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CONTRIBUTIONS

TO THE

HISTORY OF DERRYFIELD,
NEW HAMPSHIRE.

TOPOGRAPHY AND LANDSCAPE

AS MODIFIED BY TORRENTS FROM MELTING ICE-FIELDS, TOGETHER
WITH SOME ACCOUNT OF EARLY FLOODS AND OTHER
LOCAL EVIDENCES OF A GLACIAL EPOCH.

BY WILLIAM E. MOORE.

A PAPER READ BEFORE THE

MANCHESTER HISTORIC ASSOCIATION.

PART I.

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TO THE

HISTORY OF DERRYFIELD.

BY WILLIAM E. MOORE.

CHAPTER I.

PRELIMINARY — LANDMARKS — ROCK RIMMON — THE PINNACLE — MERRIMACK — PISCATAQUOG — BLACK BROOK — COHAS — MASSABESIC LAKE — SPECIAL FEATURES, ETC.

THE conscientious and self-respecting historian will always aim at relating not only the truth but the whole truth. Histories of Derryfield have been written, but none of them began at the beginning. It does not need to be added that very much was omitted.

The present undertaking will give some account of pre-historic times and will be brought down to date. The whole period covered embraces more than a thousand centuries — how much more cannot with certainty be computed. In the presence of this time-problem the wisest are ignorant, since the facts with which we have first to deal refer to times so remote as to make ancient history a tale of yesterday. The story to be related in these opening chapters relies for evidence upon no witnesses — there were none — neither upon myth, legend or tradition. Our sole authorities are certain eloquent “sermons in stones” and sundry decipherable “books in the running brooks.” These, however, supply ample and conclusive testimony.

All the available sources of information will be examined, and the animal, vegetable and mineral creation interrogated. No stone will be left unturned, no field unploughed, no plant or animal permitted to escape.

LANDMARKS.

For the present we defer giving details of the early occupation and settlement of Derryfield and confine our view to some prominent features of its natural scenery and topography. To present these in intelligent order it will be necessary to broaden our horizon to include the entire landscape, from the highlands on the east to the mountains rising west of the Merrimack.

From the river valley the ground ascends rapidly at first, then broadening into an extensive and nearly level plain, and again mounting abruptly to the height of land in the eastern foreground. Here the chief elevations are known as Wilson, Bald, and Oak or Heath-Hen hills. From these highlands a magnificent panorama salutes the eye, and as the sun illuminates the picture a thousand points of splendor punctuate the wide and varied scene.

To the north may be seen Mt. Belknap and the Gilford mountains, as well as a portion of the Ossipee and Sandwich groups, while with favoring conditions glimpses of the Franconia range may be seen without a glass. To the northwest is a distinct view of Kearsarge and Ragged mountains, while in Vermont the distant crest of Ascutney breaks the line of the horizon. Westward and trending south we are confronted with Crotchet and Temple mountains, dominated by Pack and Grand Monadnock, the blue lift of Wachuset in Massachusetts closing the grand sweep as if of a hemisphere.

But these, with others scarcely less conspicuous, form only the background of the picture, for nearer and in front stand the Uncanoonucks and Joe English, flanked by the Dunbarton, Mount Vernon and Lyndeborough ridges, while nearer still are the rounded slopes of Hackett, Shirley, Scribner's, and Yacum

hills, with a host of lesser eminences completing the details of a picturesque landscape, which for quiet and restful beauty is unrivalled in southern New Hampshire.

Ancient Derryfield included the whole river front, from above the falls at Amoskeag on the north to below Goffe's falls on the south, and the mile-limit to the east crossed the summit of Wilson hill.

ROCK RIMMON.

Directly west of Amoskeag falls, upon a level plateau extending from the ancient river terrace, Rock Rimmon lifts its solid shoulder of gneiss above the plain. This rock is an object of great interest, attracts many visitors, and offers a most superb view of the Piscataquog and Merrimack valleys. The easterly escarpment is a sheer and inaccessible precipice of one hundred and seventeen feet, the crest reaching an altitude of more than three hundred feet above the bed of the river.* The summit is easily reached from the western and northern slopes.

THE PINNACLE.

Eight miles away to the north, on the west bank of the Merrimack, is another bald and rocky peak, mounting also from a terrace-plain, rising even higher than its Derryfield rival. Just west and touching the base of the Pinnacle is a small lake. The water is very deep, is popularly believed to have no bottom, and in area and contour is said to exactly match the outline of the Pinnacle itself. It has been contended that this great mass of rock was lifted bodily from the bed of the lake and the hole afterwards filled with water. When the Pinnacle slides back to its old quarters we may the more readily assent to this theory. A substantial observatory has been erected upon the summit, from which exceptionally fine views may be had.

* The exact figures, taken from the field-notes of the City Engineer, are as follows: Top of rock above city elevation, 296.35 feet; base above the same level, 179.83 feet, and about 95 feet above low-water mark at Amoskeag eddy. Extreme height of rock, 116.53 feet.

THE MERRIMACK.

This river is now a continuous stream from its sources to the sea, but there is little doubt that the present valley was once filled with a great chain of lakes, extending from the Winnepesaukee on the north to an indeterminate point to the south, certainly as far as ancient Dunstable. The evidence in support of this view is conclusive and will be considered in detail hereafter. Along the course of the river the ancient terraces form a conspicuous feature.

THE PISCATAQUOG.

This river enters the Merrimack on the west bank, some two miles below Amoskeag falls. The valley extends in a north-westerly direction, passing to the west of Rock Rimmon. The old terraces on either bank are remarkable.

BLACK BROOK.

This considerable water-course has its source in the Dunbarton hills, twelve miles away, flows southeasterly and enters the Merrimack on the west bank a short distance above Amoskeag falls. The significant relation of this now somewhat reduced stream to our history will become more apparent as the record proceeds.

COHAS BROOK.

Aside from a number of inconsiderable brooks and rivulets, this is the only local water-way remaining unnoticed. It is the outlet of Massabesic lake and enters the Merrimack on the east bank, immediately below Goffe's falls. The foregoing, therefore, comprise all the principal water systems properly belonging to the Derryfield map, or which are of importance as relating to our present inquiry.

MASSABESIC.

Four miles to the east, and wholly within the bounds of ancient Chester, this fine body of water lies in a series of bays, so joined by necks and separated by headlands as to include a shoreline of not less than thirty-six miles. From this lake the great manufacturing city of Manchester derives its water-supply. The Massabesic is dotted with numerous islands and surrounded by highlands, conspicuous among them being a splendid rocky promontory on the Auburn shore, Minot's ledge, and the mountain in Chester familiarly known as the "Devil's Den." The old water-marks plainly show a much higher lake-level in a not remote period, the water then wholly covering the present highway and involving the out-lying meadows and lowlands. Several smaller ponds are found within the limits of ancient Derryfield, but none calling for more than passing recognition.

SPECIAL FEATURES.

Over and above the more prominent landmarks of the territory we have attempted to describe there are in addition a number of less conspicuous but even more striking points of interest. Chief among these are the following :

1. The great clay deposits about the Hooksett Pinnacle, and extending north, especially on the east bank of the river.
2. The enormous accumulations of sand upon the site of Derryfield proper.
3. The stupendous bulk of water-worn stones and gravel, high above modern water levels, in ancient terraces and moraines.
4. Certain remarkable instances of rock-wear performed by pre-historic streams.
5. Travelled blocks and rock-fragments transported from distant centres of dispersion.
6. Curious survivals of tropical trees and shrubs.

These, with added evidences of the work done by water in another age, will be considered in the proper place, when it will be shown that these wonderful monuments now bear mute but unimpeachable testimony to the existence of powerful and long-continued currents, flowing in so vast a volume as to make the proudest river of to-day a plaything. These propositions, with the facts referable to them, are as certain as anything in Deuteronomy, but we regret to say there are still otherwise intelligent people who refuse to believe them. The Agnostic claims that he can know nothing, and is aware of it; but even such an one is less difficult to convince than he who likewise knows nothing but has no knowledge of it.

Should it be desired to prove beyond question that New England was once the scene of volcanic activity, a piece of Roxbury pudding stone would be sufficient. So, in reference to our present purpose, any strip of land in New Hampshire, with hills and valleys and water-courses, will serve for illustration. Such a region was Derryfield—a territory one mile wide and eight miles long—ranging upon the Merrimack, and now the river-front of Manchester.

CHAPTER II.

THE AGE OF ICE-WATER — GRADUAL DISAPPEARANCE OF WATER — EARTH
MAKES STEAM — A WITNESS OR TWO.

Stated by the best obtainable evidence, this zone of ours has passed through at least one — possibly several — glacial epochs. We have now to consider only the last, the effects of which are still to be seen about us on every hand, when sought for with asking eyes.

The glacial and inter-glacial theories, as now understood and generally accepted, offer a wonderfully inviting field for study. No time will be lost in any discussion of the causes which made necessary an age of ice, and we shall now simply illustrate our history with some pictures showing the action of water, notably of streams proceeding from rapidly melting ice-fields.

We are tempted to record much matter not wholly within the scope of our story; we find it difficult to avoid asking and even attempting some answer to questions which troop about and beset us at every turn, but must be content with a few preliminary generalizations.

We may conceive Earth in its desolation, its first-born nakedness, before desire arose, absolutely without life other than that which may have been potential. We then reach a later period in which there was indeed life, existing in low forms, maintained with difficulty, intermittent and migratory. Still later we recognize a true life-bearing age, in which plants and animals inclusive of man appeared, moved and died.

To the foregoing it seems necessary to add that as there were life-bearing and non-life-bearing periods so there were non-life-producing as well as life yielding zones. Moreover, that climatic changes in the same zone rendered it now fit now unfit for life, and this entirely without reference to elevation and subsidence

or any other so-called cataclysmal operation of the crust of our planet. We intend to mean that the surface of solid Earth has been by turns so blasted with fire, devastated by ice, and deluged with water, that for long periods of time and large continental areas life of most sorts was out of the question.

Our orthodox friends will observe that we have no wish to ignore the flood; on the contrary, we insist upon several and as many rainbows as called for.

THE DISAPPEARANCE OF WATER.

We assert with some confidence that there was once much more water upon the surface of our globe than at present; the oceans were larger, the inland waters and streams of greater volume. Should this position need reinforcement let us admit, as it seems we must, that the earth once nourished no life, either animal or vegetable, and we have at once nameless millions of fluid tons to be somehow accounted for. Nor can it be claimed that the atmosphere then and always held moisture in suspension as now, or that absorption by percolation was a process of the earlier as well as of the later stages of creation. We are thus brought face to face with a curious problem: Without plants or animals, with an atmosphere totally rejecting it and the earth stubbornly declining to take it in at the pores, what was the status of water and where its abiding place?

THE EARTH MAKES STEAM.

Not to be entirely in the dark or beyond our depth, we may hint at the appearance and concede the existence of steam in the earlier cycles and must give it a place as one of the prime factors in the complicated processes of evolution, and to this day and hour a powerful agent in its still uncompleted operations, to which it is not our present purpose to refer. Our readers are expected to comfortably fix upon dates, either as to the appearance or duration of the phenomena described or to be

described in these opening chapters. We say only and stand by it, that there was fire, water and steam, fume of gas and molten flood, ice and snow, by turns and altogether, in such horrible fashion as no new nor old notion of hell can illustrate. If we seek for evidence, present and eloquent witnesses await our interrogations.

Let us first suppose such a state of things as has been hinted at, when there was this preponderating amount of surface water ; that following this period, in necessary sequence, the effects of evaporation and condensation succeeded ; that in simple obedience to cosmical laws milder methods of dissipation of energy were made possible, and that finally, during a period of intense cold, the whole or nearly the whole maximum mass of water at this parallel was converted into ice, and we are furnished with at least a tentative theory if not a working hypothesis.

One familiar with the testimony of the rocks and the environment of our modern water-systems cannot doubt that something much like this did happen ; that the very zone we now inhabit was once and probably more than once delivered over to the rigors of an arctic winter. In the light of the highest and best equipped recent scientific authorities no prime fact is more rightfully believed than that a large portion of this now temperate belt was once deeply covered with ice, and for so vast a cycle that it must have been regarded as perpetual by the people of that age, if people there were.

A WITNESS OR TWO.

Again without pausing to discuss the causes which brought about this condition, and not even considering the possibility of its recurrence, it assuredly follows that such an age of ice could not and did not come and go without leaving its mark.

During a long and busy life Prof. Agassiz accumulated a vast amount of information as to the agency of glacial action in producing geological effects. A student of glaciers for forty years,

and growing up in a glacial region, he was familiar with their phenomena. He says: "As soon as geologists have learned to appreciate the extent to which our globe has been covered and fashioned by ice, they may be less inclined to advocate changes of level between land and sea, whenever they meet with the evidence of the action of water."

Charpentier speaks of "perpetual snow-sheets and glaciers reaching the sea, as far down as the middle of the present temperate zone." Prof. Gunning characterizes the New England ice-sheet as "colossal." Prof. Newbury, of Columbia College, in a review of the evidence, reaches this conclusion: "The glaciers and snow-fields of Greenland stretched continuously down the Atlantic coast, to and below New York. * * * * The highlands of New England were completely covered and probably deeply buried in sheets of ice and snow." Prof. Dana says the ice-sheet was "semi-continental," and adds: "The height to which scratches and drift occur about the White Mountains proves that the upper surface of the ice in that region was 6,000 or 6,500 feet in height, and hence that the ice was not less than 5,000 feet in thickness over the whole of that part of northern New England. Facts also show that the surface height in southwestern Massachusetts was at least 2,800 feet, in southern Connecticut 1,000 feet or more." He again remarks that "the continent underwent great modifications in the features of the surface through the agency of ice," and points out in great detail the effects produced by glacial torrents.

It would be easy to multiply authorities, but since they can be consulted by questioners and doubters we will not forestall their studies. We assume, then, that there is no one prime fact in the past annals of our planet better proved than that of an age of continental glaciers. Evidence of this is increasingly convincing and may be found for the seeking upon nearly every square yard of the hillsides and valleys of New England.

Mankind are prone to treat with indifference that which is common, and the familiar aspect of our lakes and rivers, even of

the sea, provoke in us no commensurate idea of the stupendous force which water is capable of exerting.

Two hundred and odd years ago the earliest printed description of Niagara was given to the world by Father Hennepin. His account of this "vast and prodigious cadence of water" is a mixture of childish exaggeration and sober truth." But the sublimity of this great cataract, which discharges the enormous volume of eighteen million cubic feet of water every second, needs not the aid of description. About 9,800 cubic miles of fresh water—nearly half the quantity on the entire globe—are in the upper lakes, and all the water from these huge reservoirs makes the circuit of the falls, the St. Lawrence, the ocean, vapor, rain, and a return to the lakes in a little more than a century and a half.

But how shrinks this brief cycle of time and how fade the outlines of the scene when in imagination we stand beside the gigantic operations of the past. What some of those operations were let Mr. Clarence King tell in his own words. In alluding to volcanic activities he speaks of "what was once a world-wide and immense exhibition of telluric energy * * * distortions of the crust, deluges of molten stone, emissions of mineral dust, heated waters and noxious gases," and asserts that modern volcanic phenomena are "insignificant when compared with the gulfs of molten matter which were thrown up in the great massive eruptions" of the past.

He adds: "Of climatic catastrophes we have the record of at least one;" and in reference to a glacial period he sets forth the destructive effects of the invasion of our latitude by polar ice, and the devastating power of the floods which were characteristic of its recession. He contends that the modern rivers are mere echoes of their parent streams in the early quarternary age and utterly incapable, even with infinite time, to perform the work of glacial torrents. Citing the wonderful cañons of the Cordilleras, he says "they could never have been carved by the pigmy rivers of this climate to the end of time." In view

of all the ascertainable facts, Mr. King believes they present "perfectly overwhelming evidence that the general deposition of aërial water, as compared either with the phenomena of the immediately preceding period or with our own succeeding condition, constituted an age of water-catastrophe whose destructive power we only now begin distantly to suspect."

We have thus briefly cited the few foregoing authorities, in order to reinforce and fortify our interpretation of certain local phenomena, and to the end that our theories may not wilfully be divorced from fact. To the mathematician, the geologist, the astronomer—to those who walk without stumbling in the wide ways leading to the sun—we leave the task of explanation.

We call to our support at this point but one other authority, and quote from the works of Prof. Hitchcock, whose researches in the very field of our inquiry are precisely in point and entitle him to a hearing. He says: "The evidence is clear of the passage of the ice-sheet over all the higher New England summits." The facts illustrating this statement may be found in the geological reports for Maine, New Hampshire, Vermont and Massachusetts; for example as to Katahdin, the White Mountains, the Green Mountains, and for Greylock in the state last named. These reports are easily accessible. Prof. Hitchcock describes in detail the moraines and the upper and lower till, and of the former he says: "The capping of the hill is loose, the fragments are rough, not far removed from their source, commonly lying naturally." He concludes that these materials were held in the ice at the time of its melting. He also refers to extensive "sloping plains of gravel and sand, deposited by streams from melting ice acting upon the moraine." He concludes by remarking that "the numerous kames, elevated sand plains and river terraces came into existence with the copious floods of water resulting from the dissolution of the ice. The history of the ice-age is incomplete without a discussion of the events occurring in this great continental freshet."

Our own century beholds Earth, as if newly-awakened from a dream ; draped in beautiful garments, she has striven to hide the scars of her terrific struggle for life. Time has obliterated much ; but there still remain records of an age that is past, and the clear eye of science—the vision of him who seeks to know—may still see the ancient ice cap moving majestically over the spruce and fir-clad hills of our own northland.

In the tremor of forgotten earthquakes and the outburst of crater fires ; in the fall of dew and the music of rain ; in waiting flakes of snow or crystals of frost ; in the quiet creep of glaciers or the rush of enfranchised waters we recognize the play of the old terrestrial forces by which the frame-work of our Earth has been evolved.

CHAPTER III.

CONCERNING EARLY FLOODS.

There is at this day no excuse for descendants of our Derryfield ancestors not knowing that a literal river of ice once flowed down the now peaceful valley of the Merrimack. Its direction, volume and extent are mapped upon their rock-wrinkled homesteads. It crawled southward, grinding along at the rate of a foot a week—a mile in a century. It at some time halted, for how long we may only guess, and then began the terrible retreat. The rate of recession is not so well determined, but was without doubt comparatively rapid, though probably arrested at various stages and for undefined periods. To judge from the wide-spread havoc to which this near section has been subjected there must have been a halt near us. We know—since we stand upon the scene of the event—that from the foot of this retreating, melting glacier, poured frightful down-rushes of turbid water, by whose action the landscape acquired its present characteristic features, and by which the surface materials of this region have been so strangely sifted and assorted.

The tourist of to-day who shall stand beside the source of the Arveiron, “who drinks in the sublime view at the foot of the glacier; he who beholds this marvel, glorious with icy portico, façade and pyramid, who hears at night the scornful roar of the Alpine flood,” may peradventure frame some dim conception of energies which seem to know no yesterday nor morrow. But greater things than these, which promised to flow forever, have passed away.

Let us come nearer home. Passing westward from the river let us climb the isolated ridge of Rock Rimmon—if, indeed, it be not also submerged—and from that point observe. To the west and trending northerly lies the valley of the Piscataquog;

to the east front, ranging north and south, the valley of the Merrimack, and between these the lesser valley of Black Brook. From the point of time we have chosen—a matter of seventy or eighty thousand years ago—these little resemble the peaceful landscapes with which we are now acquainted.

Three powerful, ice-fed streams, terrible in their energy, are forcing their way southward, carving channels as they move; bursting their banks, assaulting rocky barriers, raging, roaring, eroding; with counter and cross-currents, eddies, whirlpools, horrible, precipitous narrows, and tremendous rapids, forerunners of still more tremendous cataracts. Borne along and whirled hither and yon in the midst of these frightful torrents we see indistinguishable masses of debris and angular blocks of frozen clay, with an interminable procession of rifted fragments of inland icebergs, accompanied with stones and rocks of differing dimensions, from the pebble to the boulder. Add to this the gloom of a cloudy sky, the ceaseless fall of rain, the riot of winds, the song of the tempest. Try to picture the indescribable, continuous rush and turmoil of the elements, the intermittent thunder of the pounding ice and boulders, then turn to the shrunken rivers of to-day.

The figures of the transporting power of water are startling. We know the force is as the sixth power of the velocity; that is, by doubling the rate we increase the power sixty four times. To give concrete examples: A stream running at the rate of three inches per second will wear away fine, tough clay; with a velocity of thirty-six inches per second the current will remove angular fragments of rock from two to three inches in diameter. The latter rate is quite moderate—a little more than two miles an hour—and presents but a picture in little of the rapidity of our earlier floods. We have taken no account of the influence of gravity operating on descending slopes, and we may also call to mind the fact that rocks lose nearly one-third of their weight in water.

Let us now inquire in a general way what we find to be the environment of our typical New England river. At its sources we usually discover great rock masses, detached from the cliffs of the mountains. Along the course of the precipitous, tumbling torrent—the trout-water of the sportsman—we find immense boulders, more or less carved and water-worn, their angular projections rounded, their bulk diminished and lessened as they course down the rough miles of attrition. At the foot of the descent we shall find aggregations of smaller boulders, with cobble-stones and pebbles. He who wades and follows, rod in hand, the bed of one of these mountain tributaries may step confidently from one stone to another and find firm footing, rarely meeting one that turns under his tread. The reason is as simple as it is significant, for each of these detached rocks has been many times rolled over and wrenched from its lodgment until it has at length found the groove that fits and holds it.

Where two mountain streams unite we shall generally find a tongue of land, or rather a delta of stone, usually symmetrical in form and built of assorted layers of stones and pebbles, seemingly put together with the discrimination of design. These shining, parti-colored beds are the boulders in miniature. Still lower we find the smaller pebbles, gravels of varying fineness, then sand, and last of all mud or silt.

We can never view a bank of earth, laid bare by accident or design, exhibiting its curiously stratified layers, without referring to this sorting and sifting process, this violent picking and choosing of torrents, while we stand in wonder at the delicate threads of deposition laid almost tenderly in place by succeeding quiet waters.

We have space merely to mention other tremendous agencies which have contributed to the landscape some of its most rugged features. We can only now hint at the ruin caused by streams dammed by drifting ice, or by the accumulation of more permanent obstacles, but there should not be left out of account the

more terrible effects of land-slides choking the mountain gorges until the gathering waters burst the mighty barriers, carrying everything before them. That almost inconceivable havoc was not infrequently caused by these agencies our torn and ravaged plains attest. The White Mountains afford evidence of ancient land-slides in many places. The Willey slide, though not large, became widely known from the loss of life which accompanied it. The great slide in Waterville was the most extensive ever known in this region. An immense mass of loosened earth and rock was precipitated to the valley from the steep western slope of Tri-Pyramid mountain, the material covering acres in extent and reaching as far as Mad river. The writer has personally visited and examined the scene of this great land-slip. Within quite recent years a considerable slide occurred on Cherry mountain, to which excursion trains were run to enable the curious to witness the unaccustomed sight.

But by far the most striking and picturesque slide ever occurring in New Hampshire took place in the town of Albany, in the county of Carroll, only a few years since. The north side of Passaconaway mountain was cleft from peak to base, laying bare the solid granite bed for the entire distance. The slide is narrow at the top, gradually widening as it descends and comes down in a straight line until the foot-hills are encountered. Here the mass was sharply deflected to the west and forced into the valley of Downs's brook. The north slope of Passaconaway is uncommonly steep and is densely wooded to the summit. But every tree and rock, inclusive of every inch of the soil, was carried down, leaving the very core of the mountain as clean as if swept with a new broom. The brook-valley was completely choked up with earth and stones piled with trees in inextricable confusion, rising many feet in height, and for nearly three miles the banks of the stream were lined with the blackened trunks of great firs and spruces. The water rose incredibly and finally forced its way through, but a splendid trout stream was ruined.

The event occurred in the night and had no witnesses, but its horrible rumble and grinding roar shook the earth and was distinctly heard and felt by the inmates of houses more than five miles distant. Passaconaway — signifying Child of the Bear — rises to a height of more than four thousand feet and is the highest summit of the Sandwich range. The writer has repeatedly visited the locality and made himself familiar with the scene by climbing for a prudent distance up the slippery bed of this huge but unworked quarry. Viewed from the Swift river valley, commonly known as the "Great Interval," at a distance of some four miles by an air-line, the picture is magnificent. The great rock-floor appears as steep as the sides of a church roof, but the feat of climbing it has been successfully accomplished, and what is more astonishing and apparently incredible, several persons have ascended the summit by way of the "Birch Intervale Trail" on the south or Tamworth side, and safely walked down the slide to the foot. It is well that they walked; to run would be fatal, for once running there could be no stopping, and an attempt to put on the brake by lying down would be simply a changed mode of motion, as one would get about two miles of roll, with an accompaniment of bumps better imagined than described. In the exercise of an instinct quite common to many of us, we have quite decided to go down in a sitting posture, with a series of short hitches, which may consume time but will contribute to our peace of mind. A number of ladies have climbed Passaconaway, but none have made use of the rock-toboggan. This is reserved for the new woman.

Flowing from the east flank of Tri-Pyramid mountain and entering the Swift river a mile or more west of the base of Passaconaway is Sabbaday brook. Two miles from its mouth may be seen the finest waterfall in the White Mountains. It is a right-angled fall, the first plunge being to the north, the second to the east. At the foot of the upper fall is a large, bowl-shaped basin, some twelve feet in diameter. At the foot of the lower

fall is another basin, and leading from it is a deep flume cut in solid trap rock. In the white, rushing foam of this flume, in the summer of 1873, the writer caught his first genuine "rainbow trout." The surroundings of this waterfall add a gloomy grandeur to the scene. The deep gorge is enclosed by vertical walls of trap rock, the ascent to the top being up a natural stone stairway, the steps as sharply defined as if cut with a chisel. Some miles further up, the stream has been overwhelmed by extensive land-slides and for a mile or more is entirely buried. The two brooks referred to are mountain streams of the first order, with wide valleys and free water-courses, averaging from two to three rods in width, and flowing, the first for a distance of six and the second for more than ten miles of winding water.

The above, with many other features of great interest in this New Hampshire "garden of the gods" are little known, owing to remoteness of situation and difficulty of access, the distance from the nearest railway at Conway Corner being fifteen miles—the entrance between the frowning walls of Moat mountain and the peak of Chocorua. There is but one road by which to enter or return, and if one seeks a shorter way he must climb over the enclosing mountains. But woe to him who loses the trail, for there are thousands of acres of timber blown flat by hurricanes, the passage of which is next to impossible.

The foregoing, although removed from the immediate surroundings of our story, is given in cumulative support of what has gone before, and as furnishing striking instances of the powerful forces still reserved by nature.

We shall not fail to find along the Merrimack valley at every mile of its course just what we might expect to find, in the light of the previous considerations. To localize the inquiry, we may now see both above and below Amoskeag falls, notably on the west bank, vast mounds of water-worn and water-borne deposits, consisting of sand, gravel and cobble-stones, the latter ranging from a few inches to a foot or more in diameter, and as various

in composition as in size. These accumulations lie many feet above any high water mark of which record or memory remains. To be reckoned in millions of tons, they lie where they were left of old in the rocky peninsulas between the floods. We may find them at greater or less elevations, alternating with deposits of sand, earth or clay, now presenting beautiful banks with differing colored strata, or again in a rude aggregation of unassorted drift. Wherever found, and whether near or remote from existing water-courses, from which many of them are far removed, these terrace-like elevations tell us of the waters that brought them there.

A mile south of Rock Rimmon, passing over an elevated sand-plain, one comes suddenly to the brink of high bluffs, which as surely once looked upon a lake below them as Boar's Head looks upon the sea. The height, the waving contour-line following the shores of bays and inlets, the sunken river beds beyond and the shoals stretching between, all testify to the occupation and conquest of water in that sub-glacial era, of which so little is known, but concerning which so much still remains in records awaiting research and interpretation.

We know in a half-thinking way that a great city occupying the site of ancient Derryfield is built upon sand. How came it here? To this there can be but one answer: It was made in the first instance and fetched here by water, however much it may have since been tossed about by the wind or shovelled about by man. In a similar mood we carelessly tread beneath our feet in the concrete foundations of our public walks the stones worn smooth in the beds of the elder floods. Our forests grow, our harvests thrive upon soil leached and filched from the mountains, while the very walls that give us shelter are built of clay ground in the glacial mills and precipitated in the still waters of glacial lakes.

With the approach of summer the thoroughfares to the White Hills will be thronged with pilgrims. In the ceaseless but un-

recognized work carried on in the laboratories of nature, asking only time and patience, how many inconceivable changes have been already wrought. Time and patience—given these what wonders have been achieved in the brief span of human effort ; with these, nature will continue to supplement her tireless work until the hills that remain shall follow those which have gone before. Slowly but surely water is performing its allotted work—the rivers are removing mountains.

Let no false conclusions be drawn from the record, and no theory of unmixed evil be too hastily reached. Nature knows no wrath. Earth, rent and torn in its early struggle with titanic forces, succeeded to a period of rest and preparation. The ordeal through which she passed was not beyond the measure of her endurance, the baptism of water and fire was a consecration to a nobler use. Nothing is sweeter than the memory of hardship and privations passed ; our planet shivered in a wintry night, with rattle of driving sleet, a season of frowning skies, a burden of icy sheets and snow-piled plains ; but in the infinite reaches of time, healed and pacified, there came a spring of grace and glory, a summer of fruitful seed, a harvest of plenty. So, from the womb of appalling danger, has been begotten the last inheritance—LIFE.

In the menacing roar of the thunderous fall, in the rainbow of its mist, and in the sea that swallows all, we seem to behold a glorious trinity of Power, Law and Order ; we bow reverently before the majesty of that Creative Will which walked in darkness upon the face of the primeval deep, which brooded upon the face of the waters.

[A succeeding paper is in preparation, which will deal with added evidences and consider other effects of the epoch under discussion in the foregoing pages. It will form part second of the series and will be paged continuously from the present number. Among the topics reserved for discussion are "The Sand Area," the "Great Clay Beds," "Pot Holes and Rock Wear," the "Devil's Pulpit," etc.]