry, Thomaston.

637. White granular limestone; Crockett's Quarry.

638. Limestone; Phipsburg Basin.

639. Dolomite or magnesian limestone; Cochran's Marsh Quarry, East Thomaston.

Obs. This stone contains about forty-three per cent. of carbonate of magnesia and fifty-three per cent. of carbonate of lime—makes a hot lime.

640. Polished specimen of the same.

641. Limestone; Paris.

642. Limestone; Gray's farm, Paris.

643. Limestone; Andrews' farm, Paris.

644. Limestone; Davis' Mt. Paris.

645. Limestone in gneiss—strata contorted by the action of heat and pressure; Bluehill.

646. Same.

647. Limestone—strata contorted; Hallowell—Morgan's farm.

648. Limestone; Bluehill.

649. Same.

650. Limestone; Norway.

651. Limestone; south part of Norway.

652. Same.

653. Limestone; Davis' farm, Newfield.

654. Limestone; Newfield.

655. Same.

656. Same.

657. Limestone; Buckfield.

658. Same.

659. Same.

660. Limestone; Palmyra—Mr. Coolidge.

661. Argillo-ferruginous limestone; Hampden.

662. Limestone; Canaan Mills—W. Coolidge.

663. Limestone; Bucksport.

664. Limestone; Bowles' farm, Winthrop.

665. Pebbles cemented together by carbonate of lime, which was held in solution in water. A recent sandstone; Bangor.

MINERALS AND ORES.

666. Quartz crystals; Waterford.

667. Quartz crystals; Crotch Island, Casco Bay.

668. Same.

669. Quartz crystals; Hockamock.

670. Quartz; Herring Island.

671. Rose Quartz; Paris.

Obs. This mineral in ancient times, was manufactured into goblets, &c., but is not used at present. It loses its color by exposure to the light.

672. Same.

673. Same.

674. Quartz crystals and chabasie? Phipsburg.

675. Hornstone; Deer Island—loose piece.

676. Mica; Paris, Oxford County.

OBS. This mineral is applied to many useful purposes. It is manufactured into lanterns, for which it is well suited by its transparency and property of withstanding a strong heat, which also render it suitable for the windows of anthracite coal stoves. In Russia, it is used for windows, instead of glass; also in vessels of war, as it is not broken by concussion from the firing. It is used, too, for compass cards, being perfectly true, and not subject to warp; for shades for lamps where the heat is intense, &c. &c. &c.

677. Same.

678. Same.

679. Same.

680. Same.

681. Mica, containing crystals of green tourmaline, a substance sometimes used in jewelry; Paris, Oxford County.

682. Same.

683. Same.

684. Same.

685. Quartz, mica, and green tourmaline; Paris.

686. Black mica in quartz and feldspar; Brunswick.

687. Lepidolite; Paris, Oxford County.

OBS. This mineral is not now much used. It is susceptible of a good polish, and has formerly been manufactured into cups, &c.

688. Same.

689. Same.

690. Lepidolite; from boulder in Waterford.

691. Feldspar; Paris, Oxford County.

OBS. *Feldspar* is valuable for making the nicer kinds of porcelian and artificial teeth. All the mineral teeth are made principally of feldspar.

692. Same.

693. Same.

694. Feldspar; Herring Island.

695. Feldspar; Hallowell.

696. Feldspar; Brunswick.

697. Same. (See obs. 691.)

698. Beryl; Georgetown.

Obs. Small and delicate crystals of this mineral are called emerald, and are used in jewelry.

699. Crystal of beryl; from Paris.

700. Small beryl and garnet in granite; Paris.

701. Cinnamon stone, or yellow garnet; Phipsburg.

702. Crystal of garnet—form rhomboidal dodecædron; Parsonsfield.

Obs. Garnets of good color are used in jewelry.

703. Cinnamon stone, or yellow garnet; Phipsburg.

704. Same.

705. Crystals of yellow garnet; Phipsburg.

706. Manganesian garnet; Phipsburg.

707. Garnet and egeran; Phipsburg.

708. Garnet, pargasite and egeran; Phipsburg.

709. Same.

710. Garnets and small beryl in granite; Paris.

711. Garnets in granite; Buckfield.

712. Same.

713. Large garnet; Buckfield.

714. Same.

715. Same.

716. Same, in iron ore; Buckfield.

717. Garnet and axinite ? Phipsburg.

718. Garnets in quartz and feldspar; Brunswick.

719. Same.

720. Garnets in granite; Strong, Me.

721. Egeran in large crystals; Parsonsfield.

722. Same.

723. Same.

724. Egeran and quartz; Parsonsfield.

725. Egeran and garnet; Phipsburg Basin
726. Egeran in separate crystals.
727. Black tourmaline in quartz and feldspar. (See obs. 731.) Paris, Oxford County.
728. Black tourmaline; Paris.
729. Same.
730. Same.
731. Gigantic crystals of black tourmaline in quartz; Paris, Oxford County.

Obs. This mineral has often been mistaken for coal, but it possesses none of the properties of coal, and is only found in rocks, where coal is never known to exist.

732. Black tourmaline in quartz; Herring Cove Island.
733. Black tourmaline; Long Cove, Bluehill.
734. Same.
735. Green tourmaline, albite and quartz; Paris.
736. Green and red tourmaline, (or rubellite,) albite and quartz; Paris.
737. Green tourmaline in quartz and feldspar; Paris.
738. Green tourmaline, quartz and feldspar; Paris.
739. Green tourmaline in lepidolite; Paris.
740. Indicolite (or blue tourmaline,) albite, and quartz; Paris.
741. Lepidolite, indicolite, albite, and quartz; Paris.
742. Hornblende in diallage, from a loose piece in Corinth.
743. Hornblende in granite; Boothbay.
744. Crystals of macle (boulder;) Bangor.
745. Same.
746. Andalusite in mica slate; Bangor.
747. Asbestus; Deer Isle.

Obs. This mineral, when of good quality, is woven into cloth and made into purses, &c. It is not affected by the fire, and may be useful for fire-proof safes, &c. Incombustible paper may be made of it.

748. Staurotide in mica slate; Winthrop.
749. Magnetic iron ore, with serpentine; Isle au Haute.
750. Same.

751. Vein of iron ore in granite; Herring Gut Island.
752. Magnetic iron ore; Buckfield.
753. Same.
754. Same.
755. Same—variety.
756. Variety of the same.
757. Magnetic iron ore; Jackson, N. H.
758. Magnetic iron ore; from a loose piece in Phillips—(by Dr. Prescott of Farmington.)
759. Bog iron ore; Shapleigh.
760. Bog iron ore; Shapleigh.
761. Bog iron ore; Paris.
762. Same.
763. Bog iron ore; Bluehill.
764. Bog iron ore; Saco.
765. Same.
766. Bog iron ore; Jewel's Island, Casco Bay.
767. Same.
768. Same.
769. Ferruginous slate; Jewel's Island.
770. Bog iron ore; Dover.
771. Bog iron ore; Lebanon.
772. Bog iron ore; No. 6, R. 9, above Williamsburg.
773. Ferruginous tufa, at junction of trap and slate; Hampden.
774. Ferruginous sandstone; Passadumkeag.
775. Black ferruginous sand; Great Androscoggin Pond, Leeds.
776. Crystalline cast iron; from under the hearth of a furnace at Newfield. It remained half fused for a number of years, so that the particles had time to take a crystalline form. The crystals are octædrons.
777. Arsenical iron; Bluehill.
778. Same.
779. Arsenical iron; Bond's Mt., Newfield.
780. Silicate of manganese—a new variety; Bluehill.
781. Same.
782. Same.

783. Black oxide of manganese; Bluehill.

784. Black oxide of manganese; Paris.

785. Bog manganese; Bluehill.

786. Bog manganese; Paris.

787. Bog manganese; Agamenticus.

788. Iron pyrites or sulphuret of iron; from Greenwood.

789. Pyrites in slate; Brooksville. (See 610.)

790. Pyrites in quartz rock; Brooksville.

791. Alum rock; Buckfield.

Obs. This stone is formed from the natural decomposition of iron pyrites and slate—forming a sulphate of alumina or alum.

792. Tungstein or wolfram and sulphuret of molybdenum; Bluehill.

Obs. *Tungstein* is composed of tungstic acid and iron—is useful for the manufacture of tungstic acid—is very rare in this country, and seldom found anywhere except in connexion with tin. (For molybdenum, see 794 obs.)

793. Same.

794. Sulphuret of molybdenum in granite; Bluehill.

Obs. This metal is of no great value. It is used only for making molybdic acid.

795. Same.

796. Same.

797. Galena or sulphuret of lead—crystalline in form; Parsonsfield.

798. Same.

799. Yellow blende or sulphuret of zinc in quartz rock; Parsonsfield.

800. Same, with sulphuret of copper.

801. Sulphuret of zinc in quartz; Parsonsfield.

802. Copper pyrites or sulphuret of copper, blende or sulphuret of zinc, and galena or sulphuret of lead, and quartz crystals; Parsonsfield.

803. Galena, sulphuret of lead; Bluehill.

804

805. Calcareous spar, in rhomboidal crystals; Thomaston.

806. Calcareous spar in low six-sided prisms—colored by iron; Thomaston.

807. Same.

808. Phosphate of lime; Long Island, Bluehill.

809. Phosphate of lime; Waterford.

810. Same.

811. Stellated gypsum; Nova Scotia.

812. Fluor spar; Bluehill.

Obs. This substance is used in Chemistry for making fluoric acid. It is also worked into a variety of ornaments.

813. Same.

814. Same.

815. Same.

816. Same.

817. Same—with quartz crystals.

818. Same—with sulphuret of molybdenum.

819. Graphite; Greenwood.

Obs. This is often, but incorrectly, called black *lead*, or plumbago. It is useful for making *lead* pencils, which however contain not a particle of *lead*—and it is used for making fire-proof crucibles.

820. Same.

821. Chert; Little Deer Isle, (see 603.)

822. Recent bituminous coal, taken from under a peat bog in Limerick—and is one of the proofs of the vegetable origin of coal, being a stage in the progress of peat into bituminous coal.

823. Anthracite; Vinalhaven, Northern Island.

Obs. It is found in small quantities in slate, which has been altered by action of trap.

824. Terebratulæ in compact slate; from a loose rock.

825. Same.

826. Terebratulæ in quartz rock; Parsonsfield.

827. Terebratulæ, lingula ? from a loose rock in Cornville—by Benjamin McDaniel.

828. Concretions from the clay, at Presumpscot Falls, Westbrook, (see obs. No. 376.)

829. Concretions of clay, inclosing the nucula portlandica; Presumpscot Falls, Westbrook, (see obs. No. 376.)

830. Clay containing impressions of nucula portlandica, Bangor.

831. Concretions of clay iron stone; Harthorn Meadow, Bangor.

832. Plastic clay; North Turner.

Obs. Best kind of clay for pottery.

833. Same.

834. Hydrate of silica, a delicate kind of clay composed almost entirely of silex—suitable for making fire-proof brick—(which see No. 838.)

835. Same.

836. Same—from Bluehill.

837. Hydrate of silica; Bluehill. (See obs. No. 834.)

838. Fire-proof brick made of the hydrate of silica and sand from Bennington, Vermont.

839. Fuller's earth; Newfield.

Obs. This is useful for cleansing cloth, &c.

840. Same—from Parsonsfield.

841. Wood preserved under peat. The woody fibres still remain, though every other part is gone; Waterford—W. Coolidge.

842. Yellow ochre; Jewel's Island. Useful for manufacturing paint.

843. Alum and copperas made from the pyritiferous slates of Jewel's Island. (See Nos. 125 and 610.)

844. Same.

845. Crystals of scapolite and pyroxene; Raymond—by Rev. A. P. Chute.

846. Tremolite with magnetic iron—by Rev. A. P. Chute; Raymond.

847. Egeran; Poland—by Rev. A. P. Chute.

848. Honblende; Raymond—by Rev. A. P. Chute.

849. Jasper, with crystals of silicate of iron; Monmouth—by N. T. True.

SPECIMENS

COLLECTED ON THE PUBLIC LANDS—1836-7.

ROCKS UNSTRATIFIED AND OF IGNEOUS ORIGIN.

850. Greenstone Trap; Peaked Mt., Seboois River. (See No. 1.)
851. Greenstone trap; three miles below Dalton's, Aroostook River.
852. Greenstone trap; Rippogenus Island.
853. Greenstone trap; outlet of Chamberlin Lake.
854. Greenstone trap; Aroostook Falls.
855. Greenstone trap; Monument Line, East Branch Penobscot.
856. Porphyritic greenstone trap; foot of Chesuncook Lake.
857. Porphyritic greenstone trap; foot of Chesuncook Lake.
858. Breccia of trap and limestone—boulder; New Limerick.
859. Amygdaloidal trap; Baskahegan Lake.
860. Amygdaloidal trap—boulder; opposite Peaked Mt., Seboois River.
861. Same.
862. Amygdaloidal trap, in place; Pongokwahem Lake.
863. Hornstone; Mt. Kenio, Moose Head Lake.

    Obs. The whole mountain is composed of this stone, which is like flint in appearance and composition.

864. Same.
865. Hornstone; Sugar Loaf Mt., Seboois River.

    Obs. The stone is here found at point of contact of the greenstone trap, which forms the top of the mountain, and of the slates, which lie on its sides.

866. Jasper breccia; Sugar Loaf Mt.

    Obs. This is found under the same circumstances, and is evidently of the same origin as the preceding.

867. Same.

868. Granite; Lincoln, Penobscot River.
869. Granite; two miles above Katepskenhegan Pond, Penobscot River, West Branch.
870. Granite; West side of Katepskenhegan Pond.
871. Granite; Gibson's Clearing, near the mouth of the Sowadnehunk, Penobscot River.
872. Granite—boulder; Calais and Houlton Road, on No. 8.

PRIMARY STRATIFIED ROCKS,

Originally deposited from water; some of which have since become crystalline by the action of heat.

873. Micaceous slate; from an Island in Moose Head Lake.
874. Micaceous slate; from the southwest shore of Moose Head Lake.
875. Quartz rock; Chesuncook Falls.
876. Siliceous slate; southwest part of Lincoln.
877. Compact siliceous slate; near the Grand Falls, on the East Branch of the Penobscot.
878. Compact siliceous slate; below the Grand Falls, on the East Branch of the Penobscot.
879. Compact siliceous slate; below the mouth of the Seboois, East Branch Penobscot.
880. Compact siliceous slate; foot of Chesuncook Lake.
881. Same.
882. Siliceous slate; one mile below Mattawamkeag, Penobscot River.
883. Silceous slate; foot of Temiscouata Lake.
884. Siliceous slate; Inlet of Shad Pond.
885. Praze and plumbaginous slate; E. Branch of the Penobscot.
886. Praze; East Branch Penobscot.
887. Plumbaginous slate; Moose Head Lake.
888. Same.

TRANSITION SERIES.

889. Argillaceous slate; Aroostook Road.
890. Limestone—a bed in argillaceous slate; Aroostook River.
891. Slate-contorted strata; Tobique River.
892. Same.
893. Compact slate; No. 2, Indian Township, Calais and Houlton Road.
894. Compact slate; Baileyville.
895. Slate; Hodgdon.
896. Slate; Madawaska.
897. Slate; Grand Falls, Penobscot.
898. Same.
899. Slate; Chesuncook Portage.
900. Green slate; Chesuncook Falls.
901. Green slate; above Sugar Loaf Falls, Seboois River.
902. Red slate; above Sugar Loaf Falls, Seboois River.
903. Same.
904. Calciferous slate—greywacke formation; Moose Head Lake.
905. Calciferous slate—greywacke formation; Moose Head Lake.
906. Same.
907. Madrepore in greywacke slate; southwest side of Moose Head Lake.
908. Madrepore limestone; Rippogenus Falls, Penobscot River.
909. Hydraulic limestone; Rippogenus Falls, Penobscot River.
910. Brecciated Marble; Rippogenus Falls.
911. Conglomerate, or greywacke; Lake Pongokwahem, Allagash River.
912. Greywacke—boulder; N. Limerick.
913. Greywacke; Weston—loose. (Compact variety.)
914. Conglomerate, or coarse greywacke; Weston.
915. Greywacke slate; Baskahegan Lake.
916. Greywacke; top of Mars Hill.
917. Greywacke; top of Mars Hill.

918. Slate—greywacke formation; foot of Mars Hill.
919. Greywacke—boulder; near mouth of Ulmquegan, Seboois River.
920. Greywacke; opposite Peaked Mountain, Seboois River.
921. Same.
922. Same.
923. Same.
924. Greywacke slate; opposite Peaked Mt., Seboois River.
925. Greywacke slate; opposite Peaked Mountain, Seboois River.
926. Greywacke—boulder; Aroostook River.
927. Greywacke—boulder; Schoodic Lake.
928. Greywacke—boulder; Baskahegan Lake.
929. Greywacke—boulder; Calais and Houlton Road.
930. Conglomerate of quartz, chalcedony, jasper and limestone—boulder; St. John River.
931. Same.
932. Greywacke, containing terebratulæ and vegetable remains; Aroostook River.
933. Same.
934. Fossil favosite in greywacke; Aroostook River.
935 Carbonaceous slate; Dalton's, Aroostook River.
936. Same.
937. Same.
933. Greywacke; Temiscouata Lake.
939. Oid red sandstone; Jerry Brook, Seboois River.
940. Same.
941. Ferruginous slate; Hodgdon.
942. Red ferruginous slate; Hodgdon.
943. Red ferruginous slate—boulder; opposite Peaked Mt., Seboois River.
944. Red ferruginous slate; Woodstock, N. B.
945. Same.
946. Hematitic iron ore; Woodstock, N. B. (See obs. 949.)
947. Same.
948. Hematitic iron ore; Aroostook River.

949. Hematitic iron ore; Aroostook River.

OBS. Though this ore contains no more than fifty-three per centum of iron, it is considered the most valuable kind of iron ore.

950. Iron ore; Hodgdon.

951. Same.

952. Greywacke slate; Temiscouata Lake.

953. Same.

954. Greywacke, containing madrepores; Temiscouata Lake.

955. Same.

956. Compact limestone or clinkstone; New Limerick.

957. Compact blue limestone; New Limerick.

958. Compact limestone, with veins of carbonate of lime; New Limerick.

959. Same—polished.

960. Same.

961. Limestone, with veins of carbonate of lime; Aroostook Falls.

962. Compact blue limestone; Aroostook River.

963. Same.

964. Compact limestone; Aroostook River.

965. Limestone; Dalton's, Aroostook River.

966. Limestone; River St. John—strata worn by the river.

967. Limestone; Tobique river—bed in slate.

968. Same.

969. Limestone; south branch of the Meduxnekeag—Houlton.

970. Same.

971. Limestone—boulder; opposite Peaked Mt., Seboois River.

972. Fossiliferous limestone—loose; River St. John.

973. Same.

974. Madrepore limestone—boulder; opposite Peaked Mt., Seboois River.

975. Same.

976. Madrepore limestone; No. 7, 7th Range.

977. Same.

978. Same.

979. Madrepore limestone; No. 7, 7th Range.

980. Limestone—strata bent by action of trap; No. 7, 7th Range, Seboois River. Polished specimen.

981. Brecciated marble, with scoriaceous trap, which cements the fragments of limestone together; No. 7, 7th Range.

982. Brecciated marble; No. 7, 7th Range. The stone is broken up into fragments by the action of trap.

983. Same.

984. Ferruginous limestone; No. 7, 7th Range.

985. Sandstone, containing carbonate of lime—boulder; Peaked Mt., Seboois River.

SECONDARY SERIES.

986. New red sandstone; Tobique River, New Brunswick.

987. Coarse red sandstone; Tobique River.

988. New red sandstone—boulder; St. John River, N. B.

989. Gypsum or "Plaster rock;" Tobique River, N. B.

990. Same.

991. Fibrous Gypsum; Tobique River.

992. Fibrous and massive gypsum; Tobique River, N. B.

993. Fibrous and massive gypsum; Tobique River.

994. Same.

995. Same.

Tertiary and recent formations.

996. Ferruginous sandstone; Aroostook River.

997. Clay, containing phosphate of iron; Madawaska.

998. Same.

999. Ferruginous sand; Madawaska.

1000. Bog manganese; Aroostook River.

Minerals, &c.

1001. Milky quartz—bed in slate; foot of Long Falls, Allagash River.

1002. Chert; Aroostook Falls.

1003. Carnelian—boulder; Aroostook River.

1004. Carnelian—boulder; St. John River.

1005. Same.

1006. Same.

Obs. This stone is similar to that brought from the East Indies, which is used in jewelry.

1007. Jasper—a precious stone; St. John River.

1008. Same.

1009. Jasper—boulder; Aroostook River.

1010. Same.

1011. Jasper—boulder; Aroostook River.

Obs. This specimen shows the slaty structure of the rock, from which it was evidently derived—slate.

1012. Jasper with vein of iron; near the head of Seboois River—boulder.

1013. Jasper; Sugar Loaf Mountain, Seboois River.

1014. Green feldspar—boulder; St. John River.

1015. Compact feldspar; Peaked Mt.

1016. Compact feldspar and quartz; below Jerry Brook, Seboois River.

1017. Tourmaline in quartz and feldspar; Burnt Jacket, Moose Head Lake.

1018. Macle—boulder; St. John River.

1019. Same.

1020. Macle in slate—boulder; Oldtown.

1021. Sulphuret of iron in altered greywacke; Sugar Loaf Mt.

1022. Oolite; No. 7, 7th Range.

1023. Limestone—boulder; Chesuncook Lake.

1024. Brecciated marble with terebratulæ—boulder; Aroostook River.

1025. Terebratulæ in limestone; Houlton.

1026. Terebratulæ; Rippogenus Falls, Penobscot River.

1027. Terebratulæ; four miles below Rippogenus.

1028. Terebratulæ in greywacke; No. 7, 7th Range.

1029. Lydian stone or touchstone—boulder; Aroostook River.

1030. Sandstone, found at the bottom of the Bay of St. Lawrence, near Prince Edward's Island, under thirty-five fathom, of water. Nothing is known as to the cause of the holes with which it is filled. Presented by Mr. William K. Weston, of Augusta.

CATALOGUE

OF SOILS

COLLECTED IN THE YEAR 1837.

1031. Soil produced by the disintegration of Porphyry; Buck's Harbor.
1032. Soil from granite; Black's Island, Mt. Desert.
1033. Soil from sienite rocks; Mt. Desert.
1034. Soil from granite; Eden, Mt. Desert—S. Higgins' farm.
1035. Soil from sienite; Wells.
1036. Soil, from Black's Island—granite.
1037. Soil from sienite; Wass' farm, Addison.
1038. Soil from slate; Searsmont.
1039. Soil from slate; near iron bed, Aroostook River.
1040. Soil from limestone and gneiss, producing twenty-five bushels of wheat to the acre; Andrews.
1041. Soil from talcose slate; Thomaston.
1042. Soil from disintegration of slate; Searsmont.
1043. Soil from limestone and slate; New Limerick.
1044. Alluvial sand from granite; Long Pond, Waterford.
1045. Diluvial soil from granite; Conant's Mills, Hope.
1046. Soil from disintegration of slate limestone; St. Albans, Somerset County—Dr. Holmes.
1047. Alluvial soil; Ox Bow, Aroostook River.
1048. Alluvial soil; Hooper's, Aroostook River.
1049. Alluvial soil; Beckwith's, Aroostook River.
1050. Disintegrated red sandstone; Perry.
1051. Diluvial sand and gravel; Conant's Mills, Hope.
1052. Ferruginous soil, from sienite; Jonesport.
1053. Soil from hematite and slate; Aroostook River.
1054. Soil from ferruginous limestone; No. 7, 7th Range.

1055. Ferruginous soil; Jacob Osgood—Bluehill.

1056. Coarse red ochre; Bluehill.

1057. Yellow oxide of iron and clay; Union Falls, (Saco River,) Hollis.

1058. Ferruginous sand; Madawaska.

1059. Soil from limestone.

1060. Soil from dolomite; Cochran's Quarry, Thomaston.

1061. Soil over limestone; Conant's Mills, Hope.

1062. Soil from limestone; Lily Pond, Camden.

1063. Diluvial soil; Hiram.

1064. Soil, good for Canada corn; Hubbard's farm, Acton.

1065. Corn soil—eighty bushels to the acre—clay two feet below; Mr. Emery—Saco.

1066. Soil over slate; Searsmont.

1067. Soil near Fuller's earth; Davis' farm, Newfield—(corn.)

1068. River sand; Aroostook River.

1069. Soil; Fairbanks', Aroostook River. (Luxuriant.)

1070. Goss' veg. soil; Aroostook River.

1071. Marl; Judge Read—Belfast.

1072. Moses Emery—corn field—clay four feet below; Saco.

1073. Gravel from beach; Bluehill.

1074. Soil seven feet below surface; New Limerick.

1075. Soil, good for corn; Scarborough.

1076. Soil from Saco—good for oats.

1077. Soil over slate; Searsmont.

1078. Sand; from beach at Dyer's Neck, Biddeford.

1079. Uncultivated soil, good for wheat and grass; W. Coolidge, Waterford.

1080. Soil from Gibbs Tilton, Jackson.

1081. Soil from the hill back of the shore village, Thomaston. Rocks in place, mica slate charged with manganese and iron.

1082. Soil over lime rock, at Marsh Quarry, Thomaston.

1083. Soil over lime rock, at Marsh Quarry, Thomaston.

1084. Soil remarkable for fine potatoes; Wiscasset.

1085. Soil occurring immediately over gneiss rock, Wiscasset.

1086. Soil remarkable for potatoes and grass; Wiscasset.
1087. Uncultivated soil; Westport.
1088. Soil from Phipsburg—Dea. Hutchins.
1089. Decomposition of talcose rock; Thomaston.
1090. Soil from Surry, No. 3.
1091. Soil from Surry, No. 1.
1092. Soil from Surry, No. 2.
1093. Soil; B. D. Boise—Canada Road.
1094. Soil from shells; Newcastle.
1095. Clay loam; T. Barstow, Brewer. Wheat luxuriant, dressed with lime.
1096.
1097. Soil; J. McCully, Wilton. Wheat forty-eight bushels to acre.
1098. Soil; I. Haines, Bethel. Grass, one and a half tons to the acre, dressed with barn manure.
1099. Soil; S. Stephenson, Gorham. High ground, not dressed for ten years.
1100. Soil; Mr. Stephens, Foxcroft. Wheat, luxuriant.
1101. Soil; Dresden—clover and herd's grass—one and a half tons to the acre.
1102. Soil; from above decomposed limestone, Farmington Hill.
1103. Soil; Mr. Jordon, Saco—No. 1, cleared.
1104. Soil; Warren—Mr. Fish. Wheat, good.
1105. Soil; William S. Mahew, Foxcroft. Bald wheat.
1106. Soil; Thomaston—north of E. W. Lime Quarry. Wheat.
1107. Red soil; from decomposed hematite, Aroostook.
1108. Soil; Orrington. Clay loam—wheat.
1109. Muck, from bog iron; Mr. Bryant, Anson.
1110. Soil; E. G. Belcher, Farmington—corn.
1111. Soil, from the decomposition of mica slate; E. Bradford—Turner.
1112. Marsh Quarry, Thomaston.
1113. Soil; Mr. Sears—wheat—Glenburn.
1114. Corn; Mr. Wood, Rumford—one hundred bushels to acre.

1115. Alluvial soil; B. Bryant, Anson. Wheat turns yellow on it.
1116. Wiscasset growth potatoes.
1117. Soil; Mr. King's farm, Kingfield—never dressed.
1118. Soil; O. Pray, Livermore. Wheat, thirty bushels to the acre.
1119. Serpentine soil; Deer Isle.
1120. Soil; Mr. Burell, Clinton—corn.
1121. Soil, over limestone; Clinton.
1122. Soil; S. Stephenson, Gorham. Low clay ground—never dressed.
1123.
1124. Soil; J. Little, Minot. Corn and grass, luxuriant.
1125. Soil; I. Smith, Norway. Corn, fifty bushels to the acre; dressing, barn manure.
1126. Yellow loam; B. Boies, Canada Road.
1127. Soil; Dr. Bates' plain, Norridgewock. Oats, peas, luxuriant.
1128. Soil; Dr. Bates' plain, Norridgewock. Wheat, luxuriant.
1129. Soil; Mr. Gleason's, Thomaston Beech—growth of wood. north of the Lime Quarry.
1130. Soil, over bog iron; Bucksport.
1131. Soil, E. Little, Danville. Grass.
1132. Soil; Minot, S. Berry. Herd's grass and Clover
1133. Soil; I. Brigg's, Danville. Corn.
1134. Sand; Sebago Lake, Raymond.
1135. Soil; Dr. Burleigh, Dexter. Oats, four feet high.
1136. Soil; E. Stetson, Minot. Corn and wheat.
1137. Soil, uncultivated; Dr. Bates' plain, Norridgewock.
1138. Soil; I. Washburn, Livermore. Clover, two tons per acre.
1139. Soil; L. Levensaler, Thomaston. Wheat, twelve loads of muscle mud to the acre.
1140. Soil from decomposed limestone; Farmington.
1141. Soil; S. Berry, Minot. Clover and herd's grass.
1142.
1143. Soil; Guilford. Oats.
1144. Soil; Mr. Chandler's, Sebec. Wheat, luxuriant.

1145. Soil; E. Little, Danville. Corn, forty bushels to acre. Wheat, twenty to twenty-five.

1146. Soil; Col. Morrill's farm, Dixfield. Grass and grain.—One hundred bushels of oats to the acre.

1147. Soil—wheat; B. Bryant, Anson.

1148. Soil; E. Little, Danville. Corn, forty bushels to acre—wheat, twenty.

1149. Smut dust, from wheat; Foxcroft Mts.

1150. Soil; Alna—white maple.

1151. Clay loam; Orrington. Wheat, good.

1152. Soil; B. Bryant, Anson. Clover and herd's grass.

1153. Soil; Dr. Burleigh, Dexter. Oats, luxuriant.

1154. Soil; corn and wheat—forty bushels of corn to the acre—twenty-five of wheat; T. B. Little's, Minot.

1155. Soil; E. T. Little, Minot. Grass, one and a half tons per acre.

1156. Soil; I. Haines, Bethel. Corn, forty bushels to the acre, dressed with barn manure.

1157. Soil, from decomposition of mica slate; Turner.

1158. Soil; eight miles from Bingham, on Canada Road—mixture of hard and soft wood.

1159. Soil; I. Foster, Avon. Corn.

1160. Soil; J. Ham, Bangor—uncultivated.

1161. Soil—bald wheat; Sebec Village.

1162. Soil; P. C. Harding, Union. Grass, forty bushels to acre.

1163.

1164. Soil; Danville. Grass, very poor.

1165. Soil; Mr. Green, Dexter. Wheat, luxuriant.

1166. Aroostook river; P. Bull's farm.

1167. Talcose slate soil; Thomaston.

1168. River sand; Aroostook.

1169. Beach sand; Dyer's Neck.

1170. Waterford wheat; T. Stone's farm.

1171. William Coolidge's farm, Waterford.

1172. W. Coolidge's farm, Waterford—limed.

1173. Over gneiss; Wiscasset.

1174. Near Fuller's earth, Davis' farm, Newfield.
1175. Soil; Oats—Saco.
1176. Diluvial soil; Hiram.
1177. Yellow soil; near iron mine, Aroostook.
1178. Alluvial; Oxbow, Aroostook.
1179. Phipsburg basin—Hutchins' farm
1180. Alluvial soil; Mr. Hooper's, Aroostook.

CATALOGUE

OF SPECIMENS

COLLECTED IN THE YEAR 1838.

ROCKS UNSTRATIFIED AND OF IGNEOUS ORIGIN.

1181. Basalt, containing basaltic hornblende and olivem; Bristol.
1182. Basalt; J. Huse, Bristol.
1183. Same.
1184. Basalt; Dixfield.

Obs. The above specimens of genuine basalt are the first ever discovered in this country.

1185. Greenstone trap; west of Twichel's pond, Greenwood.
1186. Greenstone trap; E. Heath, Whitefield.
1187. Greenstone trap; Lewiston Falls.
1188. Greenstone trap; N. Bray, Poland.
1189. Greenstone trap; Solon.
1190. Feldspar rock with iron pyrites; Raymond.
1191. Feldspar rock; Raymond.
1192. Granite; Holmes' Brook, Rumford.
1193. Granite; Peavy's Mt., Rumford.
1194. Granite; Dodland Hill, Norridgewock.
1195. Same.
1196. Granite; Ludwig's Quarry, Waldoborough.
1197. Granite; Nobleborough.
1198. Granite; D. Baldwin, Mt. Vernon.
1199. Granite; Tyler's Quarry, Waldoborough.
1200. Granite; J. Knowlton, Farmington.
1201. Granite; D. Baldwin, Mt. Vernon.
1202. Granite; Rumford Falls.
1203. Granite; Day, Bristol.

1204. Granite; Chandler, Belgrade.
1205. Granite; W. Hopkins, Newcastle.
1206. Granite; J. Knowlton, Farmington.
1207. Granite; Ryant's Hill.
1208. Granite; Canada Road.
1209. Granite; Minot.
1210. Junction of granite and grauwacke; Canada Road.

PRIMARY STRATIFIED ROCKS,

Originally deposited from water; some of which have since become crystalline by the action of heat.

1211. Gneiss; Orrington.
1212. Gneiss; Mt. Blue.
1213. G. gneiss; Dresden.
1214. Gneiss; Nobleborough.
1215. Mica slate—wall rock of limestone; E. Heath, Whitefield.
1216. Mica slate; Bear Mt., Hartford.
1217. Mica slate; Lowell's Hill, Livermore.
1218. Mica slate; Mt. Vernon.
1219. Mica slate; Mt. Abraham.
1220. Mica slate; A. Starrett, Warren.
1221. Mica slate; Lewiston Falls.
1222. Mica slate; Dresden.
1223. Mica slate; Solon.
1224. Mica slate; Rumford.
1225. Mica slate; Moose Head Lake.
1226. Mica slate; Rumford Falls.
1227. Slate coated with gypsum; Bloomfield.

TRANSITION SERIES.

1228. Quartz rock, containing mica; Seven Mill Brook, Anson.
1229. Quartz rock; near Parlin Pond, Canada Road.

1230. Grauwacke slate; between Boies's and Forks Kennebec.
1231. Grauwacke slate; Gen. Robinson, Waterville.
1232. Grauwacke slate; Norridgewock Falls.
1233. Calciferous slate; Forks Kennebec.
1234. Novaculite; Phillips.
1235. Same.
1236. Slate in compact grauwacke; west of Parlin Pond, Canada Road.
1237. Arsenical Pyrites; Titcomb's Hill, Farmington.
1238. Slate; Winslow, below Falls.
1239. Slate; from the height of land between Maine and Lower Canada.
1240. Slate; Bangor.
1241. Slate; Elliotsville.
1242. Argillaceous slate; Gen. Robinson, Waterville.
1243. Argillaceous slate; west side river, Farmington.
1244. Argillaceous slate; Mt. Abraham.
1245. Compact slate; west Parlin Pond, Canada Road.
1246. Slate; Solon.
1247. Pyritiferous slate; Bingham.
1248. Pyritiferous slate; Gov. King, Bluff Mt., Concord.
1249. Pyritiferous slate; Corinna.
1250. Pyritiferous slate; Churchill's, New Portland.
1251. Pyritiferous slate; Bluff Mt., Concord.
1252. Pyritiferous slate; Titcomb's Hill, Farmington.
1253. Slate with iron pyrites; Winslow.
1254. Pyritiferous slate; M. Hoxie, Albion.
1255. Pyritiferous slate; W. Collins, Harmony.
1256. Same.
1257. Impressions of fern; Waterville.
1258. Same.
1259. Slate with impressions of fuci; Waterville.
1260. Impresssions of fuci; Winslow.
1261. Impressions of fern, in slate; Briton, Sidney.
1262. Limestone; S. Brown, Clinton.

1263. Limestone; Witherall, Norridgewock.
1264. Limestone; Fifteen Mile Brook, Clinton.
1265. Limestone; Puffer, Dexter.
1266. Limestone; O. Brown, Vienna.
1267. Limestone; Tilson Q., Thomaston.
1268. Limestone; W. Parsons, Norway.
1269. Limestone; D. Richardson, Jay.
1270. Limestone; Old Town, Penobscot River.
1271. Limestone; Dunbar, Winslow.
1272. Limestone; P. C. Harding, Union.
1273. Limestone; I. Miller, Union.
1274. Limestone; Drummond, Winslow.
1275. Limestone; Mt. Abraham.
1276. Limestone; Furber, Winslow.
1277. Limestone; Foxcroft Falls.
1278. Sand cemented by carbonate of lime; Bangor.
1279. Limestone; I. Bean, N. Sharon.
1280. Limestone; I. Winslow, N. Sharon.
1281. Limestone; I. Winslow, N. Sharon.
1282. Limestone; I. Bean, N. Sharon.
1283. Limestone; W. Barnard, N. Sharon.
1284. Limestone; Rumford Falls.
1285. Limestone; Rumford Falls.
1286. Limestone; J. Richards, Winthrop.
1287. Limestone; Williams, Waterville.
1288. Limestone; N. Bray, Poland.
1289. Limestone; G. & J. Tolman, New Sharon.
1290. Limestone, in asbestus; I. Miller, Union.
1291. Limestone; R. White, Dixfield.
1292. Limestone; J. Chapman, Mt. Vernon.
1293. Limestone; Witherum, Abbot.
1294. Limestone; Crowell, West Waterville.
1295. Limestone—loose; Industry, on Farmington Road.
1296. Limestone; Holman's, Dixfield.
1297. Limestone—loose; Pierce, Lexington.

1298. Limestone; Whitefield.

1299. Limestone; Norton's Mills, Strong.

1300. Limestone; Harmony.

1301. Limestone; Livermore Falls.

1302. Limestone; Rumford Point.

1303. Limestone; Reed, No. 2, Carthage.

1304. Limestone; Oak Hill, Turner.

1305. Limestone; Lewiston Falls.

1306. Wood, Skowhegan.

1307. Marble, containing Pyrites; Thomaston.

1308. Clouded marble; Thomaston.

1309. Blue marble; Thomaston.

1310. Dolomite marble; Thomaston.

1311. Veined marble; Thomaston.

1312. Limestone; Crowell, Dexter.

OBS. This limestone occurs in large quantities at Dexter, and contains 98 per cent. of pure carbonate of lime.

1313. Limestone; Fish, Dexter.

1314. Limestone; Jennings, Dexter.

1315. Limestone; Pullen, Dexter.

1316. Limestone; B. Starrett, Warren.

1317. Limestone; Warren.

1318. Limestone; D. Starrett, Warren.

1319. Limestone; Alexander Starrett, Warren.

1320. Limestone; east side County road, Phillips.

1321. Limestone; West side River, Phillips.

1322. Limestone; J. Whiting, Phillips.

1323. Clouded marble; D. Bullen, Union.

1324. Same.

1325, Same.

1326. Limestone; S. Davy, Turner.

1327. Limestone; E. White, Dixfield.

1328. Limestone; J. Cole, Turner.

1329. Limestone with serpentine; I. Miller, Union.

1330. Limestone; P. Barrell, Turner.

1331. Limestone; Starks.
1332. Limestone.
1333. Limestone, Athens.
1334. Limestone.
1335. Limestone; Skowhegan Falls.
1336. Limestone; James Winslow, New Sharon.
1337. Limestone; River, Guilford.
1338. Limestone; O. Brown, Vienna.
1339. Argillo-ferruginous limestone bed in slate; Hampden.
1340. Pot stone; Warren.
1341. Limestone, containing galena and blende; Warren.
1342. Limestone; E. Dennis, Harmony.
1343. Limestone, containing galena and blende; Warren.
1344. Limestone; Titcomb, Farmington Hill.
1345. Limestone; Mr. Drummond, Winslow.
1346. Limestone; Reed, No. 1, Carthage.
1347. Limestone; J. Wall, Winslow.
1348. Limestone; G. Falls, W. Waterville.
1349. Limestone; Coney, Farmington Hill.
1350. Limestone, containing lead ore; Warren.
1351. Limestone; A. Starrett, Warren.
1352. Limestone; State Prison, Thomaston.
1353. Limestone; east side County Road, Phillips.
1354. Limestone; Noyes & Crafts, Jay.
1355. Limestone; Varnum, Temple.
1356. Limestone; Crockett's Quarry, Thomaston.
1357. Limestone; Winter, Carthage.
1358. Limestone; O. Brown, Vienna.
1359. Limestone; Pullen, Dexter.
1360. Limestone; Batchelder, Union.
1361. Limestone; J. Richards, Winthrop.
1362. Limestone; E. Heath, Whitefield.
1363. Limestone; B. Winter, Carthage.
1364. Limestone; J. Waterhouse, Poland.
1365. Limestone; Sylvester, Norridgewock.

1366. Hydraulic limestone; Forks Kennebec River.

1367. Same.

1368. Limestone; Wyman, Belgrade.

1369. Limestone, containing iron pyrites; Beechwood Quarry, Thomaston.

1370. Limestone, containing iron pyrites; Beechwood Quarry, Thomaston.

1371. Soft stone; Beechwood Quarry, Thomaston.

1372. Hard stone; Beechwood Quarry, Thomaston.

1373. Marble; Thomaston.

1374. Limestone; Beechwood Quarry, Thomaston.

1375. Same.

1376. Limestone; Achorn's Quarry, Thomaston.

1377. Limestone; Brown Quarry, Thomaston.

1378. Junction of limestone and trap dyke; Thomaston.

1379. Same.

1380. Junction of limestone and trap dyke; E. Heath, Whitefield.

1381. Junction of limestone and trap dyke; Poland.

Obs. In the above specimens, the veins of trap rock are not sufficiently wide to materially alter the appearance of the limestone.

1382. Limestone; T. Simpson, Winslow.

1383. Limestone; I. Jewett's Woods, Whitefield.

1384. Limestone; J. Winslow, New Sharon.

1385. Limestone; Starks.

1386. Hydraulic limestone; Foster, Forks Kennebec.

1387. Shell marble; Starbord's Creek; Machais.

1388. Same.

1389. Soap stone; Talcose Rock, Harpswell.

1390. Soap stone; Orr's Island.

1391. Serpentine marble; Deer Island.

1392. Same.

1393. Veined marble; Morton's Cove, Lubec.

1394. Same.

1395. Marble; L'Etang, N. Brunswick.

1396. Breccia marble; Point of Maine, Machias.
1397. Blue shaded dolomite marble; Marsh Quarry, Thomaston.
1398. Dolomite marble; Union.
1399. Same.
1400. Slate; West side Kennebec—eight miles above Bingham.
1401. Same.
1402. Same.
1403. Slate; Smith's Quarry, Glenburn.
1404. Same.
1405. Same.
1406. Slate; west side of Kennebec—eight miles above Bingham.
1407. Same.
1408. Same.
1409. Slate; Miller's Quarry, Barnard.
1410. Same.
1411. Slate; Palmer's Quarry, Barnard.
1412. Slate; Miller's Quarry, Barnard.
1413. Slate; Foxcroft.
1414. Slate; west side Kennebec—eight miles above Bingham.
1415. Slate; Miller's Quarry, Barnard.
1416. Same.
1417. Same.
1418. Slate; Williamsburg.
1419. Same.
1420. Same.
1421. Slate; Quanlan's Quarry, Pushaw Lake.

Fossils of the Transition Series.

1422. Spiriferæ in compact greywacke; half a mile west Parlin Pond, Canada Road.
1423. Shells found in a boulder; four miles south Kennebec Forks.
1424. Terebratulæ in compact greywacke; near Parlin Pond, Canada Road.
1425. Turritella, terebratulæ and avicula, in compact greywacke; one half a mile east Parlin Pond, Canada Road.

1426. Terebratulæ in compact greywacke; near Parlin Pond, Canada Road.

1427. Same.

1428. Terebratulæ.

1429. Fossil shells.

1430. Terebratulæ in compact greywacke; one half a mile west Parlin Pond, Canada Road.

1431. Terebratulæ and avicula in compact greywacke; one half a mile west Parlin Pond, Canada Road.

MINERALS AND ORES.

1432. Quartz crystals; Livermore.

1433. Rose quartz; Albany.

1434. Quartz; H. Stinchfield, Danville.

1435. Granular quartz; B. Mathews, Liberty.

1436. Same.

Obs. This mineral occurs in great abundance at Liberty, and can be used to great advantage in the manufacture of glass.

1437. Strass or flint glass.

1438. Crystal glass, from Liberty quartz.

1439. Glass made of granular quartz; of Liberty, Me.

1440. Bohemian glass; Liberty quartz.

1441. Blue quartz; Bucksport. (Loose.)

1442. Quartz; Dixfield.

1443. Quartz; Mt. Abraham.

1444. Mica and green tourmaline; Paris.

1445. Feldspar; Lewiston Falls.

1446. Smoky quartz; Mt. Fuller, Boothbay.

1447. Quartz; Solon.

1448. Milk quartz; Mt. Blue.

1449. Quartz; Albany.

1450. Iron in quartz; Abbot.

1451. Milky quartz; Bangor.

1452. Feldspar and quartz; Paris.
1453. Ferruginous quartz rock; Forks Kennebec.
1454. Feldspar; Tumble-down Dick Mt., Peru.
1455. Feldspar and quartz.
1456. Feldspar; Bog Pond, Poland.
1457. Compact feldspar—(loose); Phillips.
1458. Feldspar; Bog Pond, Poland.
1459. Feldspar; Rumford.
1460. Staurotide in mica slate; Windham.
1461. Staurotide in mica slate; Winthrop.
1462. Staurotide in mica slate; Windham.
1463. Staurotide in mica slate; Mt Abraham.
1464. Staurotide in mica slate; Winthrop.
1465. Same.
1466. Staurotide in mica slate; Farmington.
1467. Staurotide; west side river, Phillips.
1468. Beryl; Albany.
1469. Fragment of beryl; Albany.
1470. Beryl; Albany.

Obs. Small crystals of this mineral are called the emerald, and much used in jewelry.

1471. Andalusite; Bingham.
1472. Andalusite; Mt. Abraham.
1473. Andalusite; Bangor.
1474. Labradorite; H. Batchelder, Union.
1475. Black tourmaline; Waldoborough.
1476. Hornblende; Raymond.
1477. Same.
1478. Feldspar and mica; Lewiston Falls.
1479. Tourmaline in quartz; Lewiston Falls.
1480. Black tourmaline in feldspar and mica; Paris.
1481. Sahlite; Rumford Point.
1482. Sahlite; Rumford.
1483. Jasper; Bristol.
1484. Jasper; Salem.

1485. Jasper; Phillips.
1486. Jasper breccia; Eddington. (Loose.)
1487. L. feldspar; Nobleborough.
1488. Spodumene; Windham. (Loose.)
1489. Protogene; Winslow.
1490. Chlorite; Raymond. (Loose.)
1491. Macle; Mt. Abraham.
1492. Nodule pyrites; Morton Road River.
1493. Lepidolite; Paris.
1494. Andalusite; Bangor.
1495. Andalusite; Bingham.
1496. Epidote; Raymond.
1497. Novaculite; Varnum, Temple.
1498. Mica; Tumble-down-Dick Mt., Peru.
1499. Mica; Paris.
1500. Garnets; Rumford Point.
1501. Same.
1502. Garnets and pargasite; Rumford.
1503. Garnets in limestone; Rumford Falls.
1504. Garnets in granite; Lewiston.
1505. Garnets; Strong.
1506. Chlorite; Cross Isle, Machias.
1507. Vase, made of chlorite; Cross Island, Machias.
1508. Deorite; Phillips.
1509. Crystals of iron and arsenical pyrites; Corinna.
1510. Crystals of iron pyrites; Peru.
1511. Crystals of iron pyrites; Waterville.
1512. Compact red sandstone; Bay Chaleur.
1513. Bog iron ore; A. Hinds, No. 4, 11th Range.
1514. Bog iron ore; J. Lamb's, Argyle.
1515. Bog iron ore; Rogers, Dover.
1516. Bog manganese; Dover.
1517. Same.
1518. Native copperas; S. Morrill, Dixfield.
1519. Magnetic iron ore; Sandy River, Phillips.

1520. Magnetic iron ore; Sandy River, Phillips.
1521. Magnetic iron ore—boulder; Phillips—vein in granite.
1522. Magnetic iron ore; Davis, Raymond.
1523. Iron ore; D. Patrick, Patricktown.
1524. Yellow ochre; Wm. McCobb, Bristol.
1525. Same.
1526. Bog iron ore; A. Hinds.
1527. Bog iron ore; I. Miller, Union.
1528. Bog iron ore; Wm. McCobb, Bristol.
1529. Bog iron ore; A. Hinds, Dover.
1530. Bog iron ore; Proctor, Winslow.
1531. Bog iron ore; J. Lufkins, Rumford.
1532. Bog iron ore; E. Merrill, Andover.
1533. Bog iron; Robinson's, Foxcroft.
1534. Bog iron ore; Oak Hill, Turner.
1535. Bog iron ore; between Old Town and Argyle—loose.
1536. Bog iron ore; Starrett, Warren.
1537. Bog iron ore; H. Newton, Andover.
1538. Bog iron ore; A. Kimball, Bucksport.
1539. Bog iron ore; E. Merrill, Andover.
1540. Bog iron ore; Churchill's, N. Portland.
1541. Bog iron ore; J. Lamb's, Argyle.
1542. Bog iron ore; Greenbush—loose.
1543. Bog iron ore; Wyman's Hill, Farmington.
1544. Bog iron ore; Tollman, Thomaston.
1545. Bog iron ore; Rodger's, No. 2, 10th Range.
1546. Bog iron ore; Chase, Dixfield.
1547. Bog iron ore; Bryant, Anson.
1548. Bog iron; David Leighton, Harmony.
1549. Bog iron ore; M. Bradbury, Greenwood.
1550. Bog iron ore; Argyle.
1551. Lead ore; Jenning, Dexter.

Obs. In the above specimen, there is a very small per cent. of silver, but the veins are so narrow that the ore cannot be worked to advantage.

1552. Black blende; near Saw Mills, Bingham.

1553. Plumbago; west side river, Farmington.

1554. Plumbago; Holman's, Dixfield.

1555. Lead ore; Holt, Rumford.

1556. Plumbago; Phillips.

1557. Black lead; D. Holt, Rumford.

1558. Galena; near Saw Mills, Bingham.

1559. Pipe clay; Washington.

1560. Blue clay; Avon.

1561. Clay; Argyle.

1562. Same.

1563. Peat; J. Foster, Avon.

1564. Same.

1565. Peat; from the farm of Elias Phinney, Lexington, Mass. Sells for $8 per cord.

1566. Corn, raised with peat compost—seventy five bushels to the acre; planted from the tenth to the twentieth of May—ripe from twentieth of August, to the first September; farm of Elias Phinney, Lexington.

ERRATA IN THIRD ANNUAL REPORT ON THE GEOLOGY OF MAINE.

Page 2, 13th line from bottom for *forbade* read *forbad.*
32, 4th line from top for *mountain* read *mountains.*
69, 8th line from top after *being* insert *of.*
92, bottom line for *lower* read *upper.*
97, 14th line from top for *draftsmen* read *draftsman.*
138, 13th line from bottom for *indigenus* read *indigenous.*
139, 8th line from top for *are* read *were.*
139, 11th line from bottom for *stigmaricœ* read *stigmaricæ.*
141, 10th line from bottom for *sifted* read *silted.*
144, 11th line from top for *smelting* read *smelling.*

ERRATA IN CATALOGUES APPENDED.

No. 191, for *chrystalline* read *crystalline.*
209, for *crytalized* read *crystalized.*
227, first word should be *trilobite.*
360, (obs.) after *mixed with* insert *lime and,* and after ; but dele *with lime.*
379, *et seq.* for *Presumpscot Falls* read *slide.*
468, (obs.) *dele* ("*it is also used for making a green dye.*")
776, (obs.) for *years* read *days.*
885-6, for *praze* read *prase.*
1181, for *olivem* read *olivine.*
1228, for *Seven Mill Brook* read *Seven Mile Brook.*
1492, for *Road River* read *Roach River.*

ERRATA IN BAROMETRICAL TABLE OF HON. DANIEL SEWALL.

Dec. 4, column of thermometer—sun set—for 22 read 24.
12, " " " " " 22 read 24.
13, " " " " " 38 read 26.
31, " " " " " 34 read 36.
Jan. 8, " " " (attached) " " 48 read 45.
10, " " Wind, " N. read W.
12, " " attached ther. " " 31 read 37.
15, " " Barom. " " 29.58 read 29.68.
24, " " Ther. sun rise, " 9 read 19.
" " " Barom. sunset, " 40 read 30.
Feb. 22, " " Barom. sunrise and sunset, insert 29 inches.
24, " " Ther. 1 P. M. insert 35.
Mar. 4, " " " sunset—for 28 read 36.
6, " " Barom. sunrise, " 29.65 read 29.60.
7, " " Weather—for rain read snow.
9, " " Ther. sunrise—for 15 read 25.
28, " " " 1 P. M. " 38 read 31.
29, " " Barom. " and sunset, insert 29 inches.
April 5, " " attached Ther. sunrise—for 30 read 39.
27, " " Ther. sunset, " 51 read 53.
May 13, " " Barom. sunrise, " 86 read 80.
June 15, " " Ther. 1 P. M. " 82 read 79.
30, " " attached Ther. sunrise, " 61 read 65.
July 7, " " Ther. sunset, " 57 read 74.
Aug. 5, " " " sunrise, " 30 read 62.
" " " " " sunset, " 43 read 74.
Sept. 2, " " " sunrise, " 59 read 49.
Oct. 12, " " Barom. sunset. " 84 read 89.
28, " " " 1 P. M. " 29.98 read 29.95.
Nov. 7, " " " " " 30.41 read 30.45.
28, " " Ther. " " 42 read 22.
26, " " " " " 39 read 25.
27, " " " " " 37 read 27.
30, " " " sunset, " 30 read 34.

IN REV. SOLOMON ADAMS' TABLE.

Aug. 17, column of remarks—strike out "clearing off."
Sept. 20, " " " " "chilly."